



Promoting physical activity in high-poverty neighborhood parks: A cluster randomized controlled trial



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ABSTRACT

Although physical activity can help mitigate or prevent multiple chronic diseases, most people in the U.S., especially high-poverty minority groups, engage in insufficient levels of physical activity. To test ways to promote more physical activity in high-poverty area public parks we conducted a randomized controlled intervention trial. After completing baseline measures of park-based physical activity using systematic direct observation three times/day each month for six months and assessing preferences for park programming among 1445 residents living within 1 mile of study parks, we randomized 48 parks in high poverty neighborhoods in the City of Los Angeles, California during 2013–2014 to four study arms: 1) free physical activity classes over a 6-month period, 2) a frequent user program where participants could win prizes based upon the number of visits they made to the park, 3) both the programs, and 4) neither one (control condition). We re-measured park use in 2014–2015 using the same methods during the six months the intervention programs were in operation.

A total of 2047 free park classes were offered attracting 16,718 participants. The frequent user programs enrolled 1452 individuals and prizes were awarded to 830. Residents in the two study arms with free classes were more likely to report being aware of and participating in park-based physical activity programs; however, overall observed park-based physical activity increased similarly across all study arms. The process evaluation uncovered several barriers to program implementation, including inconsistent scheduling of classes, partly due to safety concerns among instructors. Multiple social factors interfere with leisure time physical activity among low-income populations, suggesting modest interventions may be insufficient to overcome these issues. Although new park programs can attract users, new programs alone may be insufficient to increase overall park use in low-income neighborhoods at times when the programs are not taking place.

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1. Introduction

Parks are designed for moderate-to-vigorous physical activity (MVPA) and are the preferred site of leisure time exercise in many communities, particularly among high-poverty disadvantaged groups that cannot afford to join health clubs or may not have access to them (Cohen et al., 2007). Most localities maintain parks, and in urban centers the mean and median distance to a park is 0.7 miles and 0.5 miles, respectively (Wen et al., 2013). In Los Angeles,

55% of residents live within a half-mile of a neighborhood park (TPL, 2015).

Considering the high rates of chronic diseases and the importance of physical activity in their prevention and mitigation, one might expect neighborhood parks serving high-poverty populations to be especially well used. However, studies have documented lower rates of park use in high-poverty neighborhoods (Cohen et al., 2016; Cohen et al., 2010, 2012). Several factors have been associated with lower rates of park use in high-poverty neighborhoods, including smaller park size and less programming and fewer outreach and marketing efforts (Cohen et al., 2016; Cohen et al., 2010). In addition, in high poverty areas there are significant concerns about safety (Foster and Giles-Corti, 2008), and high crime rates are likely a deterrent to park use. Yet concerns

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about safety are not unique to high-poverty area parks (Leslie et al., 2010) and studies have indicated that safety concerns only partially explain differences in park use (Cohen et al., 2010, 2012). A national study indicated that parks in high-poverty neighborhoods also offered fewer programs and organized activities than parks in higher-income areas and that these factors largely accounted for their lower use (Cohen et al., 2016). However, the lack of park use and dearth of programming may contribute to a perception of lack of safety, creating a vicious cycle. Nonetheless, when parks in high-poverty neighborhoods offer events and activities, they can be just as busy as parks in higher-income areas (Han et al., 2014).

Given that limited park use in high-poverty areas is in large part attributable to the lack of organized and reliable portfolio of activities that meet the needs of local residents, we hypothesized that it would be possible to increase park-based physical activity and park use by offering more activities and programs. Moreover, we hypothesized that increasing programming could potentially activate the parks, promoting a generalization effect so that parks would be used more even when that programming was not taking place.

Programming can be introduced in several ways: scheduling classes for people to participate in activities at specific times or places or promoting more flexibility, so that individuals could participate at a time that is convenient to them. We anticipated that organized classes might be attractive to some, for example, with Zumba classes especially appealing to women who are less likely to engage in sports like basketball or soccer. Another approach, taken by many companies who want repeat visits from customers, is to provide incentives for people to continue to patronize the business. Thus, airlines offer frequent flyer miles, and coffee shops, car washes and restaurants sometimes offer discounts or products after a certain number of visits. We expected a system in which park users could earn points for visits and then trade them in (or redeem) for prizes might motivate local residents to visit their neighborhood park more frequently.

