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Physical activity levels and pattern of use for youth participants at a traditional aquatic venue

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ABSTRACT

In an effort to encourage youth to acquire recommended levels of moderate to vigorous physical activity (MVPA), we need to examine affordances available to enhance opportunities. Included for consideration should be built environments such as swimming pools which can have significant impacts through leisure service delivery to promote active lifestyles. For this study, The System for Observing Play and Recreation in Communities (SOPARC), was employed at a traditional aquatic venue during July and August in the Midwestern region of the U.S. Data was collected on three physical activity postures for youths age 4 to 18 along with variables including: (a) age, (b) gender, (c) physical activity posture, and (d) areas of participation termed *target areas*. A total of 3780 observations were taken into account during analysis. To detect differences among key variables, One-Way ANOVA and *t*-tests were performed. Descriptive results indicated that MVPA accounted for 70% of activity in the aquatic venue. Overall, female youths generated more MVPA within target areas compared to males, and youth as a single group consistently scored higher in all target areas as well as overall in MVPA. Significant differences were discovered in relation to several target areas. Findings from the study indicate that the use of a traditional aquatic venue can have positive impacts on youth physical activity and assist in meeting national standards for daily requirements of MVPA. It is also indicated that design features of an aquatic venue can play a role in determining levels of engagement and physical activity.

1. Introduction

Physical inactivity can be seen as a main determinant of ill-health (Giles-Corti and Donovan, 2002), thus efforts to promote opportunities for youth to become more active are paramount for prevention and intervention. In the United States, health issues associated with being overweight and obese as a result of physical inactivity remain top of mind for public health professionals. The result of physical inactivity is important due to its association with negative health outcomes, such as diabetes, high blood pressure, asthma, arthritis, high cholesterol, and general poor health status. This poor health status can take place regardless of age, gender, and education level (Mokdad et al., 2003). Today, physical inactivity still poses a substantial public health challenge that can be attributed to over 280,000 deaths each year in the United States (Allison et al., 1999), and while we know that engaging in physical activity plays a role in reducing depression and anxiety (Paluska and Schwenk, 2000; Dimeo et al., 2001), as well as in preventing cardiovascular disease, obesity, cancer, hypertension, osteoporosis and diabetes (Warburton et al., 2006; Lee and Skerrett, 2001; Fang et al., 2003; Kai et al., 2003; Williams, 2003); these conditions still exist on a large scale. From an intervention standpoint, research conducted by Van Dyck et al. (Van Dyck et al., 2015) concluded that moderate-to-vigorous physical activity (MVPA) was positively associated with preventing weight gain with MVPA which is denoted as the function of aggregating the estimated Metabolic Equivalents (METS) from energy expended in the moderate and vigorous categories (3.0 and 6.0 METS, respectively). Although youth obesity is prevalent worldwide, developed countries in regions such as North America and Western Europe have experienced particularly high rates (Nocon et al., 2008). Within research regarding the prevalence of obesity in school-aged youth from 34 countries, Janssen et al. (Janssen et al., 2005) concluded that increasing physical activity and decreasing the amount of television watched played an important role in preventing overweight and obesity in adolescents.

As part of the effort to educate the public on physical inactivity, entities such as the U.S. Department of Health and Human Services

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(DHHS) and American College of Sports Medicine (ACSM) have created guidelines for child and adolescent physical activity, but despite the fact that these guidelines are viewed as important, the reality remains that people must still be able to locate, access, and interact with built and natural environments to "play out" the movement necessary (U.S. Department of Health and Human Services (DHHS), 2008) These physical spaces provide opportunities for varying levels of physical activity through design characteristics, systems of management, and service delivery methods that are often found in the realm of recreation (Kaczynski and Henderson, 2007). Using recreation and leisure delivery systems can help to empower individuals to meet the recommended requirements for physical activity. The impact of these spaces are valuable and worth addressing as part of the larger picture in combating the problem with youth physical inactivity (Israel et al., 1998; Merom et al., 2003; Potwarka et al., 2008).

From a leisure context, youth today find themselves over extended, mostly as the result of engagement in organized sport (Matz, 2014). Although beneficial on many fronts, including providing opportunities for physical activity, we should not discount time set aside for informal recreation. Within the profession of recreation and leisure delivery, the area of informal recreation is represented by creating time for participants that is managed and supervised, but designed to allow for individual choice in order to maximize engagement through less structured activity and play (Mull et al., 2013).

