

A systematic review about the characteristics and patterns of use of outdoor gyms

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ABSTRACT

The outdoor gyms have risen exponentially during the last years as a way of revitalizing public areas to enhance the practice of physical activity by insufficiently active older people. However, little is known about their use patterns that might help to maximize its benefits. To know the outdoor gyms profile, an exhaustive scientific literature review was made on research databases (WOS, Scopus, SportDiscus, CINAHL, Cochrane Library Plus, PubMed, Proquest Dissertations and Theses, and Google Scholar). Only 24 studies met the selection criteria of the 17,035 gathered. In general, outdoor gyms were used 3-5 days per week. They are 10-20 min away from users' home and distance was between 500 and 2007 m. Most activities on outdoor gyms were a supplement of other main PA. More rigorous study designs (intervention programs) are needed. It is necessary to operate in a community setting with local government. Current studies have indicated the existence of potential safety risks due to inappropriate usage behaviours. The most demanded improvements were more instructors, benches, variety devices, small roofs over the equipment, toilets, maintenance, lighting the area, security city guards, better promotion and placing information signs. The average number of devices per outdoor gym was 4,6. The dimensions were between 100-200 m².

Keywords: Review; Physical activity; Fitness zones; Open gyms; Equipment; Outdoor gym profile.

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INTRODUCTION

People are becoming less active as they grow old. WHO (2013, 2017) and the USA Department of Health and Human Services (2018) reports state that risk reductions routinely occur on levels of at least 150-300 minutes per week of moderate-intensity aerobic physical activity (PA) during the week or, at least 75-150 minutes of vigorous-intensity aerobic throughout the week; balance and prevent falls; muscle-strengthening activities. When seniors cannot achieve the recommended amounts of PA due to health conditions, they should perform as much PA as their abilities and conditions allow. To guide public health practice, ecological social models have been recommended. These describe the interactions between people and their social and physical environment (Golden & Earp, 2012; Lee, Lo & Ho, 2018). That's why the use of safe outdoor public spaces is one of the ways to improve practice of PA (McCormack, Rock, Toohey & Hignell, 2010).

For public health institutions, strategies focused on changing environmental contexts to facilitate healthy behaviours are at lower unit cost than care in medical prescription or hospitals (Frieden, 2015). So, a popular strategy is the outdoor gym (OG) installation (Copeland et al., 2017; Del Campo, Bermúdez, Peluffo & Del Campo, 2016). An OG is defined as fixed exercise equipment placed in an outdoor area that is freely accessible to the public, to promote structured PA through strength, aerobic and stretching devices (Cohen, Marsh, Williamson, Golinelli & McKenzie, 2012; Cranney, Shaw & Phongsavan, 2018; Lee et al. 2018).

The terms used for the designation of these OGs are miscellaneous. Table 2 shows the most common names used by authors, countries and focus. In English language the most used are outdoor gyms, outdoor fitness equipment, fitness zone, open fitness zones, senior playground, family recreation zones or golden age gym. In the Spanish language there was a transition from "parques biosaludables" (Hernández, Fernández-Rodríguez, Merino-Marbán & Chinchilla, 2010) to "gimnasios al aire libre denomination" (Del Campo et al., 2016). Most studies have been conducted in Brazil. The term "academia ao ar livre (AAL) is the most common in the Portuguese language. In this paper we have preferred to use the term OG (GAL in Spanish and AAL in Portuguese language) because, unlike others, it makes it clear that it is done outdoors as well as being the most used.

Incorporation of people with poor or no exercise habits into the realm of regular exercisers is the main reason for building OGs parks. The finding that two out of five OG users did not do any type of PA immediately prior to the installation of OG suggests that they are successful in overcoming people's sedentary behaviour (Mora, 2012; Mora, Weisstaub, Greene & Herrmann, 2017). Others purpose of OGs are to enhance the practice of PA by insufficiently active people. Generally, for adults or older, this exercises equipment uses the practitioner's body mass (Silva et al., 2017). These sport facilities are contributing to the revitalization of the public spaces (parks, squares...) in which they are located (Chow, 2013; Chow, Mowen & Wu, 2017; Furber, Pomroy, Grego & Tavener-Smith, 2104; Lima, 2013; Mora, 2012). Increasing the accessibility of OGs through good design, location and promotion could be an important public health strategy to increase PA among at risk populations (Cranney, Shaw, Phongsavan, 2018). OGs can contribute users' PA and attract people with sedentary lifestyles to exercise (Mora et al., 2017). But OGs success depends on different elements; complement such as fountains, shadows, good maintenance, PA teachers and others. The targeted marketing is important in the success of the OGs and, is favouring that users commute to it walking or biking (Costa, De la Rocha Freitas & Silva, 2016; Del Campo et al., 2016).

Some reviews have been made about OGs. The review by Lee et al. (2018) synthesizes the design, the main user group and the terminology used for the OG of nine studies. It gives an overview of how users and neighbourhood residents from different cultural backgrounds perceive this type of environmental

infrastructure related to PA. Objectives of its study were to support knowledge of OGs and identify recurring themes related to experiences and perceptions of OGs through qualitative and quantitative data synthesis. Jansson, Lubans, Smith, Duncan, Haslam & Plotnikoff (2019) review, examine the effects of OGs on community-based PA, on individuals and other health-related outcomes of 18 studies. Other objectives were to describe the features, user characteristics, and use of OGs. The review by Fernández-Rodríguez, Merino-Marban, Romero-Ramos & López-Fernández (2020) have many coincidences with that carried out by Jansson et al. (2019); reference, citation number, country, sample, size, participants, outcome measure, terminology, number and types of equipment / exercises, supervision... It included 22 studies that met the selection criteria. Also, it included many countries (South and North America, Asia, Europa and Australia). The highest frequency of OGs older users were female; married; with medium income, high school, live close to OGs and physically active on leisure time. They used the OGs between three to five times per week. Curiously, their perceived health is good, but they are overweight or obese, normally they are medicated, and many users suffer from chronic diseases. Consequently, the aim of this current systematic review study was, to analyse what the published literature shows regarding the OGs profile in relation with the used patterns by users of OGs.

