Landscape and Urban Planning 178 (2018) 261–269

Contents lists available at ScienceDirect

Landscape and Urban Planning

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

Research Paper

Physical activity areas in urban parks and their use by the elderly from two cities in China and Germany

Yanping Duan[a,*], Petra Wagner[b,1], Ru Zhang[a,2], Hagen Wulff[b,1], Walter Brehm[c,3]

[a] Department of Physical Education, Faculty of Social Sciences, Hong Kong Baptist University, Hong Kong, P.R.China
[b] Institute of Exercise and Public Health, Faculty of Sport Sciences, University of Leipzig, Germany
[c] Institute of Sport Sciences, University of Bayreuth, Germany

ARTICLE INFO

Keywords:
Urban parks
Physical activity areas
Elderly
Park-based physical activity
Health enhancing physical activity

ABSTRACT

Urban parks have been recognized as important physical activity (PA) places for senior city residents. This research aimed to investigate PA areas in parks and their use by the elderly in a Chinese (Hong Kong) and a German city (Leipzig). PA areas and the PA executed by the elderly were observed in six parks in each city. Additionally, observers also surveyed overall PA, park-based PA and park accessibility of the active elderly in Hong Kong (HK) (n = 317, Mean age = 69.96, SD = 6.81), and in Leipzig (L) (n = 311, Mean age = 72.06, SD = 6.78) respectively. Results demonstrated that trails were the most often used PA areas by the elderly, where the elderly walk (in both cities) or cycle (only in L). Fitness stations and secure areas were more often found in HK parks, however, more lawn areas were found in L parks, making structured exercise possible. Sports fields were often used by HK elderly for sports and fitness exercising, but were rarely used by L elderly. Playgrounds were more often used by the HK elderly. In both cities, more males than female elderly were active and more often with low intensity. The elderly preferred accessing PA areas in parks by walking or cycling. Compared with L, the urban parks in HK were the primary locations for the elderly to engage in PA. Park planners should consider optimizing the functioning of PA areas to facilitate elderly physical activity in parks thus enhancing the health status of the elderly.

1. Introduction

Starting with the industrial revolution in Europe in the second half of the 19th century, urbanization has dramatically changed the world. As a recent report from the Worldbank (2017) indicates, globally, 54% of the population lives in urban areas. For example, about 56% of Chinese population and 75% of German population live in cities and this trend is expected to continue. Under such situations, the functions of parks integrated within these urban areas have been adjusted globally to function as the “ecological lungs” of the cities, as “social spaces” open to all citizens, and as “places for passive and active recreation” (Mertes & Hall, 1995; Thompson, 2002).

As physical inactivity has become a global pandemic among urban populations over the past few decades, urban parks are becoming more important for communities to engage in active and health-enhancing recreation. Especially, Health-Enhancing Physical Activity (HEPA) is a worldwide target that aims to reduce urban population’s non-communicable diseases and improve physiological and psychological health (Kohl, Craig, Lambert, Inoue, & Alkandari, 2012; Lee et al., 2012). It is proposed that an accumulated 120 min of at least moderate-intensity everyday life PA (e.g. brisk walking, cycling), exercise (e.g. fitness training, tai chi) and sport activities (e.g. tennis, volleyball) throughout the week (e.g., approximately 800 kcal/week) may be the lowest HEPA criterion for adults, including the elderly (Cavill, Kahlmeier, & Racioppi, 2006; Duan et al., 2013). As a result, focusing on physical activity (PA) areas in urban parks to provide opportunities for HEPA participation is an important task for park planning. Sallis et al. (2016) investigated 14 cities worldwide and showed that the number of public parks is positively related to urban population PA and as such, public parks have the potential to substantially contribute to PA.

