ATTRIBUTES THAT PROVIDE QUALITY TO PUBLIC OPEN SPACES FOR THE OLDER ADULTS WALKING FOR LEISURE: A REVIEW

ATRIBUTOS QUE CONFEREM QUALIDADE AOS ESPAÇOS LIVRES PÚBLICOS PARA A CAMINHADA NO LAZER DE IDOSOS: UMA REVISÃO

ATRIBUTOS QUE CONFIEREN CALIDAD A LOS ESPACIOS PÚBLICOS ABIERTOS PARA LA CAMINATA RECREATIVA DE ADULTOS MAYORES: UNA REVISIÓN

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ABSTRACT

Regular physical activity is essential to improve and maintain the mental and physical health of the elderly and its practice is associated with the potential of urban open spaces. In order to support design and management of these urban spaces to be attractive to the elderly the central aim of this paper is to identify, through a systematic review of the literature, the attributes that provide quality to public open spaces for the walking for leisure of the elderly. The results showed that the spaces that observe the mobility limitations of the elderly allowing better accessibility conditions and the natural aspect of the environment are attributes desired by the elderly that appeared more frequently in the analyzed studies (they appeared in almost two thirds of them). Then there are the safety conditions and the quality of the sidewalks, mentioned in a little more than half of the studies. The proximity of these urban spaces to the elderly's residence, together with the relationship with water and infrastructure consisting of a walking path and the presence of benches, appeared in third place in the analyzed studies. Other attributes were identified; however, they appear less frequently in the studies that comprised this research.

KEYWORDS

Urban open spaces; urban green areas; leisure walking; older adults.

RESUMO

A atividade física regular apresenta-se como um elemento essencial para melhorar e manter a saúde mental e física dos idosos e sua prática está associada ao potencial dos espaços livres urbanos. No sentido de amparar decisões tanto de projeto quanto de gestão destes espaços urbanos para que sejam atrativos ao usufruto do idoso, o objetivo central deste artigo é identificar, através de uma revisão sistemática da literatura, os atributos que conferem qualidade aos espaços livres públicos para a caminhada no lazer de pessoas idosas. Os resultados apontaram que os espaços que observam as limitações de mobilidade do idoso permitindo melhores condições de acessibilidade e o aspecto natural do ambiente são atributos desejados pelos idosos que apareceram com maior frequência nos estudos analisados (figuraram em quase dois terços deles). Em seguida apareceram as condições de segurança e a qualidade das calçadas, mencionados em um pouco mais da metade dos estudos. A proximidade desses espaços urbanos da residência do idoso, juntamente com a relação com a água e infraestrutura composta por pista de caminhada e presença de bancos, apareceram em terceiro lugar nos estudos analisados. Outros atributos foram identificados, no entanto aparecem com menor frequência nos estudos que compuseram esta pesquisa.

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PALAVRAS-CHAVE

Espaços livres urbanos; áreas verdes urbanas; caminhada no lazer; idosos.

RESUMEN

La actividad física regular se presenta como un elemento esencial para mejorar y mantener la salud mental y física de las personas mayores, y su práctica está asociada al potencial de los espacios libres urbanos. Con el fin de respaldar decisiones tanto de diseño como de gestión de estos espacios urbanos para que resulten atractivos para el disfrute de las personas mayores, el objetivo central de este artículo es identificar, a través de una revisión sistemática de la literatura, los atributos que confieren calidad a los espacios públicos abiertos para la caminata recreativa de adultos mayores. Los resultados indicaron que los espacios que consideran las limitaciones de movilidad de los adultos mayores, permitiendo mejores condiciones de accesibilidad, así como el componente natural del entorno, son atributos valorados por este grupo etario y fueron los más frecuentemente mencionados en los estudios analizados (presentes en casi dos tercios de ellos). En segundo lugar, se destacaron las condiciones de seguridad y la calidad de las aceras, mencionadas en algo más de la mitad de los estudios. La proximidad de estos espacios urbanos a la residencia de los adultos mayores, junto con la presencia de elementos como cuerpos de agua, senderos peatonales y bancos, ocuparon el tercer lugar en los estudios revisados. Se identificaron otros atributos adicionales, aunque con menor frecuencia en los estudios que conformaron esta investigación.

PALABRAS CLAVE

Espacios libres urbanos; Áreas verdes urbanas; Caminata recreativa; Personas mayores.

1. INTRODUCTION

The increase in life expectancy has confirmed the global trend of population aging. According to the World Health Organization (2008), developing countries are aging at a much faster rate than developed countries. The proportion of people aged 60 and over will double, rising from 11% in 2006 to 22% in 2050.