METHODS

The following eight electronic bibliographic databases were searched through until October 2019: Web of Science (all databases), Scopus, SportDiscus, CINAHL, Cochrane Library Plus, PubMed, Proquest Dissertations and Theses, and Google Scholar. The searches were carried out in the search field type "Title, abstract, and keywords" or equivalent (e.g. "Topic" for the Web of Science database). Any publication format including journal papers and grey literature (i.e. master/doctoral dissertations and conference proceedings) was examined. Additionally, no language or publication date restrictions were imposed.

The search terms used were based on one concept. This concept included terms related to outdoor gym (geriatric park, open gym, outdoor fitness equipment, fitness zone, senior exercise park, elderly fitness, fitness corner...). Additionally, the keywords that consisted of more than one word were enclosed in quotes. Finally, the terms were combined with the Boolean operator "OR" (Cooper, Hedges & Valentine, 2009). Based on the results of the Boolean-based search (as well as all the related studies by Léger), other modes of searching were carried out. The reference lists of all studies were manually searched. Furthermore, the reference citations (in the Web of Science and Scopus databases) and the researcher publications of the first authors (in the Web of Science and Scopus databases) were also examined.

Inclusion and exclusion criteria

Studies were included if they (1) Investigated profile of OGs users as the main focus; (2) Explored the views and perceptions of OGs either quantitatively or qualitatively; (3) Were peer-reviewed journal articles. Studies were excluded if they (1) Mainly explored PA experiences in green spaces or parks; or (2) contained insufficient data for analysis/synthesis (Lee, Lo & Ho, 2018). Risk of bias was assessed by three reviewers. Any discrepancies regarding quality ratings were resolved with a fourth.

Results study description

Of the 17,035 bibliographic databases search results, 95 potentially relevant publications were retrieved for a more detailed evaluation (Studies excluded based on selection criteria were 75). Afterward, based on the studies of the Boolean-based database search, 31 additional records were identified through other sources (24 excluded based on selection criteria) Finally 24 studies met the selection criteria (Figure 1).

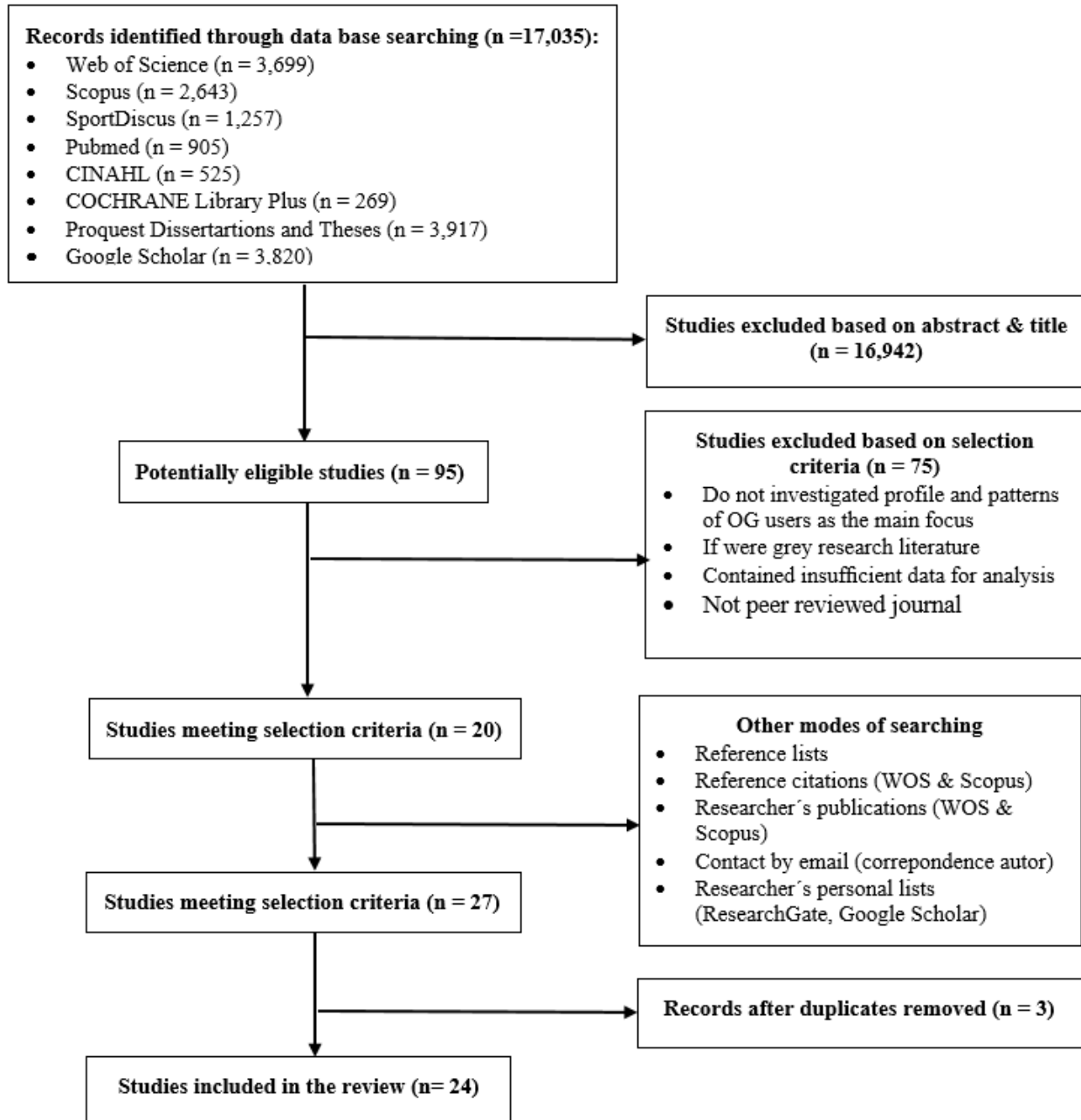


Figure 1. Flow chart of selection process.

