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Implementation of early childhood physical activity curriculum (SPARK) in the Central Valley of California (USA)

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Abstract

The aim of this paper is to describe the methodology applied to develop and launch the implementation of physical activity curriculum (SPARK) at several schools in the Central Valley of California. The SPARK Early Childhood Program is one of eight within the SPARK Coordinated School Health (CSH) model. This research try to create environments that promote healthful behaviors at school and in the community for both children and adults. Overweight and obese children are likely to develop serious health problems. Among children in the U.S., Latino children are affected disproportionately by the obesity epidemic.

Niños Sanos, Familia Sana (Healthy Children, Healthy Family) is a five-year, multi-faceted intervention study to decrease the rate of BMI growth in Mexican origin children in California’s Central Valley. This study is funded by the National Institute of Food and Agriculture of the United States Department of Agriculture, grant number 2011-68001-30167. The NSFS project consists of four major component interventions in the areas of nutrition, physical activity, economic and art-community engagement to induce behavioral change in our target population in order to achieve obesity prevention. SPARK Physical Education (PE) represents a paradigm shift in the traditional PE world. The SPARK programs are designed to involve all children, be more active, incorporate social skills, and emphasize both health-related fitness and sill development.

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1. Introduction

The prevalence of obesity disproportionately affects certain U.S. ethnic groups, including Latino-Americans. Among children and adolescent populations, obesity affects 21.2% of Latinos compared to 14% White non-Latinos (Ogden et al., 2012). Such differences suggest that more information is needed to assess childhood obesity risk and preventive factors in order to create culturally appropriate and sustainable behavioral interventions for high-risk populations (De la Torre et al., 2013).

In attempt to address the dearth of literature in the field of childhood obesity prevention for the growing Latino community and data suggesting that underlying community factors may impact these rates, we develop Niños Sanos, Familia Sana (NSFS), a five-year multifaceted intervention study targeting California’s Mexican-origin communities. The research goals include (a) identifying individual and environmental factors that influence food consumption patterns; and (b) generating new knowledge about community- and school- based interventions to reduce the rate of growth of BMI within Mexican-origin children. The behavioral intervention includes curriculum-based interventions in the community (preschool) and schools (K-2). A companion parent education and market-based (fruit and vegetable vouchers) intervention addresses the reality that parents make food choices for young children but may not have the resources to make healthy choices (De la Torre et al., 2013).

A major goal of *Niños Sanos, Familia Sana* is to reduce the rate of growth of childhood obesity among Mexican-origin children between the ages of three and eight by improving the economic capacity of low-income, Mexican-origin families, enhancing the nutritional skills of families, supporting the capacity of schools to more effectively provide Physical Education (PE) opportunities for children in preschool and K-2 settings, and providing community art programs that allow for nutrition and positive behavioral health messaging. Biannual anthropometric data, annual physical activity data and annual household survey data are collected of our sample population, which allow us to determine the impact of behavioral and community intervention factors on rate of growth of childhood obesity within our study (De la Torre et al., 2013) population. These data are compared to our comparison community that receives a nonnutrition community-based intervention.

Childhood obesity leads to lifelong struggles with weight, higher risks for cancer, cardiovascular disease, stroke, Type 2 diabetes, and can affect social and emotional factors .

Childhood obesity is such a national concern that the first lady, Michelle Obama, in 2010, led a push to change young children’s eating and exercise habits; stating that: “One in 5 children is overweight or obese by age 6”. She launched a huge campaign called Let’s Move to change the way a generation of children think about food and exercise and recommending 1 - 2 hours of physical activity throughout the day (Davis, 2007). (www.Healthykidshealthyfuture.org).

Despite recent evidence suggesting slight declines in low-income, child obesity rates in the United States, these trends are not shared equally across subpopulations and high rates of childhood obesity are still prevalent across the United States (Pan et al., 2012).

Based on the most recent National Health and Nutrition Examination Survey (NHANES), approximately one in six children and adolescents in the U.S., aged 2–19 y, are obese (Ogden et al., 2012).

Baseline weight data from the NSFS study (Fall 2012) are shown on the table below. Findings revealed that baseline BMI measures of NSFS children are well above the national averages.