An important and vulnerable target group for HEPA participation are the elderly. Moreover, “active aging” together with “healthy aging”

* Corresponding author at: Department of Physical Education, Hong Kong Baptist University, 8 On Muk Street, Shek Mun, Shatin, Hong Kong, P.R.China.
E-mail addresses: duanyp@hkbu.edu.hk (Y. Duan), petra.wagner@uni-leipzig.de (P. Wagner), zhangru@hkbu.edu.hk (R. Zhang), hagen.wulff@uni-leipzig.de (H. Wulff), walter.brehm@uni-bayreuth.de (W. Brehm).
[1] Postal address: A207/Haus 1, Jahnallee 59, 04109 Leipzig, Germany.
[2] Postal address: AAB 928, 9/F, Academic and Administration Building, Baptist University Road Campus, Hong Kong Baptist University, Kowloon Tong, Hong Kong, P.R. China.
[3] Postal address: Albert Schweitzer Str. 3, Institut für Sportwissenschaft, Universität Bayreuth, 95447 Bayreuth, Germany.

https://doi.org/10.1016/j.landurbplan.2018.06.009
Received 13 November 2017; Received in revised form 3 May 2018; Accepted 29 June 2018

for older adults is a critical challenge in many societies (Bauman, Merom, Bull, Buchner, & Fiatarone Singh, 2016; Whittaker et al., 2017). Recent research has revealed that the elderly represented at least 20% of the population in many countries, however, no more than 5% were park users (Cohen et al., 2016; Evenson, Jones, Holliday, Cohen, & McKenzie, 2016). To this end, urban parks can play an important role when encountering this challenge. Important preconditions are expected, including park proximity as well as attractive and motivating PA areas in parks, where the elderly can engage in their favoured PA. The results of a review by Evenson et al. (2016) and other studies (Chow, McKenzie, & Sit, 2016; Cohen et al., 2016), revealed that there is a general positive relationship between park proximity/accessibility and active park use, and that the elderly prefer being active in the morning, and their preferred park PA intensity is “low” or “medium”. Despite the variety of observations and classifications of PA areas, it seems that trails, walking circuits, fitness zones and exercise areas are park PA provisions frequently used by seniors (Chow, 2013; McCormack, Rock, Toohey, & Hignell, 2010).

Based on various Eastern and Western traditions in park design over the years (Yang & Volkman, 2010), the planning and integration of PA areas in urban parks also varies. For example, the Leisure and Cultural Services Department of the Hong Kong Special Administrative Region of China, has a specific sub-section that governs recreation facilities in public areas, such as park fitness stations for the elderly (Chow et al., 2016). In Western cities like Leipzig of Germany, comparable institutions do not exist. In addition, urban conditions such as the building and population density influence the characteristics of parks (Adams et al., 2014). From the perspective of “learning from differences”, it is important to determine the PA areas within parks and how the active elderly use these areas across regions. This will provide insights which are helpful for the design of urban parks and for the promotion of health-enhancing park-based PA for the elderly.

In order to develop the literature around preferred PA areas and park-based PA of the elderly, the following research questions are addressed in this paper: (1) What is the proportion of active elderly in relation to all active people in parks? (2) How do the active elderly access the parks? (3) What are the park PA areas and how are they used by the elderly? (4) What are the types, intensity, frequency and temporal characteristics of elderly park-based PA? And how does general park-based PA and moderate and vigorous park-based PA contribute to the overall PA of the elderly? (5) With respect to the questions above, can the differences be found between two cities that vary in culture traditions and urban conditions?

2. Methods

The current study was a descriptive study using various methods. An observation approach was used to explore park-based PA, PA areas and urban conditions from an external point of view. In addition, a survey approach was used to investigate park-based PA, overall PA behaviour and the perception of the PA environment (e.g., park accessibility) from the individual perspective.

2.1. Selection of cities and parks

Two cities were chosen in this study to represent various cultural traditions and urban conditions including Hong Kong in China and Leipzig in Germany. Hong Kong is a city with a population of 7.35 million (23% are elderly with 60 years and above), representing a high density of buildings and population (6958 inhabitants/km^2; 7.07 million people live in residential high-rises), and a mixture of international and Chinese cultures. Besides smaller recreation areas, 32 urban parks are managed by the Hong Kong Leisure and Cultural Services department, with a specific section that governs recreation facilities for the elderly. The mean size of the parks is 8.43 ha (park size range: 1.76–22.0 ha). Leipzig is a city with a population of 0.56 million (26% are elderly with 60 years and above), representing a relatively low density of buildings and population (1882 inhabitants/km^2, very few residential high-rises), and European culture. Besides smaller recreation areas, 31 urban parks are managed by the city authorities. The mean size of the parks is 11.52 ha (park size range: 0.4–42.4 ha).