RESULTS

We understand as an OGs' profile all those urban and environmental components that affect their use; the physical appearance (size, square meters, distance between pieces of equipment, number and quality of machines...); complements that improve it (drinking fountains, benches, shades, toilets...), maintenance (cleaning, lighting...) and, ultimately, all those things that show at the user as they are.

The machines usage profile (OG parks) refers to how they are used (how, when, which ...) if they are used well, badly or safely. The literature, generally, analyse the users' profile (table 2). For a better understanding,

results of general elements of the OGs are, also, presented. The sections included in this review are presented in Table 1.

Table 1. Sections included in this review.

General data
Barriers / Disadvantages
Closeness / Distance
Comparison between OGs
Data collector and methodology
Facilitators
Favourite equipment
How many days are the OGs used?
Instructional exercise
Measurements
Target
Time-duration, long-term loyalty and seasonality
Urban design
When? morning or afternoon & weekday or weekend
OGs, who uses them?

General data

The table 2 shows authors (numbering codes), the publication year, OGs' names, origin and focus included in this systematic review. Onwards, in order to abbreviate the tables, each paper included in this systematic review, will be associated with a number (Table 2).

Table 2. Authors and code (numbering), year, terms and acronym, countries and focus.

Authors	Paper-year	Name	Country	Focus
1 = Bettencourt & Neves	2016	Senior playgrounds (SP) *Parques geriaticos	Portugal	User' profile
2 = Chow	2013	Outdoor fitness equipment (OFE)	Taiwan	User' profile
3 = Chow, Mowen & Wu	2017	Outdoor fitness equipment (OFE)	Taiwan	User' profile
4= Costa et al.	2016	Academias ao ar livre (AAL) *Open fitness zones (OFZ)	Brazil	Users' perception
5 = Del Campo et al.	2016	Gimnasios aire libre (GAL) *Outdoor Gyms (OG)	Uruguay	Pattern/user profile
6 = Ibiapina et al.	2017	Outdoor fitness equipment (OFE) *Academias ao ar livre (AAL)	Brazil	User' profile
7 = Iepsen & Silva	2015	Academias ao ar livre (AAL) *Fitness Zones (FZ)	Brazil	User' profile
8 = Mathias et al.	2018	Academias ao ar livre (AAL) *Fitness zones (FZ) / GAL	Brazil	User' profile
9 = Mora	2012	Open gyms (OG)	Chile	User' profile
10 = Mora et al.	2017	Outdoor gyms (OG)	Chile	User' profile

11 = Nałęcz et al.	2018	Outdoor gyms (OG)	Poland	User' profile
12 = Pinheiro & Coelho	2017	Outdoor gyms (OG/AAL)	Brazil	User' profile
13 = Ramirez et al.	2017	Outdoor gyms (OG)	Colombia	Users/OG profile
14= Salin et al.	2014	Golden age gym	Brazil	Users' perception
15 = Santos et al.	2017	Academias ao ar livre (AAL) * Outdoor gyms (OG)	Brazil	User' profile
16 = Scott et al.	2014	Outdoor gyms (OG)	Australia	OGs' promotion
17 = Silva et al.	2016	Academias ao ar livre/ *FZ	Brazil	OGs' injuries
18 = Silva et al.	2018	Fitness zones/ *AAL / *GAL	Brazil	Distance to OGs
19 = Silva et al.	2017	Fitness zones / *AAL	Brazil	User' profile
20 = Souza et al.	2014	Academias ao ar livre/ *FZ	Brazil	Pattern/user profile
21 = Stride et al.	2017	Outdoor gyms (OG)	Australia	Enablers/barriers
22 = Szopa & Sas-Nowosielski	2016	Family recreation zones	Poland	Pattern' profile
23 = Chow & Wu	2019	Outdoor Fitness Equipment (OFE)	Taiwan	Use profile
24 = Levinge et al.	2019	Senior Exercise Park (SEP)	Australia	PA program

Note: *Jargon in other languages used by the authors. GAL= Gimnasios al Aire Libre; AAL= Academias ao ar Livre.

Barriers and disadvantages for usage an OG

The reasons that make an OG non attractive are indicated in Table 3. It shows the reasons indicated in the different articles of this review. There are more reasons associated with the OGs' profile than the users' profile. The most repeated reason was bad weather

Table 3. Main barriers to go to an OG.

Barriers	Papers	Barriers	Papers
Cleaning	12, 13, 22	Lack PA teacher	22
Children	21,22	Lack of a roof	22
Comfort	1	Maintenance	13, 22
Crowding	21, 22	Modest machines	22
Damage machines	22	Painting	13, 22
Deck/pavement- quality	2	Safety	20, 22
Bundles and seats comfort	2	Bad weather	1,11, 21, 22
Too much distance	19, 21		

OGs, closeness or distance

Table 4. Main time or distance to go to an OG.

Papers	Time / metres
6	0 -10 minutes
7	11-20 minutes
9,10	500 m
11	5-20-minute walk, 5-10 minutes bike/public transport
18	5-3 minutes by car 2007 m

Table 4 shows the time or distance to go to an OG. Arrival time to an OG from home is variable. In Ibiapina et al. (2017) study, most users (63%) take up to 10 minutes to reach the OG but, in Iepsen & Silva (2015) study most users take more than 30 minutes, although 71% of users find it easy to walk from home to the OG. Attending to Mora (2012) and Mora et al. (2017) study, in some cases, a 64% of the households found an OG within 500m. Silva, Fermino, Santos Lopes, Alberico & Reis (2018) found that mean distance from home to fitness zone was 2,007 meters.

Comparison between parks; studies

Table 5. Comparison studies between OGs. Intervention program and senior/older words in title.

Reason	N° OGs	Research
To analyse geographic accessibility and proximity	2	1*
To assess sizes, locations, population, proportion of older adults, and socioeconomic status	2	2*
		3
To compare sociodemographic characteristics, perceived use of equipment and the practice of MVPA among attendees		4
To describe and analyse the characteristics of use and users	3	5
To verify the characteristics of the users and the usage pattern of OGs	22	6
To verify the profile of the users of OGs located in the urban perimeter	3	7
To analyse the functioning of four recently installed OGs	4	8
To record of all existing OGs in Santiago (Chile) and socioeconomic parameters	4	9
To registry of the location of all existing (OGs) in Santiago, Chile	1981	10
To analyse the use of OGs in Warsaw and selected surrounding settlements	49	11
To compare two groups: average income of the neighbourhoods	11	12*
To describe the characteristics of OG, their users and their level of PA	10	13
To describe the perception of older adults (motivation for entry and permanence)	15	14 [^] *
To describe the OG user profile, guided and not guided by professionals of PA	2	15 [^]
		16 [^] *
To determine the association between injuries and PA among adults who use FZ	20	17
To analyse the association between distance from home to fitness zones	20	18*
To verify the adequate practice of PA and associated factors among OGs users	3	19
To identify the profile of the users, pattern use & and association between these and neighbourhood income	20	20
		21*
To examine how the relatively new initiative supporting active leisure of people	5	22
To analyse how outdoor gyms are used	**49	**11,23
		24 [^] *

Note: [^] = intervention studies; * = words in title: senior, older.

Most researches compare more than two OG parks to better understand the element to study (Table 5). It is observed that the majority compare less than five OGs. It is followed by a group of articles that compares between five and 20 parks. The article by Nałęcz, Ostrowska-Tryzno & Pawlikowska-Piechotka (2018) compare 49 OGs in different areas of Warsaw. Only the article by Mora et al. (2017) includes 1981 OGs since it is a descriptive study that registers the location of all existing OGs in Santiago (Chile). The authors' aims to make a comparison between OGs are shown in table 5. Also shows the intervention programs and

those articles where the words “older / senior...” appears in the title. There are only four intervention articles and in eight, the words older / senior appears in the title.

Data collection and methodology

Table 6 shows data collection tools and methodology. Basically, they were interviews, questionnaires and various types of observations.

Table 6. Data collection and methodology used in the different researches.

Methodology data collection	Researches
Observation	
Observation. SOPARC; *3= Case Study; *13= cross-sectional study	*3, *13
Observation. No participant systematic observation	1
Observation (without specifying) and short survey; *twofold	*9
Interviews	
Interviews. Structured Interview: Descriptive cross-sectional study	*4
Interview & others: Structured interview & survey by standardized questionnaire participant and non-participant undisguised observation	11
Interview. Semi-structured guide & peer debriefing; *qualitative fieldwork	*2
Interview. Semi-structured interview or survey; descriptive study	*14
Interview; Descriptive cross-sectional study	*8
Interview. Survey & GPAQ questionnaire	10
Questionnaire and / other	
Filling out a form & observations; Descriptive, exploratory, cross-sectional & a quantitative research	*6
Questionnaire. Structured and semi-structured; *Descriptive cross-sectional study	*12, *15
Interview, survey or questionnaire without specifying the type of interview *7= descriptive; *18= cross-sectional study; *19 cross-sectional observational	1,5, *7,16,17, *18, *19, 20,21,22
International Physical Activity Questionnaire (IPAQ)	7, 17,18,19, 20
3Q-PA	21
Video Content Analysis	23
Multi-site prospective study	24

Facilitators. Recommendations of studies to improve use

Table 7. Main recommendations to improve the use of OGs.

Facilitators	More instructor	Benches	Shades	Variety machines	Toilets	Fountains	Accessible	Aesthetic
Papers	6,11,14, 16,18,21	11,14, 16,21	3,11,14, 16,21	11,14, 16,21	12,14	14	16	16
Facilitators	Guides/ marketing	Safety	Light	More activities	Cleaning	Painting	Bike stands	Pet waste
Papers	3,16	6, 16,21	16	14	6,13	6,13	16	13

The most typical recommendations to improve OG use are shown in Table 8. Few papers describe if the machines have visible information. Ramírez et al. (2017) show that 81.8% had visible information about PA guidance and 27.3% had rules of usage. The most typical recommendations to improve OG use are presented in Table 7.

Favourite equipment

The machines have low complexity of execution of the movements and, normally, the load can vary according to the body mass. Most users reported being satisfied with the quantity and quality of the available machines (Pinheiro & Coelho Filho, 2017). The average number of pieces of fitness equipment per OG was 4.6 (Mora et al.,2017; Del campo et al., 2016). Most OGs have between 4 and 6. It is not uncommon to find some OG with more than 10, usually 12. The most commonly used machines are shown in Table 8.

Table 8. Most widely used pieces of equipment and average number of machines per OG.

Research	Most used machines	Less used machines	Machines / OG
1	surf, ski, scale	parallel, push-up, balance bars	6-13
2	arm stretch		
3	arm stretch, walker, twister	shoulder-arm wheel, bonny rider	
5 males	biceps press		
5 females	hip side		
6	stretcher, Seated Row	ski walker, walking, double ladder	
9			4.6
11	surf treadmill, orbitrek, twister	climbing wall, trampoline	8-10
21	back pull down		12
22	arm/chest press		
23	air walker, triple waist twister, ski		

How many days per week were the parks used?

Table 9 shows the predominant number of days of OGs use in the different papers.

Table 9. Predominant number of days per week of assistance.

Days / week	Papers
1	21
2-3	11
3	7, 9, 10, 17, 19
3 to 5	6, 8, 18, 20, 22
≥ 5	2, 4, 12, 22

Instructional exercise

Table 10. Researches where PA teachers were used. Other sessions promoted.

Research with exercise instructors	6,14,15, 16,17,24
Sessions promoted in newspaper, websites, flyers, posters, libraries, community centres	16

It is the highest of older users' demand (Table 6). Table 10 shows papers where PA teachers were used. In general, 1/3 of users who go to OGs alone, do not reach the PA recommendation (Cozzensa da Silva et al., 2017). Older users, in general, do not use OGs' machines vigorously (Chow 2013). In the other hand, community-based interventions (with instructors) have shown to be effective in increasing and promoting PA (Levinge et al., 2019; Santos et al.,2017).

Measurements

Few papers have established the size of the OGs or, the percentage into de park area. Ramírez, Camargo & Quiroga (2017) are the only ones that indicate the % of the OG within a public park. The space size in the different studies carried out was in Table 11.

Table 11. Outdoor gyms, physical activity area, park size area.