Table 1. BMI measures of NSFS children

| Firebaugh and Golden Plains | Underweight | Normal | Overweight | Obese |
|-----------------------------------------|-------------|----------------|---------------|---------------|
| Children 2-4 years old N= 435 | N=7 (1.6%) | N= 219 (50.2%) | N= 89 (20.6%) | N= 120(27.6%) |
| National Average Children 2-5 years old | | | 14.4% | 8.4% |
| African American Children 2-5 years | | | 10.6% | 11.3% |
| Hispanic Children2-5 | | | 13.1% | 13.1% |

Firebaugh pre-schools and K-2nd grade teachers received SPARK physical education intervention from a SPARK trained physical education teacher. The project purchased K-2nd grade SPARK binders for teachers to help them integrate SPARK activities into the classroom. To familiarize the PE teacher to the materials, he attended a 2-day SPARK K- 2nd Grade training session in San Diego CA (De la Torre et al., 2013)

2. Method

2.1. Study design

The research to be conducted in the scope of this project is a five-year multi-faceted intervention, controlled, community-based trial. The research will both incorporate and inform best practices in delivering science-based interventions designed to influence behavior. The study has three phases: (1) setup, (2) intervention and (3) follow-up. The set up phase (Year 1) will include establishing an advisory council of parental, community, school staff, UCCE, and UCD stakeholders; tailoring the interventions based on stakeholder input; training teachers and promotoras; collecting the baseline information from the children and their parents; and assessing the purchasing behavior of the targeted population in order to establish the voucher system. The intervention phase will take place during Years 2-4. The follow-up phase (Year 5) *will not include any intervention*, but will continue data collection. The structured intervention has two main components, including (1) the nutrition education, physical activity and social marketing components, and (2) the voucher component. We recognize as a byproduct of the structured intervention that the participants will have the capacity to alter their environment to create a healthier community for their children. Thus we will provide qualitative assessment of this process through ethnographic observation and focus groups.

SPARK Curriculum is a research-based, public health organization of San Diego State University (disseminated exclusively by School Specialty, Inc.) dedicated to creating, implementing and evaluating programs that promote lifelong wellness. Each SPARK Program strives to foster environmental and behavioral change by providing a coordinated package of: Highly Active Content, On-site Teacher Training, Content-Matched Equipment, Extensive Follow-Up Support (De la Torre et al., 2013)

2.2. Subject eligibility and recruitment

Promotores are hired in both communities to facilitate recruitment of families and trained to conduct recruitment events and go house to house to recruit hard-to-reach families. Subject eligibility for this project is determined a priori by the USDA's National Institute of Food and Agriculture (NIFA) guidelines stated in the request for proposal. Eligible applicants for the study include children who fall within the ages of 3 to 8 years of age during the intervention period years.

To facilitate recruitment, all children in the same grade are recruited to meet ethical considerations of equal access to students from the same classroom. Children and their families are excluded if they are not interested in participating in the study, they move out of the district; they no longer have an eligible child living in their home, or do not comply with the completion of all survey instruments and anthropometric measurements. Families living within the Firebaugh-Las Deltas Unified School District (FLDUSD) are considered as the intervention group and those living in the Golden Plains Unified School District (GPUSD), which includes the town of San Joaquin, are considered participants in the comparison site (De la Torre et al., 2013)

2.3. Study instruments

Physical Education Program. SPARK (Sports, Play, and Active Recreation for Kids) PE was designed to be a comprehensive program for upper elementary students. The program was implemented in the two PES and two TT schools for 3 academic years (1990-93). A written curriculum guide identified the program philosophy and goals and included a yearly plan which was divided into instruction units with activity progressions within each unit (McKenzie & Rosengard, 1994). A main strategy to reach the program's fitness, motor skill, and activity goals was to promote high levels of enjoyable physical activity during classes; thus, lesson time was the focus of the current study. PE lessons were planned for 30-min segments to be conducted three times per week throughout the year. A detailed plan was provided for each PE lesson, which typically had two parts: health-fitness activities (15 min) and skill-fitness activities (15 min) (Mckenzie et al. 1995).