1.1. Water-based aspects of physical activity

Water-based activities help provide youth with above average amounts of MVPA (Ramos and Ross, 2013). Beets, Weaver, Beighle, Webster, and Pate (Beets et al., 2013) discovered that water-based activities in a summer day camp setting were linked to a high proportion of vigorous type activity in youth. Despite research demonstrating that water-based physical activity is related to both moderate and vigorous physical activity, there are few studies addressing physical activity by aquatic venue type. In addition, the literature tends to address the negative impacts covering aquatic venues, such as chemical exposure, drowning, and the effects of sunlight in relation to skin cancer, while studies highlighting the positive outcomes are less popular (Middlestadt et al., 2015). One study highlighting the benefits of using an aquatic venue for physical activity was conducted by Ashbullby et al. (Ashbullby et al., 2013) where it was discovered that those with access to coastal beach water-spaces were encouraged to be more active by the nature of the environment. Thomson and Veneman (Thompson and Veneman, 2005) also discovered through a study of traditional swimming pools in two communities, that there were positive health impacts related to the physical, social, and mental dimensions of well-being. The information becomes more relevant regarding swimming pools when we consider that the average person in the U.S. swims in a pool six times per year, and that 41% of those are children and teens between the ages of seven and seventeen (*Interesting Fact and Statistics About Swimming Pools [Internet]. Visually US*, 2017).

Our study focused on how a traditional aquatic venue (swimming pool) may provide opportunities to produce levels of physical activity for youth participants in an informal recreational setting along with an examination of possible differences based on gender, two developmental age groupings, and specific areas of use. The research was a follow up to work performed by Ramos and Ross (Ramos and Ross, 2013) in which the setting of a waterpark type aquatic venue was examined.

For the purposes of this article, the term "aquatic venue" is coined to address the current description of aquatic spaces in the Centers for Disease Control's – Model Aquatic Health Code (MAHC) which includes swimming pools.(U.S. Centers for Disease Control and Prevention (CDC), 2016)

2. Methods

Data collection was performed using The System for Observing Play and Recreation in Communities (SOPARC). SOPARC is a tool that employs systematic observational data collection grounded in the framework of Momentary Time Sampling (MTS) to record selected variables on specific groups of individuals in order to gauge levels of physical activity within specified recreational spaces. SOPARC was chosen as the data collection tool due to its existing measures of reliability and validity, as well as being a non-intrusive measure, which is amenable to the Internal Review Board process when working with youth. For the purpose of this study the following variables were chosen for data collection: (a) age, (b) gender, (c) physical activity postures, and (d) target areas.

As prescribed by the creators of SOPARC, data collectors were trained using a multi-step process. Steps included: (a) tutorial through DVD produced by the Robert Wood Johnson Foundation and San Diego State University with built in practice scenarios, (b) on-site practice sessions, and (c) dual observer on-site reliability practice sessions. Rigorous and repeated training was crucial to ensure reliability. During practice sessions, conversations were encouraged to discuss training discrepancies that culminated with agreed upon criteria for coding variables.

In order to achieve a satisfactory level of reliability, two data collectors worked simultaneously to record observations. The same two personnel were able to collect all of the data needed with daily spot checks conducted for accuracy. After data collection was completed, a Pearson Product-moment Correlation was used to determine the reliability between the pair of data collectors. Acceptable *r*-squared outcomes from previous work with SOPARC are typically within the range of 0.70 and above (McKenzie et al., 2006).

A seasonal outdoor aquatic venue was chosen in the Midwest region of the United States. This venue was determined to meet the classification of a "traditional" type of swimming pool. Characteristics leading to this classification included: (a) built mainly for lap swim/competitive swimming and diving purposes, (b) does not vary widely in pool shape from a rectangle or square frame, and (c) does not contain any special play or spray type features. This would be in contrast to a waterpark, splash ground, wading pool, open water, or other types of known aquatic venues. The aquatic facility used in the study included a 10 lane/50 m lap pool (4 to 6 ft in depth), a diving well (13 to 14 ft in depth) with a series of diving boards and towers, as well as a shallow pool (3 to 4 ft in depth) used for instruction. Deck space surrounded all pools and also existed between pools as well. The north, south, and east sides of the facility were surrounded by fencing up to the deck, with the main building closing in the west end. It is important to note that although there is a traditional lap pool at the venue, during informal time, half of this space remains for lap swimming while the other half is opened as a space for recreational play.

The facility was situated on the edge of a university campus but services were available and delivered in the same manner as in a public recreation model. Membership at the facility was open to anyone on a daily pass, weekly pass, or season membership basis and open to youths of any age. Youths under the age of 16 were required to be accompanied by a parent or guardian at least 18 years of age.

In preparation for data collection, the aquatic venue was divided into major areas designated as *main target areas*. These were defined as areas deemed significant in nature either through design, function, or from the standpoint of feasibility for observation. Main target areas were then segmented into smaller more manageable areas for observation termed *sub-target areas*. Data collected from the observation of sub-target areas was aggregated to provide overall data for each main target area, with data from all main target areas aggregated to provide a view of the venue being studied as a whole. The following is a summary of main target areas and the number of sub-target areas within each: