

Open public spaces and physical activity facilities: study of systematic observation of the environment

Espaços públicos de lazer e estruturas para atividade física: estudo de observação sistemática do ambiente

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Abstract – The aim of this study was to investigate the quantity and quality of open public spaces (OPS) and physical activity (PA) facilities in Florianópolis, Santa Catarina. A descriptive survey was carried out in 2015 on the quantity, type and quality of OPS and PA facilities. The quality of OPS and PA facilities were assessed by systematic observation. A quality index of OPS (score -3 to 6 points) was divided into three categories, poor (category ≤ 0), average (0.1 to 2.9) and good quality (category ≥ 3). For analysis, descriptive statistics were used. Of the 214 OPS, the highest proportion was squares/gardens ($n = 128$, 59.8%). Of the 214 OPS, 59.8% were squares/gardens. About 51.9% ($n = 111$) of OPS had good quality. A higher proportion of comfort items obtained good quality, such as lighting (54.7%), trash cans (45.8%) and garden benches (55.1%). In more than 60.0% of OPS, there were no incivilities. Of the 377 PA facilities identified, 53.6% presented good quality and 13.8% poor quality. Playgrounds (29.4%), outdoor gyms (15.9%) and soccer fields/courts (14.9%) were more frequent, only the latter less than half had good quality (28,6%). There were no PA facilities in 29.0% of OPS. A higher proportion of OPSs have good quality, but less than half require improvement, comfort, less incivility and greater diversity of PA facilities. This may promote greater visits to OPS and leisure opportunities, including the practice of PA.

Key words: Healthy environment; Leisure activities; Motor activity.

Resumo – *Objetivou-se analisar a quantidade e a qualidade dos espaços públicos de lazer e estruturas para atividades físicas em Florianópolis, Santa Catarina. Realizou-se, no ano de 2015, um levantamento descritivo da quantidade, tipo e qualidade dos espaços públicos de lazer (EPL) e estruturas para atividade física (AF). A qualidade dos EPL e estruturas para AF foi avaliada por meio de observação sistemática. Um índice de qualidade dos EPL (escore -3 a 6 pontos) foi categorizado em três níveis, qualidade ruim (categoria ≤ 0), média (0,1 a 2,9) e boa (categoria ≥ 3). Para análise fez-se uso da estatística descritiva. Dos 214 EPL, maior proporção foi de praças/jardins ($n=128$; 59,8%). Em 51,9% ($n=111$) dos EPL tinham qualidade boa. Maior proporção de itens de conforto obteve qualidade boa como iluminação (54,7%), lixeiras (45,8%) e bancos (55,1%). Em mais de 60,0% dos EPL inexistiam incivildades. Das 377 estruturas para AF identificadas, 53,6% apresentaram qualidade boa e 13,8% qualidade ruim. Os parquinhos infantis (29,4%), academias ao ar livre (15,9%) e campos/canchas de futebol (14,9%) foram mais frequentes, apenas este último menos da metade apresentou qualidade boa (28,6%). Em 29,0% dos EPL inexistiam estruturas para AF. Maior proporção dos EPL tem boa qualidade, mas ainda menos da metade necessitam de melhorias, em conforto, menores incivildades e maior diversidade de estruturas para AF. Isso poderá promover maior visitação aos EPL e oportunidade de lazer, incluindo a prática de AF.*

Palavras-chave: Atividades de lazer; Atividade motora; Ambiente saudável.

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Received: August 21, 2017
Accepted: May 10, 2018



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INTRODUCTION

Open public spaces (OPS) are important attributes of the urban environment that favor health promotion^{1,2}. These spaces favor free access and promote benefits for mental health, environmental and economic sustainability³. Studies in high-income countries demonstrate that the presence and quality of OPS^{1,4} and structures for activities in these spaces can promote higher level of physical activity in different population groups⁵.

Thus, public policies could stimulate the adaptations of urban centers to stimulate the installation of environmental attributes, such as OPSs in order to contribute to the sustainable development of cities². This is necessary since, in low- and middle-income countries, public health expenditures are high due to physical inactivity, representing approximately US\$ 42.5 million in per year⁶. Analyzing the urban context of a city in its distribution of public goods and services intended for health promotion, such as parks, squares, allows us understanding how much a city is friendly to the population^{4,7}. In the context of Brazil, this analysis may favor more vulnerable groups, such as those with low income and lower levels of education, to enjoy leisure options in an active and safe way^{8,9}.

