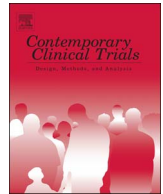




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Together We STRIDE: A quasi-experimental trial testing the effectiveness of a multi-level obesity intervention for Hispanic children in rural communities

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ABSTRACT

Background: Hispanic children are disproportionately overweight and obese compared to their non-Hispanic white counterparts in the US. Community-wide, multi-level interventions have been successful to promote healthier nutrition, increased physical activity (PA), and weight loss. Using community-based participatory approach (CBPR) that engages community members in rural Hispanic communities is a promising way to promote behavior change, and ultimately weight loss among Hispanic children.

Objectives: Led by a community-academic partnership, the Together We STRIDE (Strategizing Together Relevant Interventions for Diet and Exercise) aims to test the effectiveness of a community-wide, multi-level intervention to promote healthier diets, increased PA, and weight loss among Hispanic children.

Methods: The Together We STRIDE is a parallel quasi-experimental trial with a goal of recruiting 900 children aged 8–12 years nested within two communities (one intervention and one comparison). Children will be recruited from their respective elementary schools. Components of the 2-year multi-level intervention include comic books (individual-level), multi-generational nutrition and PA classes (family-level), teacher-led PA breaks and media literacy education (school-level), family nights, a farmer's market and a community PA event (known as *ciclovia*) at the community-level. Children from the comparison community will receive two newsletters. Height and weight measures will be collected from children in both communities at three time points (baseline, 6-months, and 18-months).

Summary: The Together We STRIDE study aims to promote healthier diet and increased PA to produce healthy weight among Hispanic children. The use of CBPR approach and the engagement of the community will springboard strategies for intervention' sustainability.

Clinical Trials Registration Number: NCT02982759 Retrospectively registered.

1. Introduction

Overweight and obesity among children are associated with an increased risk of childhood morbidity, such as type 2 diabetes [1,2] and cardiovascular disease [3], and has been shown to affect long-term health, including future adult obesity and morbidity. Within the United States (US), Hispanic children [4,5] bear some of the largest burden of the childhood obesity epidemic, and the disparities gap is even greater among Hispanic children in rural communities [5]. Obesity prevention interventions have been shown to promote healthier weights among

children, however, many take place in urban settings where resources are more available than rural settings [6–9]. To effectively address childhood obesity disparities among Hispanics, interventions that extend to resource-scarce rural communities are needed.

Obesity disparities in children may be attributed to a variety of factors; however, it is evident that the overall environment in which children, live, play, and interact has an effect on nutrition and physical activity (PA), and ultimately weight [10,11]. Community, schools, peers, and family as well as the media and food/beverage industry are all entities that affect the rates of childhood obesity [10,11]. For

Abbreviations: CBPR, community-based participatory research; STRIDE, Strategizing Together Relevant Interventions for Diet and Exercise; PA, physical activity; MVPA, moderate-to-vigorous physical activity; SED, sedentary; BMI, body mass index; DSQ, Dietary Screener Questionnaire; CAB, community advisory board; NCI, National Cancer Institute; NHANES, National Health and Nutrition Examination Survey

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example, inaccessibility to fresh fruits and vegetables, through full service grocery stores and places to engage in PA were associated with higher body mass index (BMI) among elementary school children [11]. Thus, interventions that address both children and their environment, that is, multi-level intervention, may be conducive to healthier diet and PA, and ultimately healthier weights [12,13].

Several intervention studies have successfully used multi-level approaches. They demonstrated that effective and sustainable interventions need to include community stakeholders, be guided by a theoretical framework, be longer than one school year, address multi-level predictors, and target children as they are beginning to establish their personal health behavior patterns [8,9]. These successful studies were uniformly in urbanized settings where resources are more available than rural settings [6–8,11]. Little research has been done to conduct and implement a community-based, multi-level intervention for rural Hispanic children.

A community-based participatory research (CBPR) approach builds on the complementary strengths and insights of community and academic partners to facilitate the development of interventions that are relevant for underrepresented groups and to maximize the effects of research addressing health disparities [14,15]. Together We STRIDE (Strategizing Together Relevant Interventions for Diet and Exercise) is a community-based, weight loss trial for rural Hispanic children that uses a CBPR approach. The primary objective of the Together We STRIDE trial is to test the effectiveness of the comprehensive, community-wide multi-level intervention at reducing BMI z-scores among Hispanic children living in a rural area. Secondary objectives are to test the effectiveness of the intervention on healthier dietary patterns and promoting physical activity.