We conducted a randomized controlled trial (RCT) to test and compare whether additional park programming, a flexible incentive system based on frequent user model, or a combination of the two efforts would influence the pre-specified primary outcome, which was the amount of energy expended through physical activity in parks in high-poverty neighborhoods over a 6 month period. The secondary outcome was a change in the number of parks users. Because we also surveyed park users and local residents around each park, this study could be considered a cluster randomized trial, although the unit of analysis for the primary outcome was at the level of the park.

2. Materials and methods

The RCT is registered in <https://clinicaltrials.gov/> #NCT01925404 (enrollment flow diagram shown in Fig. 1). After considering 86 recreation centers located in low-income neighborhoods and eliminating 6 ineligible parks, we randomly selected 48 (60%), optimizing geographical dispersion to avoid contamination that could occur if parks were too close. Parks were considered ineligible if they only provided specialized services or were in isolated housing projects and use by the general public was prohibited.

The 48 parks were assigned by the project statistician (BH) to the four study arms using a blocked randomization procedure to ensure balance in all observed characteristics. Before the baseline observation in 2013–14, the 48 parks were first split into four cohorts with 12 parks in each cohort, so that 3 parks in each study arm started the intervention at a different season (summer, fall, winter and spring). Cohorts were checked on the following static

characteristics to achieve balance: park size, population density, percent households in poverty and race/ethnicity composition within a 1 mile radius. This staggered schedule helped account for potential seasonal variation in park use. At baseline we assessed aggregated weekly park-based energy expenditure and the number of users in each park, and conducted surveys of park users and neighborhood residents. Then the 12 parks in each cohort were randomized to one of the four study arms: (a) 4–5 free physical activity classes for adults per week (in addition to those already offered by the park), (b) a frequent user program for adults incentivizing park visits with lottery prizes up to \$200, (c) both free classes and the frequent user program, and (4) a control, business as usual condition (no new free programs offered). Balance in all static characteristics as well as the observed park use outcomes at the baseline were checked among the four study arms to ensure the randomization was appropriate. Given a previous park-based intervention which resulted in a relative 7–12% increase in park energy expenditure and use with a modest investment of \$4000 per park (Cohen et al., 2013), we limited the cost of the interventions not to exceed this amount, so it could be replicable if found to be effective.

Class offerings were informed by the baseline surveys previously conducted with randomly-selected park users and households within 1 mile of each park; and for each park, we created a list of activities that park users and residents preferred. In consultation with the park director and taking into account the availability of instructors within the City of Los Angeles Department of Recreation and Parks, a schedule of classes was developed. These included a variety of fitness classes, such as Zumba, aerobics, and line dancing. Classes were chosen to not duplicate or occur simultaneously with current existing classes in each park. An investment of \$3000 per park or about \$30 per 1-h class was provided to the City Department of Recreation and Parks to pay qualified instructors and schedule the classes.

For the frequent user program, we developed a brochure describing the prizes that park users could potentially win by visiting the park between 8 and 20 times per month. People who registered for the program simply had to sign in with a special ID number assigned at registration. Participants could earn one point per 24 h period and an additional five points for registering for a class the park offered. Promotional items including water bottles, back packs, t-shirts, and gift cards were distributed via lottery to eligible participants each month. Prize levels were categorized as bronze, silver and gold, with the higher-priced items requiring more points. Each month those who accrued 8 points were eligible for a bronze prize, 12 points a silver prize and 20 points a gold prize. A grand prize of \$200 plus four \$50 discount prizes for other park programs was available after 6 months to any park user who accrued at least 75 points during that period. Total costs for prizes were about \$1000 per park.

We marketed the programs similarly across each of the intervention arms. We provided 3 large colorful banners in the frequent user and free class arms and 4 in the combined arm, advertising the offerings. These were posted on exterior fences and recreation buildings to maximize their visibility. Each park also had flyers available with more details about each of the activities and when they would take place. Brochures for the frequent user program included pictures of prizes that could be won. Flyers were also posted on bulletin boards about the programs. In addition, we sent informational materials about the new programs to all local community and faith-based organizations, the local city councilperson's office and the local neighborhood council. We also shared details with the LA County Dept. of Public Health and they circulated the information among their local networks. In addition, where parks had an email list of park users, the information was sent as an email

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