3. Results

3.1. School site intervention

SPARK Curriculum: The project manager (Dr. Whent) will in-service Kindergarten-through-third- grade teachers on how to integrate daily physical activities into their classroom lessons, using the Sport Play and Active Recreation for Kids (SPARK) Physical Education Program. SPARK was initiated in 1989 by San Diego State University as part of a grant from the National Institutes of Health to develop and evaluate a health-related PE program for elementary students. The current K-3 PE SPARK manual provides 16 chapters of age-appropriate activities, instructional materials and resources, including 10 instructional units. It is used by both elementary physical education specialists and classroom teachers and is aligned with National Association for Sport and Physical Education (NASPE) National Standards, (Dowda et al., 2005)

The CA EFNEP curriculum materials discussed above have not been evaluated in a controlled intervention to determine their effectiveness on changing parent behaviors related to child feeding in a Mexican-origin audience. In addition, the school-based curriculum has not been tested with Spanish-speaking children. A research component of this proposal will allow researchers to test the appropriateness and effectiveness of these curriculum materials within this community demographic.

3.2. Childhood Physical Activity

SPARK Physical Education (PE) represents a paradigm shift in the traditional PE world. The SPARK programs are designed to involve all children, be more active, incorporate social skills, and emphasize both health-related fitness and skill development.

This curriculum is designed to be a practical aid to elementary PE providers -both specialists and classroom teachers. The SPARK team considered many factors during development: the options and recommendations of curriculum experts, professional organizations, national and state guidelines and frameworks, Healthy People Objectives for the Nation, budgetary constraints, and the need for a user-friendly document that can be implemented in the "real world".

The original SPARK study was funded in 1998, by the Heart, Lung, and Blood Institute of the National Institutes of Health, to help reduce cardiovascular disease risk factors (e.g., obesity, high blood pressure, sedentary lifestyle) that often begin in childhood. Project SPARK, the successful research trial, evolved into the SPARK Programs, an organization dedicated to improving the quantity and quality of physical education for teachers and children everywhere. SPARK educators and researchers have been disseminating the Spark programs (Early Childhood, Elementary, Middle, and High School PE. After schools, and Coordinated School Health), created during and after the initial 5-years study, to schools throughout the world since 1994.

The SPARK Early Childhood Program is one of eight within the SPARK Coordinated School Health (CSH) model. To create environments that promote healthful behaviours at school and in the community for both children and adults, SPARK encourages teaching and reinforcing the five simple messages below with your students, their parents, and your colleagues on staff.

SPARK is a research-based, public health organization of San Diego State University (disseminated exclusively by School Specialty, Inc.) dedicated to creating, implementing and evaluating programs that promote lifelong wellness. Each SPARK Program strives to foster environmental and behaviour change by providing a coordinated package of:

1. Highly Active Content
2. On-site Teacher Training
3. Content-Matched Equipment
4. Extensive Follow-Up Support

Since 1989, SPARK has provided these "essential components" to over 100,000 teachers and youth leaders, representing many thousands of schools, organizations, and agencies worldwide.

Today, over 45 publications demonstrate the efficacy of SPARK'S coordinated approach to children's health. The SPARK Early Childhood (EC) Curriculum materials include:

The SPARK Manual

This manual begins with helpful introductory sections that help teachers understand the manual's components, where they are located, and how they can be used to instruct an effective SPARK EC Class. The manual contains more than 230 activities presented in 11 sections: One unit of Musical ASPAs (Active Soon As Possible) and 10 instructional units. The instructional units are placed in the manual in their suggested teaching order. Each SPARK EC unit presents easy to instruct lessons comprised of field- tested activities written in scope and sequence.

SPARKfamily.org Website

SPARKfamily.org is a password-protected website hosting effective digital tools to support your SPARK EC Physical Activity Program. Including:

- Introductory Sections
- Instructional, Resource, and SPARK Star Materials
- Video introduction of each unit
- Video clips of SPARK EC activities

3.3. Teaching spark early childhood

SPARK believes every preschool environment should provide children with both structured and unstructured physical activity (PA) time so every child accumulates at least 60 active minutes each day. A SPARK EC session is an example of structured PA because the time is scheduled, the lesson has specific learning objectives, and the teacher has pre-selected content and instructional strategies. Unstructured PA may be planned (e.g., scheduled activity break) but children usually have more choices of what to do, and who and what to play with. Unstructured PA fosters individual creativity, enables exploration, and allows children time to show they can play safely and cooperatively with others in social environments.