In both cities, similar park selection criteria were used. Only accessible parks that were built in varied geographic locations, of different sizes, and with active areas were selected as study settings (Cohen et al., 2012; Kaczynski & Mowen, 2011; Ward et al., 2014). Parks under construction or renovation during study periods were also excluded (Ward et al., 2014). As a result, six parks were selected in each city. In Hong Kong, two parks were chosen from each of the three regions, with one park smaller than the mean size (8.43 ha) of all Hong Kong parks and another larger than the mean size. In particular, Victoria Park (19.00 ha) and Chai Wan Park (7.13 ha) are located on Hong Kong Island, Lai Chi Kok Park (17.65 ha) and Shek Kip Mei Park (8.00 ha) are in Kowloon, as well as Shing Mun Valley Park (10.73 ha) and Tsuen Wan Riviera Park (4.50 ha) in the New Territories. In Leipzig, two parks were selected from the center region including Friedenspark (17.00 ha) and Clara-Zetkin-Park (42.40 ha), while the remaining four parks were selected from eastern (Stadtteilpark Rabet, 5.80 ha), western (Volkspark Kleinzschocher, 40.00 ha), southern (Lene-Voigt-Park, 5.60 ha) and northern (Arthur-Brettschneider-Park, 7.30 ha) regions. Three parks in Leipzig were smaller than the mean size (11.52 ha) of all Leipzig parks, and three parks were larger than the mean size.

2.2. Observation

Prior to park observation, park maps were established by GmapGIS for all selected parks. PA areas were then allocated by observers, which included areas with facilities and equipment designed for PA, such as basketball fields, walking/jogging circuits or fitness stations. In addition, other areas where PA could be observed were also included, such as places for group fitness, tai chi or dancing. After identifying PA areas, these were marked and coded by observers on the park maps, as well as were taken photographs. In this manner, 145 PA areas in Hong Kong and 100 PA areas in Leipzig were addressed.

The systematic observation of PA areas was based on a modified version of SOPARC (System for Observing Play and Recreation in Communities; McKenzie, Cohen, Sehgal, Williamson, & Golinelli, 2006). Gender and age group (youth: 0–17 years; adults: 18–59 years; seniors: 60 years and above) of PA area users as well as accessibility of PA areas were observed and counted. In terms of PA intensity, sedentary behaviour such as sitting, standing, lying down, reading, eating, sleeping, card playing, and playing chess were not counted as any of the PA intensities. In this study, the classification of PA intensity (low, moderate, vigorous) was based on those developed by Ainsworth et al. (2011) which include codes, Metabolic Equivalent (MET) values of PA, and specific activities. PA with low-intensity (1.6–2.9 METs), moderate-intensity (3–5.9 METs), and vigorous-intensity ($>=$6 METs) were recorded. In addition, types of PA and the social situation of PA (groups or individuals) were added to the revised SOPARC sheet.

The revised SOPARC data were collected by six research assistants in Hong Kong and two research assistants in Leipzig. Before collecting data, all observers completed a 4-day training course which was offered by a research associate who works on the current project. In the first 2-day workshop, observers memorized the operational definitions of the behavioural dimensions and subcategories of these and then learned the data recoding procedures. This was followed by a further 2-day field practice observation. Training continued until an observer reached a high level of agreement (inter-observer agreement, IOA = 80%; intraclass correlation, r = 0.75, McKenzie et al., 2006). In Hong Kong, 6 observers were divided into 3 groups. Each group rated two of the six parks. In Leipzig, 2 observers rated all 6 parks. The observation was conducted at different time periods (8:30 AM, 11:00 AM, 3:00 PM and