The city of Florianópolis is among the capitals of Brazil with the highest prevalence of people active in leisure time (43.9%), compared to São Paulo, with the lowest prevalence (30.4%)¹⁰. The quantity and quality of OPS, as well as the presence of physical activity facilities in spaces can have an important impact on the health of the population, such as adherence, maintenance and motivation to healthy life choices¹¹. Therefore, investigating the characteristics of these spaces may support municipal and national public policies for the planning of health-promoting urban environments².

Thus, this study aims to investigate the quantity and quality of open public spaces and physical activity facilities in Florianópolis.

METHODOLOGICAL PROCEDURES

Study site

The study was carried out in the city of Florianópolis, capital of the state of Santa Catarina, located on the coast of southern Brazil. Florianópolis has population of 421,240 thousand inhabitants, population density of 623.68 inhabitants/km² and human development index above the national average (0.847 in Florianópolis and 0.727 in Brazil)¹⁰.

Design, study characteristics and ethical aspects

A descriptive observational cross-sectional study of existing OPS was carried out between August 2015 and January 2016. The ethical procedures were approved by the Ethics Committee for Research with Humans of the Federal University of Santa Catarina (protocol No. 47789015.8.0000.012) and Coordination of Research of the Health area of Florianópolis.

Selection of open public spaces

Initially, OPSs were identified from information available at the Municipal Health Secretariat of Florianópolis based on the 2012 database. In order to update data, an interview with community health agents in health centers was conducted to identify spaces not included in the lists. Finally, OPSs were geo-referenced in the Google Earth program and visited by a team of trained evaluators. The types of OPSs were classified into squares/gardens (≤ 2 street blocks), parks/woods (≥ 2 street blocks), garden beds (central streets and avenues), community institutions and/or residents' association (containing open areas of free access to the population) and free areas, composed of seaside coastal regions.

Data collection

The presence and quality of OPSs and physical activity facilities were obtained through the method of systematic observation of the environment, through the Physical Activity Resource Assessment (PARA) instrument¹², also used in the Brazilian context^{9,13}. The instrument is composed of a checklist that evaluates the presence/quantity of physical activity facilities (courts and sports fields, outdoor gym, playgrounds, among others); comfort items (picnic tables, bathrooms, benches, lighting, drinkers, changing rooms and trash cans); and incivility items (broken glass, presence of animals, loose dogs, evidence of alcohol use, graffiti, scattered garbage, signs of vandalism and high grass). The quality of these items is established by a likert scale, ranging from 0 (negative pole) to 3 points (positive pole), thus: a) '0' represents the absence of structures; b) '1' presence of structures with poor quality (established for present items or structures, but that do not offer conditions of use due to poor state of conservation); c) '2' presence of structure with average quality (considered when the structure can be used, but needs improvement); and d) '3' presence of structures with good quality (those that have their characteristics preserved in good state of conservation). For the presence of incivility items, the likert scale is inverted, where '0' refers to the non-existence of incivilities; '1' the place is in good condition, but at least one sign of incivility is observed; '2' 2 to 4 incivility items are present and, '3' more than 5 incivility items are observed, revealing poor quality¹².

The number of OPS was counted according to classification of the space evaluated. For the quality analysis, a quality index of OPS was computed through the sum of the quality averages of physical activity facilities, the average quality of comfort structures, subtracted from the mean value of the presence of incivilities⁵. This index varied from -3 to 6 points, with positive values indicating higher quality of OPS and below zero greater presence of incivilities. For the purposes of analysis, this quality index was composed of three categories, being poor quality (category ≤ 0), OPSs with higher incivilities, average quality (0.1 to 2.9) and values above the median (category ≥ 3) good quality. For comfort quality, facilities were evaluated according to the same likert scale, adopting values '0' non-existent, '1' poor

quality, '2' average quality and '3' good quality. With regard to incivilities, for analysis only, the poles of the scale have been inverted and thus, the larger the scale value, the better the quality of the space.