Paper	m ²	% of PA area	% of Total park area
1	800 m ²		
11	100-200 m ²		
13	169.7 ± 42.9 m ²	2.6–13.4	0.6–4.3

Target activity or complement

Most users consider their PA level active or very active (Del Campo et al., 2016; Mathias, Filho, Szkudlarek, Gallo, Fermino & Silveira Gomes, 2018; Mora,2012), regardless of the use of the OGs.

According to the different studies, using OGs represents only a supplementary activity and most people use OGs to supplement main activities and are active when they commute to the OGs (Chow, 2013, 2017; Ibiapina et al., 2017; Iepsen & Silva, 2015; Mathias et al., 2018; Mora, 2012; Mora et al.,2017;Nałęcz et al., 2018; Pinheiro & Coelho Filho, 2017; Salin, Virtuoso, Noronha Nepomuceno, Weiers & Mazo, 2014; Silva, Fermino, Alberico & Reis, 2016, 2018, 2017; Souza, Fermino, Rodriguez-Añez. & Reis, ,2014).

Time-duration, long-term loyalty and seasonality

There are some differences according to authors and countries. The percentage of time spent exercising was very low. In general, at most, users spend 15-20 minutes on 3-4 favourite machines (Bettencourt & Neves, 2016; Nałęcz et al., 2018) and some studies have observed that approximately half of the users only use one device and then leave. In general, no difference was found for total time of use based on gender. In a single machine they stay less than five minutes (Chow et al. ,2017; Nałęcz et al., 2018). According to Table 12, it can be seen that daily exercise recommendations are not always achieved.

Table 12. Average time (minutes) spent using all equipment and percentage of weekly time recommendation met.

Research	1	2,3	4	6	7	9	11	17	18	19	8,10,*12,20,22
Time spent (minutes)	1-30 (7.7)	< 9		20 to 40	33	≤15	15- 20	≤30	30	30	30 ≥
Number of machines used								3-4			
% Weekly PA time recommendation met (%)			72					73	72	75	

Note: *Up to 30 minutes.

Regarding customer' long-term loyalty, some studies show a long period of OGs use over one year in Iepsen & Silva (2015) until 42,4% of users (Chow, 2013; Ibiapina et al.,2017; Iepsen & Silva, 2015; Pinheiro & Coelho Filho, 2017; Silva, et al. (2016,2018,2017; Souza et al., 2014). Family income and time spent in the places (months) were positively associated with neighbourhood income (Souza et al., 2014). Regarding the time of use the OGs, the data of Iepsen & Silva (2015) are representative of most of the authors. First time they attend, 14%; few weeks, 10.9%; one month, 4.6%; 1-3 months, 9.6%; 3-6 months, 7.4%; 6-12 months, 11.1%

and more than 1 year 42.4%. Seasonality is another important issue in park use and design. The seasons when the users visit the OGs most frequently are Spring, Summer and Autumn (sunny and rainless days) and OGs are not visited at extreme temperatures: on very cold days in winter or scorching days in summer (Nalecz et al., 2018). Just some few studies mention the climatic conditions in which the studies were carried out. Since weather greatly influences outdoor behaviour, table 13 shows the data in the studies that report it.

Table 13. Weather.

Paper	Country	Season	Temperature	Humidity
2	Taiwan		24.3° C	77.2%
3	Taiwan	September	28.5° C	68 %
12	Chile	December	8.5°C to 22° C	
22	Poland	August-April	14°C to 22°C	

Urban design

Several characteristics of the built environment in urban cities are important predictors of PA, especially in commuting and leisure and presence, availability, access and quality of public open spaces for PA near home are positively associated to the use of those spaces for leisure and PA (Silva et al., 2018). It is customary to install them in a particular place. The most frequent location is inside a public park, in small squares or close to the beach. The presence, proximity and use of public spaces is associated with better physical, psychological and social well-being in the community (Mora, 2012; Souza et al., 2014) and the introduction of OGs in parks increases the assistance and PA level to them (Mora, 2012; Szopa & Sas-Nowosielski, 2016). Co-locating OGs with walkways or cycleways is important to increase access for those living further away and facilitate combined OG use with walking and cycling (Stride et al., 2017). The fact that more vigorous activity was seen in the areas where the OGs were installed highlights the importance of such infrastructure in supplying the need to increase levels of PA in the population (Del Campo et al., 2016). The number of OG users increases in the period of time after installation (Cranney et al., 2016) and two out of five users of OGs did not carry out any PA prior to their construction. In its urban implementation, OGs are more prevalent in the poorer and more densely populated areas (Mora, 2012).

When? morning or afternoon and weekday or weekend?

Table 14. Users' preference between morning/afternoon and weekends/weekdays.

Research	% Morning	% Evening	% Weekend	% Weekdays
1	17.8	20.9	61,2	38.8
6		*	3,1	70 to 80
9			3	14
12			45-55	47-53
13	*			
20			12.2	43.5
22		74		

Note: * Preference but unspecified percent.

In both cases the use is similar. Table 14 and 15 show the preference for use in the morning / afternoon, on the weekend / weekdays or both. Studies cannot specify the predominance. Normally at weekends and during holidays, the use grows rapidly. On weekdays, OGs are particularly popular all day in late spring and in summer, (Chow et al. 2017; Nałęcz et al., 2018). As for the time of day, it may vary; the use is in the morning (Ramírez et al. 2017), in the morning or afternoon (Chow et al. 2017) or at nightfall (Nałęcz et al., 2018). Habitually in summer, activity start at 8 h and reached the maximum at about 11 h, descending around

lunchtime and moving upwards after 18 h. Few people use the gyms after 21 h. In wintertime, activity start later, at 10 h, and reached its peak at noon, but went down substantially as lunchtime approached. The use of gyms resumes right after lunch, and reached its maximum about 17 h, again decreasing rapidly once the sun had set; 17 h in winter (Mora, 2012).

Table 15. Blend of weekday or weekend with morning or afternoon. Preference of use.