2. Methods

Together We STRIDE is a parallel quasi-experimental trial with the goal of recruiting 900 children aged 8–12 years to test the effectiveness of a comprehensive, multi-level intervention on children's BMI z-scores, dietary intake, and PA using repeated measures (at baseline, 6-months, and 18-months). The multi-level intervention includes activities at the individual level, family level, school level, and community level.

2.1. Randomization

This quasi-experimental study includes two communities (one intervention and one comparison); both communities were matched in regards to town population, population density, number of elementary schools, and school student characteristics (standardized test scores, percentage of students eligible to receive free or reduced-price lunch, and school size).

2.2. Setting and population

This intervention study takes place in the Lower Yakima Valley of Eastern Washington State. In Washington State, much of the Hispanic population is concentrated in Yakima County. According to the 2011 census, the Lower Valley has a total population of about 100,000 people; roughly 65% are of Hispanic origin. Most of the Hispanic population in the Valley is Mexican-American (95%) [16].

2.3. Community-based participatory partnership

This study builds on more than 20 years of partnership between researchers and local community advisory boards (CABs), a group of community representatives who strive to promote health in their community. The CABs has collaborated with the Fred Hutchinson Cancer Research Center researchers in areas of cancer prevention and control, diabetes prevention and control, pesticide control, and most recently on obesity prevention among children. The Together We

STRIDE study CAB consists of a diverse group of community stakeholders including community-based organizations, school representatives, political figures, community health organizations, and community advocates. The Together We STRIDE study was built upon a community-wide needs health assessment of Hispanic children and their families in the lower Yakima Valley who identified childhood obesity as an issue of community interest. In addition, a pilot study that assessed community-wide, multi-level weight intervention strategies for underserved Hispanic children and their families was conducted recently and helped form the intervention for this project. Consistent with CBPR principles [14], identification of the intervention, the study design, and proposed evaluation and dissemination plans were conducted collaboratively between community and academic partners. The study also includes two community subcontractors who are serving as community investigators. The application of the nine core CBPR principles delineated by Israel and colleagues are being followed [14].

2.4. Conceptual framework and intervention

Together We STRIDE is grounded in the social ecological framework. The socio-ecological framework emphasizes the multiple spheres of influence on health and the dynamic interaction between the individual (child), family, schools, and community. Following a socio-ecological framework, the project is implementing a variety of activities at multiple levels of the child's environment. At the individual level, children will view comic books and posters that discuss the values of healthy eating and PA through story telling. At the family level, children and their families will participate in nutrition and PA classes to help them gain the skills to identify and prepare healthy meals and to participate in increased PA. At the school level, children will learn marketing practices of the food industry that leads to unhealthy eating and will learn how to incorporate PA during short intervals in their classrooms. Finally, at the community level, children will learn that the community cares about fostering healthy children. Taken together, the activities will have a synergy that provides children with constant, inescapable messages that healthy eating and PA are beneficial.

2.5. Interventions

The Together We STRIDE logic model depicts the hypothesized pathways of influence of the intervention on the continuum of obesity related outcomes (Fig. 1). The model illustrates how inputs, such as of the existing infrastructure and resources, may be related to the interventions, which may then be related to the short-term outcomes, including the children themselves, home/family environment, school, and the community. The short-term outcomes may be related to the intermediate outcomes of healthier nutrition and increased PA and ultimately will translate into healthier BMI.

2.5.1. Individual level

The Together We STRIDE study will distribute two annual comic books to children with targeted messages around healthy eating and engaging in PA. Stories will integrate the Go, Slow, and Whoa tool from Coordinated Approach To Child Health (CATCH) [17–21], a school-based program that promotes healthy eating and PA among children. This tool describes the list of healthful food choices (**Go**), those that should be taken in moderation (**Slow**), and food products to avoid (**Whoa**). The Go Slow and Whoa also will be adapted for PA. Two comic books will be distributed annually, one at fall and one in spring.

2.5.2. Family level

This study will offer multi-generational nutrition and PA classes to the families of participants. Each series will be eight weeks long and will cover seven different topics and a review session. Examples of topics are 1) discussions about values and health, 2) types of PA and ways to incorporate them every day, and 3) discussions about My Plate. Each

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