The analysis of the presence/amount of physical activity facilities was calculated as the sum of the types of structures present in OPS. According to the description of the structure quality, the instrument's own likert scale was adopted, being '1' poor quality, '2' average quality and '3' good quality. After that, the presence of physical activity facilities by type of public space was analyzed, being distributed into four categories: "nonexistent", "presence of one facilities", "two facilities", "three facilities" and "≥4 facilities".

Statistical analyses

Data were entered in the Excel software by the double typing method to avoid errors in the process. Absolute and relative frequency distribution was used to describe the presence of OPS and physical activity facilities; quality of OPS (categories) and physical activity facilities (categories); comfort structures and incivilities, as well as measures such as mean, median, minimum and maximum for the presentation of OPS quality as a continuous variable. Analyses were performed by the SPSS software version 17.0.

RESULTS

A total of 374 OPSs were identified, and sites such as ecological trails ($n = 16$, 4.3%), non-habitable garden beds (used for pedestrian crossing only) ($n = 45$, 12%), ($N = 2$, 0.5%), those located in risk areas ($n = 5$, 1.3%), in private places ($n = 20$, 5.3%) and duplicate spaces ($n = 14$, 3.7%) were excluded. Thus, 153 spaces were excluded (40.9%), remaining 221 located via Google Earth and 22 included during visits. Of these, 243 public spaces, 29 (11.9%) had to be excluded from the final analysis because they were exclusively from stretches of cycle paths, resulting in 214 OPSs evaluated.

Among OPSs evaluated, higher presence of squares/gardens ($n = 128$, 59.8%), free areas ($n = 47$, 22%) and only nine parks/woods ($n = 9$, 4.2%) (Table 1). The quality index of OPSs ranged from -2 to 6 and only squares / gardens obtained negative scores. The mean space quality was 2.7 (median [md] = 3.0), being higher among parks / woods (mean [μ] = 3.8, md = 4.1). Higher proportion garden beds presented average quality ($n = 5$, 55.6%) and the other types of OPS showed good quality (Table 1).

Regarding the presence of comfort items, more than 80.0% of OPSs had bathrooms (83.2%), changing rooms (95.8%) and drinkers (98.1%), but only drinkers had higher proportion in good quality (4.2%). Lighting (54.7%), trash cans (45.8%) and benches (55.1%) were present in a higher proportion with good quality (Table 2). In addition, scattered garbage was non-existent in only 32.7% of OPSs, representing an incivility item with poor quality (26.2%) (Table 2).

Table 1. Description of the presence / quantity and quality of open public spaces in Florianópolis, 2015 (n = 214).

Types of Public Spaces	Total Quality Index (continuous)			Quality Index (categories)*		
	n (%)	Mean (μ)	Median (min,max)	Poor	Average	Good
				n (%)	n (%)	n (%)
Squares / gardens	128 (59.8)	2.7	2.9 (-2.0;6.0)	12 (9.4)	52 (40.6)	64 (50.0)
Free areas	47 (22.0)	2.7	3.0 (0.0;6.0)	3 (6.4)	18 (38.3)	26 (55.3)
Community institutions	21 (9.8)	2.8	3.0 (0.0;5.7)	1 (4.8)	9 (42.9)	11 (52.4)
Parks / woods	9 (4.2)	3.8	4.1 (2.0;5.8)	-	3 (33.3)	6 (66.7)
Garden beds	9 (4.2)	2.2	1.7 (0.5;4.4)	-	5 (55.6)	4(44.4)
Total	214 (100)	2.7	3.0 (-2.0;6.0)	16 (7.5)	87 (40.7)	111 (51.9)

Note. * Quality score classification: poor quality (category \leq zero); average quality (category of 0.1-2.9); good quality (category \geq 3.0).

Table 2. Frequency and quality of comfort and incivility items observed in open public spaces of Florianopolis, 2015 (n = 214).