SPARK encourages that structured PA classes engage children in moderate to vigorous PA (MVPA) at least 50% of the session time. Moderate PA is the equivalent of a fast walk; vigorous PA is similar to a jog. Create a structured activity teaching schedule that shows when each teacher is planning to lead their SPARK EC class (e.g., "Monday, Wednesday and Friday from 1-2pm") And where it will occur (e.g., "Inside large group instruction area"). Post the schedule where all teachers can view it and attach a copy to the equipment cart. Creating this teaching schedule ensures each instructor has their own time, space, and the necessary equipment to lead effective SPARK EC lessons.

SPARK recommends teaching the units in the order presented beginning with Building Blocks, followed by Super Stunts, and so on.

It is important to teach Building Blocks in its entirety. However, after that, modification to the yearly plan may be necessary to respond to site-specific conditions and circumstances.

A goal of physical activity providers is to create a supportive environment in which children learn and practice positive social interactions that are physically and emotionally safe. SPARK recommends teaching social skills, not just during SPARK Early Childhood activity sessions, but throughout the day. With practice and gentle reminders, preschoolers will soon demonstrate positive social skills.

4. Conclusions

Physical activity (PA) is fundamental for developing motor skills and normal growth of children. It helps build muscles, strengthen bones, increases self-esteem and mood, increases learning, can decrease fatigue, and can prevent childhood overweight and obesity.

From birth, a child is learning how to control their body movements and how to interact with the world around them. This learning process is called motor skill development. One essential way to develop motor skills is participating in physical activity. It is during the preschool years that children improve the most in these skills.

Moderate PA is when the heart beats faster than normal and the child will breathe harder than normal, but still be able to talk without difficulty (brisk walking, light jog). Vigorous PA is when the heart beats much faster than normal and the child will breathe much harder than normal. The child may need to stop the activity in order to talk (e.g., running, jumping, skipping).

In Firebaugh only 60% (girls) to 80% (boys) get the recommended 1 hr/day according to the accelerometer data collected at baseline. What is an accelerometer? Show example of accelerometer and ask teachers if they would wear it for the next two weeks. Take off at bedtime: Our Post-doc Sara Schaefer will provide results in group mean form.

Numerous studies have shown that PA has positive influences on concentration, memory and classroom behavior. Engage teachers in discussion by asking: “Can anyone remember a time when they implemented physical activity in the classroom or on the playground and saw a difference in their student’s attention, behaviour or classroom performance?”

Some researchers found connections between children’s physical activity levels and reduced absenteeism and drop-out rates, and increased social connectedness.

- Research has shown that time spent in PE is **not** likely to detract from academic performance even when there is less time devoted to subjects as children are more receptive to learning and remembering information.
- We know that teachers are faced with increasing demands on your class time in order to meet new core standards and prepare their students for math and ELA assessments. However, even small PA breaks of 5 to 10 minutes can rejuvenate students such that they are better able to focus and engage in academic subjects.

Teachers can do to help children receive the recommended amount of physical activity per day with:

- Small bouts of PA the include 5-10 minutes activity breaks from classroom instruction.
- Transition time- hop to the next activity, march in place like a soldier, or walk like an animal when children are going to lunch, recess, etc.
- Center time- create an activity center stations in the classroom, such that and students must use different motor skill movements to go to the next next center station.
- Literary arts- read books that include movements or have children act out the story during story time.
- Music time- play music that prompts students to do different types of movements, encourage students to dance in place.
- Use simple activities that require little to no equipment (i.e. tag, toss-and-catch, incorporate furniture as obstacle course, and homemade games from recycled materials).
- Teach a lesson outside under a tree and incorporate physical activities into the lesson (i.e. Colors/shapes-jump on the red circle, blue triangle, etc.).

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