Days	Weekdays	Weekdays-morning	Weekdays-afternoon	Weekend	Weekend-morning	Weekend-afternoon
Paper	6, *9 ^a , 12, 20	3, 12 ^b , 13	12 ^b	3, 4, *9 ^b , 11	12 ^a , 13	1, 12 ^a

Note: * 9a weekdays preference during the week in Summer. *9b preference during the weekend in winter the week in Summer and * 9b preference during the weekend in winter. 12^a; on weekends the use is similar in the morning and afternoon (wintertime and summertime). 12^b During the week, OGs are used more in the evening than in the morning (wintertime and summertime).

OGs, who uses them?

Table 16. Research and age groups with their % use of OGs.

Paper	Child	Youth	Young-adult	Older-adults	Elderly
1	Child (0-14) 44.2	Youngster (15-24) 10.1	Adult (25-64); 39.5		Elderly (+ 64); 6.2
*2				50 and older	
3	Children 11	Youths 8.7	Adults 36.7	Seniors; 43.3	
4	19-29; 8.8	30-39; 12.6	40-49; 23.3	50-59; 31	≥60; 24.2
7		20-29; 7.7	30-39; 12.4; 40-49; 18	50-59; 26.9	60-69; 24.2; ≥70; 10.2
8			18-39; 85.9	40-60; 14, 1	
*12					≥60
13 [^]	Children; 19.8%		Adults; 61.5	Adults; 61.5	≥60
*14					≥60
15 [^]				*≥50	
16 [^]				≥50; 85	
19	20-29; 7.7	30-39; 12.4	40-49; 18, 6	50-59; 26.9	≥60; 34.4
*21				50-60; 66.4	≥65; 33.6
22		Youths; 5	Adults; 75		≥60; 20
23	Children	Teenager		Adult	*Senior; 47%

Note: *=only elder users; ^ intervention program.

Only in the paper by Bettencourt & Neves (2016), carried out in Portugal, children (0-14 years old) and young people (15-24) were the main users (42.2% and 10.1%). Children normally were more likely to be attracted to play equipment and tend to be more physically active but this equipment is usually not suitable for children and may jeopardize their safety (Chow & Wu, 2019). Table 16 shows the use of the different age groups. The people who went and practiced the most were adults (18-60 years old). Elderly people were only the main group when the study was recruiting an older people sample. In the observations carried out throughout the days and at different times, the seniors were a minority. Chow et al. (2017) monitor only 12 users/hour. According to Pinheiro & Coelho Filho (2017), Silva, et al (2016, 2018) only a little more than a third of the older people who participated exercised in the company of someone else. Usually, older users come to the gym alone while young people come in pairs or even in groups (Mora, 2012, Nałęcz et al., 2018; Pinheiro & Coelho Filho, 2017; Silva et al., 2018, 2017; Souza et al., 2014).

DISCUSSION

Most original papers come from South America (especially Brazil). It seems that the name used to describe OGs has evolved from names that referred to the elderly to broader and more common names (Senior playgrounds to Outdoor fitness equipment, Open fitness zones, Open gyms or Outdoor Gyms). Outdoor Gyms (OG) is the most used name. Researchers who initially used another name, in later articles change to OG. Regarding barriers and disadvantages for usage an OG, there are more causes associated with the OGs profile than the users' profile. In general, the most referred cause was bad weather. Among the causes of the OGs own profile, the most frequently referred to the lack of cleaning, maintenance, painting and the remoteness from the house. It seems that a careful environment is very important to want to use an OG.

Are the OGs far or close to the people? People will more likely use OGs close to their homes. The greater or lesser distance to the OGs influences a greater or lesser use of OGs. People who live near parks or squares, walking or running circuits and physical-recreational facilities, are associated with greater use of the facilities and higher levels of PA. Normally, OGs are used in higher proportion by local residents and were more frequent park users compared with general park users (Del Campo et al., 2016; Stride et al, Cranney et al., 2016). According to Silva et al. (2018), OGs with fewer machines (four) are closer to neighbours than those with more machines (six or more). The proximity from OGs to homes increases in 126% the probability of walking, while a greater number of fitness centres improves in 52% the probability of moderate to vigorous PA in leisure time. So, shortening distances and increasing the number of units could facilitate active commute and length of stay. But Mora et al. (2017) also indicated that OGs users do not necessarily go to the closest facility to their residence, but rather to the one that provides them with a more complete exercise routine, or that have a more convenient location in the city, either for esthetical or for security reasons. It seems that OGs near to neighbours are associated with greater use of the facilities and higher levels of PA. Local topography and sidewalk availability are associated with non-motorized modes of transport, whereas studies have demonstrated that urban density is a crucial factor in determining people's willingness to choose active modes of transportation and walking behaviour in older people depends, to a large extent, on street connectivity.

In some studies, distances and times were calculated with the Geographic Information System (GIS) using the street network in ArcGIS. In Mora et al. (2017) all OGs were mapped, an accessibility analysis was carried out. They employed the Network Analyst tool of Arc Gis, which allowed determination of an OG, within the city's urban grid, considering a specific radius. In this case, a radius of 500 meters was set, equal to a ten-minute walk, a typical threshold used in urban studies. So, these studies can be a good reference.

Most papers have preferred to study users' profile or OG use patterns that OGs profile. It seems logical since the analysis of the former can improve the profile of the latter. In the methodology, the data collection tools are similar in most of the investigations in this review (table 6). In the observation highlights the use of System for Observing Play and Recreation in Communities (SOPARC), a digitized tool that allows thousands of observations to be collected comfortably since it is based on camera system. This allows to classify the PA level of the people observed as sedentary, moderate or vigorous. Also, the International Physical Activity Questionnaire (IPAQ) is used how complement to measure physical activity levels. Many authors do not specify adequately the type of methodology. Issue; sometimes the same tool is used with a different name. For this reason, that apparent methodological dispersion.

The effort perception on OG equipment is medium/strong (Chow, 2013; Silva et al., 2016). The equipment appears to be safe for users (Chow, 2013; Pinheiro & Coelho Filho, 2017; Silva et al. 2016). In OGs, the

49.4% of users do not use any piece and the main reasons for not using some piece of equipment in the OGs was pain, they do not like it and non-anatomical machines (Ibiapina et al., 2017). About 31% of participants reported not knowing how to use OGs devices and 47.9% reported not controlling the use of equipment, and always using the same devices; 16% reported feeling discomfort during use. The 69% needed instruction to exercise; 23% reported having received instruction during the practical intervention (Costa et al., 2016).