Comfort	Non-existent	Poor quality	Average quality	Good quality
	n (%)	n (%)	n (%)	n (%)
Lighting	35 (16.4)	11 (5.1)	51(23.8)	117 (54.7)
Trash can	56 (26.2)	17 (7.9)	43 (20.1)	98 (45.8)
Benches	61 (28.5)	6 (2.8)	29 (13.6)	118 (55.1)
Picnic tables	119 (55.6)	14 (6.5)	19 (8.9)	62 (29.0)
Bathrooms *	178 (83.2)	8 (3.7)	19 (8.9)	9 (4.2)
Changing rooms	205 (95.8)	3 (1.4)	5 (2.3)	1 (0.5)
Drinkers	210 (98.1)	1 (0.5)	-	3 (1.4)
Incivilities	Poor quality	Average quality	Good quality	Non-existent
	n (%)	n (%)	n (%)	n (%)
Scattered garbage	56 (26.2)	34 (15.9)	54 (25.2)	70 (32.7)
High grass	13 (6.1)	36 (16.8)	28 (13.1)	137 (64.0)
Graffiti	19 (8.9)	15 (7.0)	32 (15.0)	148 (69.2)
Vandalism	9 (4.2)	16 (7.5)	37 (17.3)	152 (71.0)
Dirt of animals	6 (2.8)	10 (4.7)	29 (13.6)	169 (79.0)
Alcohol use	6 (2.8)	9 (4.2)	24 (11.2)	175 (81.8)
Loose animals	2 (0.9)	6 (2.8)	27 (12.6)	179 (83.6)
Broken glass	3 (1.4)	4 (1.9)	13 (6.1)	194 (90.7)

Note. * Bathrooms: free and paid. a Comfort items are evaluated on a likert scale from the negative pole to the positive pole ('0' nonexistent; '1' poor quality; '2' average quality and '3' good quality b For incivilities, poles are inverted ('0' nonexistent; '1' good quality, low quantity of local incivility; 2 'average quality and' 3 'poor quality, high quantity of local incivility).v

In OPSs, 377 physical activity facilities were identified. In general, a higher proportion of facilities had good quality (53.6%), followed by average quality (32.6%) and poor quality (13.8%) (Figure 1). The most frequent facilities were children's playgrounds (29.4%, n = 111), outdoor gyms (15.9%, n = 60) and soccer fields/courts (14.9%, n = 56), in the latter, less than half had good quality (14.9%). basketball (33.3%), soccer (25.0%) and handball (23.1%) courts had higher proportion of poor quality facilities (Figure 1).

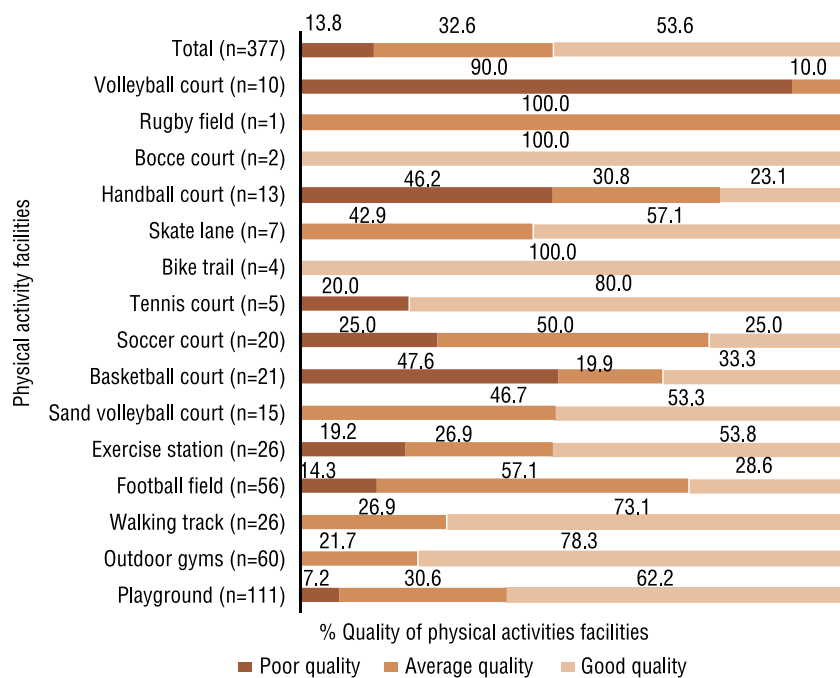


Figure 1. Proportion of the quality of physical activity facilities present in open public spaces of Florianopolis, 2015 (n = 377).

