Contents lists available at ScienceDirect

Preventive Medicine

journal homepage: www.elsevier.com/locate/ypmed

Review Article

Park characteristics, use, and physical activity: A review of studies using SOPARC (System for Observing Play and Recreation in Communities)

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A B S T R A C T

The System for Observing Play and Recreation in Communities (SOPARC) can obtain information on park users and their physical activity using momentary time sampling. We conducted a literature review of studies using the SOPARC tool to describe the observational methods of each study, and to extract public park use overall and by demographics and physical activity levels. We searched PubMed, Embase, and SPORTDiscus for full-length observational studies published in English in peer-reviewed journals through 2014. Twenty-four studies from 34 articles were included. The number of parks observed per study ranged from 3 to 50. Most studies observed parks during one season. The number of days parks were observed ranged from 1 to 16, with 16 studies observing 5 or more days. All studies included at least one weekday and all but two included at least one weekend day. Parks were observed from 1 to 14 times/day, with most studies observing at least 4 times/day. All studies included both morning and afternoon observations, with one exception. There was a wide range of park users (mean 1.0 to 152.6 people/park/observation period), with typically more males than females visiting parks and older adults less than other age groups. Park user physical activity levels varied greatly across studies, with youths generally more active than adults and younger children more active than adolescents. SOPARC was adapted to numerous settings and these review results can be used to improve future studies using the tool, demonstrate ways to compare park data, and inform park promotions and programming.

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1. Introduction

Public parks are widely available free or low cost resources for physical activity, with more than 9000 local park and recreation departments and organizations managing more than 108,000 public park facilities and 65,000 indoor facilities in the United States (US) (Godbey and Mowen, 2010). Identifying the demographics and physical activity levels of park users could inform park promotions and programming and be used to develop interventions to promote physical activity and reduce sedentary behavior through park use. The System for Observing Play and Recreation in Communities (SOPARC) tool was designed to obtain information on area users and their physical activity while in community environments and uses momentary time sampling to record observations (McKenzie et al., 2006; Active Living Research, 2016). When applied to park settings, a park is mapped and target areas are created to subdivide the park space for observation. Various characteristics about the target areas can be collected and observational scans of target areas are performed periodically to obtain information such as the number of parks users and their gender, age, race/ethnicity, and physical activity. A scan is a single observation or visual sweep from left to right across the target area.

Systematic observation can be used to assess the environmental contexts in which physical activity occurs, and in recent years many studies have used SOPARC to observe park use (McKenzie and van der Mars, 2015). Reviewing the SOPARC study methods can highlight ways to modify or improve the tool and may permit comparisons of data across parks, park systems, and studies. Additionally, reviewing SOPARC study results provides a way to summarize park usage (by demographics and physical activity level) across diverse geographic areas while ensuring quality and comparability in the underlying data collection. Thus, we conducted a literature review using the SOPARC tool through 2014 to describe the observational methods of each study, and to extract municipal or county level public park use overall and by demographics (age, gender, race/ethnicity) and physical activity levels across a variety of geographic settings.

2. Methods

Searches of PubMed, Embase, and SPORTDiscus were conducted to include only full-length observational studies published in English in peer-reviewed journals through December 31, 2014. Each search used the term SOPARC, both abbreviated and spelled out, and "System for Observing Play and Leisure Activity in Youth" (SOPLAY) combined with "park". In addition, we searched the reference lists of included studies for possible studies missed by the searches. The search results were described based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Liberati et al., 2009; Moher et al., 2009).

We excluded abstracts, conference proceedings, studies evaluating park-related interventions (since park use may change as a result of the intervention), studies using tools only other than SOPARC (such as the Environmental Assessment of Public Recreation Spaces (EAPRS) (Bruton and Floyd, 2014; Perry et al., 2011) or Public Open Space (POS) (Giles-Corti et al., 2005)), studies with walking path observations only (Jia and Fu, 2014), and studies using SOPARC that did not specifically report on park use (Han et al., 2013, 2014). We excluded studies that extensively modified the tool for use in large park areas, such as at hotel waterparks (Ramos and Ross, 2013), state parks (Whiting et al., 2012), and national parks (Walden-Schreiner et al., 2014). We also excluded studies that used modifications of SOPARC to only capture

activities outside of park use, such as joint use of schools (Lafleur et al., 2013) and youth sports (Cohen et al., 2014).

An abstraction tool was developed to extract the number of parks and target areas (subdivided areas of the park space), their location, park size, and observation frequency including number of days (weekend and weekday) and times per day. An observation period was defined as one full rotational assessment of a park, which included scanning, in sequence, all the target areas that comprised the park. Target area characteristics were also extracted, including whether the park was accessible (not locked or rented to others), dark, empty, and usable (physical activity can be performed here and the area was not excessively wet or windy), and whether or not there were activities that were organized (by personnel), equipped (with loose, non-permanent equipment), and supervised by park staff or other personnel. For park users, we extracted the number of people, demographics (age, gender, race/ethnicity), and physical activity level overall and by demographic characteristics, if reported. We focused on overall results, and if not available then we extracted results by season. According to the original SOPARC protocol (McKenzie et al., 2006), physical activity is collected as sedentary (lying down, sitting, or standing in place), walking (casual pace), or vigorous (greater than an ordinary walk). The original age categories identified in the SOPARC protocol were 0–12, 13–20, 21–59, and ≥ 60 years. We also abstracted reliability results from the included studies, specifically for number of people observed, age, gender, race/ethnicity, physical activity, and target area characteristics defined in the original SOPARC protocol when reported. We did not abstract reliability results documented during training, but rather focused on reliability during data collection. Each included article was abstracted by a primary reviewer and checked by a second reviewer, with disagreements resolved by consensus. Summary tables were created from the abstracted information and grouped by study since some projects produced more than one paper.

In order to compare across studies with different observational methods, we calculated two summary measures.

$$\begin{aligned} &\text{total number of people observed in a park per day} \\ &= \text{total number of people observed}/(\text{total number of study parks} \\ &\quad * \text{number of observed days} * \text{number of seasons}) \end{aligned}$$

(1)

$$\begin{aligned} &\text{total number of people observed in a park per observation period} \\ &= \text{total number of people observed in a park per day}/ \\ &\quad \text{number of observation periods} \end{aligned}$$

(2)

3. Results

3.1. Description of included studies

The search yielded 99 articles. Twelve additional articles came from other sources (i.e., reference lists of included articles). All were screened for inclusion (Appendix Fig. 1). In this review, we included 34 articles representing 24 distinct studies (Table 1). However, in one case we presented an earlier study that reported only on adults (Reed et al., 2008) as well as the extension of the study that reported only on youth (Reed and Hooker, 2012). The earliest study initiated observations in 2003 (McKenzie et al., 2006), when the SOPARC method was created, and the latest study started observations in 2013 (Roemmich and Johnson, 2014). While all studies employed SOPARC observational