In accordance with them, the occurrence of injuries is considerably lower (3,4%) than reported due to the practice of physical leisure activities so, it seems to be safe for the physical integrity. Among the studies, in this review does not appear studies that have identified the factors associated with injuries during the practice of PA in OGs. But for Ibiapina et al. (2017) 49.4% of the subjects do not use at least one piece of equipment because of some pain, do not like it or non-anatomical and for Chow and Wu (2019) a significant portion of user behaviours did not follow manufacturers' instructions, which might pose potential risks or actually cause injuries. Children were especially prone to act improperly. Their study provides empirical evidence indicating the existence of potential safety risks due to inappropriate usage behaviours that might lead to accidents and injuries while using OGs. This study is the only one that has categorized different patterns or types of user behaviours for the same devices, noting many runtime errors. A higher percentage of inappropriate behaviours was observed in children and seniors than in those in other age groups and this equipment is usually not suitable for children and may jeopardize their safety.

Attending to equipment or preferred devices. It is difficult to carry out, to compare, a global analysis because the OGs pieces of equipment are not the same between OGs. For gender, men preferred OGs devices for the development of muscle strength (parallel bars, bicep press, leg press and abdominal stretcher), women prefer devices that enhance aerobic capacity (walking, elliptical) and joint mobility (lateral hip) and for women, aerobics (Del campo et al., 2016; Nałęcz et al., 2018; Szopa & Sas-Nowosielski, 2016). Those OGs that are used by more women, could have more aerobic machines? In other words, could we generate exclusive parks for men and others for women? On the other hand, the ratio of numbers of devices, usually, were similar (strength, aerobics, stretching). In general, few machines are used. In Chow et al. (2017) only 3.6% used all stations of equipment and most users interacted with less than three of the available devices. Costa et al. (2016) indicated that 68.7% know how to use the machines and 31. % do not know, 70,8% always use the same device and 52.1% control the time they are on the device. Bettencourt & Neves (2016) show that 44% of users do not get to exercise in a second machine. OGs users interacted with less than three or four of the available six OG stations in Chow et al. (2017) and Nałęcz et al. (2018). In OGs, the 49.4% of users do not use any piece of equipment and the main reason for not using some piece of equipment in the OGs was pain, do not like it and non-anatomical devices (Ibiapina et al., 2017). It is uncertain if equipment needs to be tailored to gender or different age groups.

Lee et al. (2018) state that the number of equipment and the inclusion of functional types of equipment did not have a unified standard; whether or not there were the guiding principle behind the selection of the functional type of equipment is unclear. Generally, it is not known who or how the machines are decided and why. Further research is needed for exploring the design parameter". These authors indicated that:

Regarding recommendations, only in the study of Nałęcz et al. (2018) 60% of users believe that there is no need to introduce any changes to the OGs. The most frequent demands in papers (from highest to lowest) to improve OGs' use are more instructors, benches, shades and more variety of pieces of equipment. It is clear that the presence of teachers is necessary. How many days per week are the parks used? Most OGs are used between 3 and 5 days a week (per user). Few papers included a use of more than 5 days a week.

Also, very few people use the OG only one day a week. The number of days users go to an OG could be used as an index to establish the monthly / annual maintenance plan (Bettencourt & Neves, 2016).

In general, programming exercise sessions is important to increasing older adults' PA (Bettencourt & Neves, 2016). Some authors point out that the lack of a PE professional, some fitness devices are underused (Ibiapina et al., 2017). These classes are important to prevent injury and improve strength, balance and flexibility. Santos Moreno, Oliveira Ferreira & Cruz Siqueira (2017) concluded that most OGs users who are not guided by a PE professional report higher pain or limitations at the time of PA when compared to those oriented. About 77% never received instruction, 69.2% reported feeling need for instruction to better use the equipment and 23% reported having received instruction (Costa et al., 2016). Thus, the lack of direct supervision could, to some extent, increase exposure to injury risk (Silva et al., 2016). When there are PA teachers, users request a longer follow-up by these professionals (Ibiapina et al., 2017). This research (Brazil), was the only one where 70% of the OGs have a teacher. In general, these are hired for a short time. In several studies women claim, more than men, the presence of PA teachers.

Regarding de size. It seems that the size of the OG is not as important as other aspects of it. However, it is true that, generally, the user wants a greater variety of machines and this could mean more space for them. Target" activity or complement? During the observation process it was seen that most users went to the OG because they were encouraged by other family members or friends, including their children or grandchildren. Attending to Iepsen & Silva (2015), around 33.7% reported that they moved there specifically to use OGs, and the other 66.3% used it as a complement to the main activity they performed, as walking. For 87% of the users, OGs are the only places where they do exercise. The percentage of individuals who reported walking in leisure time was 74.0%, and of these, most walked at least three days a week. The individuals' average walking time was 58.1 ± 25.2 minutes per week and 66.3% used it because it is walking. Attending to Stride et al. (2017), between 40 and 90% usually combined a visit at the OGs with other ways of sport and recreation: walk or run (74%), bike ride (15%), walking the dog, fitness classes, roller skating, swimming pool; even in Brazilian users, soccer (17.1%). Definitely, it is common to see people going to the park for a walk, a jog or to perform other activities and end up using OG. They are not target. They are supplements but combining time in OG with other time of physical activity, 73.2% exceed 150 mi / week (Costa et al., 2016), although in relation to the MVPA, only 19.8% met the 150 min per week recommendation.