Higher proportion of OPSs showed the presence of only one physical activity facility (36.9%) and in 29.0%, they were non-existent. High proportion of squares/gardens (34.4%) and garden beds (55.6%) did not contain physical activity facilities, while in parks/woods, 44.4% contained four or more facilities (Figure 2).

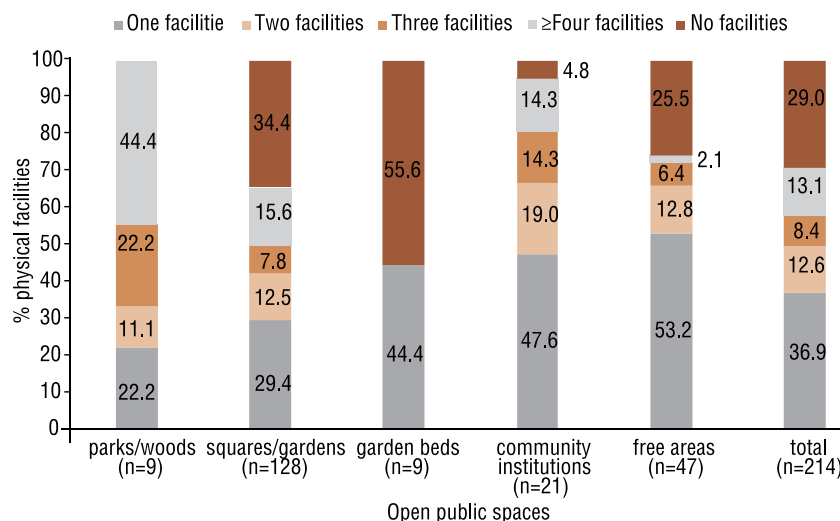


Figure 2. Proportion of structures for physical activities present in open public spaces of Florianopolis, 2015 (n = 377).

DISCUSSION

The data of the present study are pioneer in the context of Florianopolis. The highest proportion of OPSs is composed of squares/gardens (59.8%). More

than 50% of spaces presented good quality, but 48.1% need improvements in comfort and less presence of incivilities, such as high grass, scattered litter and graffiti. In addition, the options of physical activities facilities in OPS are reduced, being more frequent the presence of playgrounds, outdoor gyms and soccer fields/courts. The latter, for the most part, did not show good conditions of use. In general, greater proportion of OPS contain only one physical activity facility, which denotes the need for greater public and private investments to broaden and diversify the options for active leisure to the population.

Evidence shows that public leisure spaces in urban centers are important, since they are associated with greater practice of physical activities^{2,14}. In Florianópolis, the amount of OPS is reduced compared to other cities in Brazil, but more than half (51.9 %) are in good conditions of use, unlike other regions of the country such as Parintins/AM¹⁵, Cuiabá/MT⁸ and Pelotas/RS⁹. Possibly, the greater proportion of OPS with good quality in Florianópolis may be due to the adoption of squares and parks by private companies that are jointly responsible for their maintenance, in exchange for the disclosure of their brands. This can be an interesting strategy to improve the quality of spaces and encourage active leisure^{1,5}. In addition, adjusting the quality of existing spaces can contribute not only to the city sustainability but also the equity of access to the local population for health promotion⁹.

About 48.2% of surveyed OPSs still need better adaptations, especially in the reduction of incivilities, such as scattered garbage, high grass and graffiti, as they make spaces more vulnerable to crime, as observed in the city of Curitiba¹⁶. Comfort items such as good lighting were present in more than 54.7% of public spaces of Florianópolis, which in addition to improving the perception of safety by users, can contribute to the engagement in physical activities throughout the day^{16,17}. The presence of trash cans (45.8%), benches (55.1%) and picnic tables (29.0%) with good quality in the spaces evaluated also serve to support moments of rest, socialization and contemplation¹⁸. Evidence shows that each new comfort attribute perceived in parks increases by three times the probability of being highly used¹⁹. Thus, the maintenance, aesthetics and good quality of OPS may explain, in part, why some places are more frequented than others^{11,19}.