What about urban design, the importance of the environment for permanence of older adults in PA programs, identified the feeling of well-being (60%) and easy access to the place of PA (50%) as very important factors (Salin et al. 2014). Urban design is a key factor. Mora (2012) indicates that "environments restrict the range of behaviour by promoting, and sometimes demanding, certain actions and by discouraging or prohibiting other behaviours. Urban planning, therefore, becomes a relevant variable in the fight against obesity" (p.496). It can be said that they are an important environmental variable contributing to the PA level of adults and older adults (Szopa & Sas-Nowosielski, 2016). The practice of PA in OGs is associated with higher energy expenditure and users of these equipment perform more vigorous walking and PA more frequently than those who do not use them (Souza et al., 2014). Also, the finding that two out of five subjects or 25.9% (men) and 38.7% (women) in Mora (2012, 2017) did not do any type of PA immediately prior to the installation of OGs, suggests that they are successful in overcoming people's sedentary behaviour.

When? morning or afternoon and weekday or weekend? We can say that people go less or not much in winter, during the hottest hours in summer and at night, after 21 h. There is little difference in the use of OGs between the morning and the afternoon or between the week and the weekend. More studies are needed in winters and to analyse what could improve its use during this season. Time-duration, long-term loyalty and

seasonality. Although there is a percentage of users who abandon the OG, surprisingly there are a high percentage of loyal users. All the necessary resources must be applied to maintain and increase it. Virtually, all papers make it clear that OGs are used less in winter and in extreme temperatures. No author gives a solution to this problem.

Who uses the OGs? The most relevant issue is the low number of elderly people observed using OGs, despite the fact that these are designed purposely for this age group. Authors not included in this review as Cohen, Marsh, Williamson & Golinelli (2012) found that few older adults use these spaces. So, it is time to stop thinking that these OGs are for older and focus on how they could really use it more. We must distinguish two elements in relation to age. One is what the observations say. That is, how old are the people who go to the OG parks? The age of the visitors suggests that this kind of fitness setting is attractive mainly for adults, irrespective of sex or country (Iepsen & Silva, 2015; Mathias et al., 2018; Szopa & Sas-Nowosielski, 2016). Interventions are needed to increase the level of PA among individuals to encourage the adoption of an active lifestyle by retirees or pensioners. Retirement is a determinant of involvement in PA. It is important to take advantage of this opportunity to encourage the maintenance or adoption of an active lifestyle within the context of outdoor gyms (Barnett, Van Sluijs & Ogilvie, 2012).

According to the data, it seems that married people or partners are more active than those who are not or live alone (Pinheiro & Coelho, 2017). This age group tried to establish some kind of contact or relationship with other people (Romero-Reche, Martos-Fernández & Hita-Alonso, 2015). Most participants reported not having company to attend OG and having met new people in the neighbourhood after the installation of OG. Exercising with others, as well as the presence of other older people in the places where the gyms are located, can contribute to the reduction of depressive symptoms. Depression is a disorder related to several factors, such as sadness, loneliness and social isolation. Most of the users received some family social support from their families (Pinheiro & Coelho, 2017). Even though social support is an important factor associated with PA, this variable was not enough to encourage active commute to OGs (Silva et al., 2018). Future policies should attempt to integrate other groups.

Unlike other reviews, this one integrates quantitative, qualitative and mixed-methods studies and interventional studies. Also, non-published grey research literature was not included. In some papers, supporting quotations were not reported and this affected the comprehensiveness of data analysis. Not all authors analyse the same parameters or delve into them in the same way. This makes it difficult to first compare those studies and better understand the characteristics and OGs' users behaviours. Still, the findings of this review may help with a better knowledge of the OGs in public open space environments. The ultimate question is how can OG parks be used more and better?

This review is a complement to the one published by Fernández-Rodríguez et al. (2020). That one focused on the users' profile, giving a large amount of information and, in this case, it focuses on the patterns of use of the OGs and their profile. Results suggest that OGs might be acting as catalysts for the adoption of active lifestyles. Practicing in these places can enhance the physical and psychological health benefits; additionally, these places are also associated with a good level of PA.

CONCLUSIONS

These installations have positive effects, as they not only contribute to increase PA made by their users, but also because they attract people with sedentary lifestyles to make PA. These might contribute to make urban areas more liveable and safer, allowing to use cities' under-occupied public spaces.

In spite of the different cultural or geographical contexts where they take place, a better knowledge of OGs, would generate a more effective installation, design and use of the OG, giving rise to local and more effective national public health promotion policies. These findings are important for local government and health authorities committed to ensuring existing limited open space is purposeful and meets the active recreational needs of an increasing and ageing population. These installations have positive collateral effects, as they not only contribute to increasing PA made by their users, but also because they attract people with sedentary lifestyles to make PA.

It can be said that not only the design of the park (number of machines, shadows, fountains, instructors, services ...) is important. Other aspects can influence in a higher use of OGs; several authors consider that affordability, proximity to neighbours, marketing... were important factors for the success. As referred by the Toronto Charter (2010), it is important that the decision-makers promote PA by increasing access to public spaces. The location of OG seems to be an important factor concerning its potential to be used by the population. An OG located in a green area with several other sports facilities will have a greater impact than an isolated OG. Therefore, the promoting entities must study and analyse the choice of location made. OG may be excellent promoters of PA outdoors in addition to attracting users and becoming a decisive factor in the classification of the public space.

Practical implications

Few OGs were supported by a user guide and supervised classes by an instructor. An inadequate instructional support may provide a reason for current OG research demonstrating that users did not interact with the equipment with an adequate amount and intensity to achieve health benefits.

The number of equipment and types of equipment did not have a unified standard.

It seems that there are no objective criteria for the selection of the outdoor gym and the machines that make it up.

There were few intervention programs and it's a problem because they are essential to know the health outcomes.

It is necessary to operate in a community setting with local government engagement to maximise the usage of the OGs.

Many authors do not specify the type of methodology. Sometimes the same tool is used with a different name.

OGs take slightly different forms in different countries.

Few articles address a specific aspect in depth. Too many aspects are studied at once. It may be necessary to start addressing OG problems separately, specifically, to better solve them.

Current studies have indicated the existence of potential safety risks due to inappropriate usage behaviours.

The greatest demands for improvement in the OGs from the users were: benches close to the machines, roofs over the equipment, toilets, maintenance, variety of machines, lighting the area, security guards, instructor, better promotion and placing information signs.

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COMPETING INTERESTS

The authors declare that they have no competing interests.

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