Leisure physical activity facilities are also important factors for the frequent use of public spaces²⁰. In 29% of spaces evaluated in Florianópolis, there were no structures for the practice of physical activity. Consequently, these spaces are more used for less active activities, such as rest and/or contemplation¹⁸. In general, facilities such as playgrounds, outdoor gyms and soccer fields/courts were more frequent, only the latter with less than half in good conditions of use. However, the type of facilities present for physical activity in an OPS may favor some age groups of the population to the detriment of others²⁰. For example, children's playgrounds are more frequented by children and adolescents²¹, while outdoor gyms favor the use by adults and older adults²². Hiking trails, although little present in the

evaluated public spaces, stimulate greater engagement in walking activities, regardless of socioeconomic conditions of cities²³. Thus, soil occupation in Florianopolis, although reduced, due to its geographic characteristics (insular and continental portion) may be more attractive if OPSs had greater diversity of physical activity facilities. In addition to serving to the different age groups, they may also favor the active leisure choices of residents²⁴.

It could be observed that parks/woods were OPSs that obtained more than four physical activity facilities (44.4%). Possibly these spaces may be the greatest potentiates of engagement in physical activities, due to their larger area in square meters, and to the greater amount of sport-recreational events by the greater number of physical activity facilities present in these spaces¹⁹⁻²¹, as observed in other studies^{24,25}. Evidence shows that the frequency of use of a OPS can be justified by the types of physical activities offered^{20,21}. Therefore, garden beds, community institutions, free areas and squares/gardens can enhance the use of spaces if they are attractive to a greater diversity of interests of the population¹⁹. This not only contributes to the adoption and maintenance of the recommended levels of physical activities, but also in the health co-benefits³.

The present study presents strengths, as it evaluates the quantity and quality of OPS and physical activity facilities in all regions of the city using an internationally recognized instrument, validated and adapted to the Brazilian context. The findings contribute to reduce the lack of results in the area about the characteristics of OPS for health promotion in Latin American regions, enabling future actions and strategies to be made to make cities friendlier to healthy practices, thus allowing the proximity of data.

However, some limitations to the analysis of findings should be considered. The identification of the types of public spaces present is characteristic of the city; therefore, they could not be generalizable to other contexts. Public spaces such as beaches and ecological trails, despite the large amount in the city, positively contributing to the practice of physical activity, were not investigated because they were considered natural environments, which evaluation would be impossible with the instrument used. Potential sites to be evaluated were previously identified through a listing provided by community health agents, in addition to visits by researchers to verify and confirm sites not included in the listing. However, places that may not have been identified in one of these possibilities may not have been evaluated.

Finally, it was identified that more than half of OPSs of Florianopolis are squares/gardens, followed by free areas. Overall, a higher proportion presented good quality, but 48.2% required improvements in comfort, incivilities and greater diversity of physical activity facilities. There are frequent structures for physical activities such as playgrounds, outdoor gyms and soccer fields/courts, but only the latter with less quantity in good quality. However, almost one-third of OPSs did not have physical activity facilities, possibly because they are used for less active activities. These data may contribute to stimulate future studies in the understanding of the patterns of use of OPS in different cities, profile of users and frequency

of use, also assisting managers, urban planners and health professionals in the implementation of programs and events to encourage the creation, maintenance and adaptation of open public spaces, as a way to encourage the population to have healthier habits by using these spaces for practicing physical activities.

COMPLIANCE WITH ETHICAL STANDARDS

Funding

CNPQ for the award of Masters scholarship. Financing of the project by FAPESC / PPSUS / n.2014TR2263.

Conflict of interest statement

The authors have no conflict of interests to declare.

Ethical approval

Ethical approval was obtained from the local Human Research Ethics Committee - Federal University of Santa Catarina (No. 47789015.8.0000.012) and Research Coordination of the Health area of Florianopolis, and the protocol was written in accordance with the standards set by the Declaration of Helsinki.

Authors' Contributions

SWM; CRR and TRBB conceived and designed the experiments; SWM and CRR performed the experiments, SWM analyzed data, SWM, CRR, TRBB, AASL and AAFH contributed with reagents/materials/analysis tools, SWM, CRR, TRBB, AASL and AAFH wrote the paper.

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