With this demographic shift, the promotion of health and quality of life for older adults is becoming increasingly important. Active aging is the process of optimizing opportunities for health, participation, and security to enhance quality of life as people age. Active aging depends on a range of influences or determinants, including material conditions, social factors, and aspects of the urban environment that affect the behavior and feelings of individuals. Public spaces, buildings, transportation systems, and housing conditions in cities, when well-designed, contribute to safe mobility, social participation, autonomy, and, most importantly, encourage healthy behaviors among the elderly population (WHO, 2008).

In this context, regular physical activity is essential to improve and maintain the mental and physical health of this age group. A promising approach to promoting physical activity is associated with the potential of urban green spaces. In addition to reducing stress and facilitating social interaction, these areas can stimulate active behavior among the population. Several studies have shown that the physical activity levels of urban residents are positively associated with the accessibility and quality of public green spaces (PETERSEN et al, 2018).

In light of the above, and to support both design and management decisions for these urban spaces to make them attractive for elderly use, the central aim of this article is to identify, through a systematic literature review, the attributes that provide quality to public open spaces for leisure walking by older adults.

2. METHODOLOGICAL PROCEDURES

A systematic or methodological review is a model of scientific investigation that uses rigorous and explicit methods to identify, select, collect data, analyze, and describe relevant contributions to research. It aims to answer a clearly formulated question, in addition to gathering, critically evaluating, and synthesizing the results of multiple primary studies (CORDEIRO et al., 2007). According to Sampaio and Mancini (2007), systematic reviews are designed to be methodical, explicit, and reproducible. To achieve this, the research process is conducted according to a well-defined sequence of steps, following a pre-planned study protocol (KITCHENHAM, 2004).

Kitchenham (2004) divides the systematic review process into three phases: the first is planning, which includes the need for investigation and the development of a detailed research protocol; the second phase is conducting, which involves selecting studies and assessing their quality; and the third phase is synthesizing and communicating the results.

The systematic literature review in this article aimed to identify the attributes that provide quality to public open spaces for the leisure walking of older adults. To achieve this, the search strategy used terms related to quality, open spaces or green areas, walking, leisure, and older adults. The databases used for the research were Compendex (Engineering Village), Scopus, and Web of Science. The article screening was limited to those written in Portuguese, English, or Spanish and published up to 2019.

The following criteria were used for article selection:

- Inclusion: studies with elderly individuals in the sample; focus on public open spaces; study of environmental quality attributes; inclusion of walking as an activity.
- Exclusion: articles outside the study area; not primary data (systematic review); studies in rural areas; studies without elderly individuals in the sample; studies not focusing on public open spaces.

For the systematic literature review, the free software StArt (State of the Art through Systematic Review) developed by the Lapes laboratory at UFSCar was used, based on the methodology proposed by Barbara Kitchenham (2004), and includes three phases: planning, execution, and summarization. Initially, the search in the databases identified 186 articles using the search strategy mentioned earlier. After removing duplicate articles, the initial selection was made by reading the title, keywords, and abstract. This led to a second verification stage, with a more in-depth analysis of the selected material, resulting in 16 articles included (Table 01).

	Year	Author	Country	Public open spaces and the older adults walking for leisure
1	2018	COLOM et al.	Spain	Study explores the relationship between open public space and leisure-time physical activity in older adults at high cardiovascular risk in Palma de Mallorca, Spain.
2	2017	ARTMANN et al.	Austria, Germany, Norway, Poland, Romania and Slovenia	Study developed with shelter institutions, where the importance of green areas for the quality of life of the older adults was investigated, the importance of urban green spaces outside the shelter centers for the quality of life of the seniors and the consideration of natural and environmentally friendly projects aging.
3	2017	ZHAI; BARAN	China	Study carried out in two parks in Beijing, examining the link between the specific characteristics of the paths and the walking of elderly people.
4	2016	YUNG; CONEJOS; CHAN	China	Study developed to identify the social needs of elderly people regarding the use of open public spaces in urban renewal areas.
5	2016	SCHUETT et al.	South Korea	Study examined use of Seoraksan National Park in South Korea by older adults.
6	2016	LOUKAITOU-SID ERIS et al.	United States	Study designed to identify the preferences and challenges of low-income older adults in using neighborhood parks in Los Angeles, California.
7	2015	FINLAY et al.	Canada	Study designed to investigate how green and blue spaces affect the health and well-being of older adults in Vancouver, Canada.
8	2015	MITRA; SIVA; KEHLER	Canada	Study developed with older adults in Canada that explores the relationship between the built environment of the neighborhood and the activity of walking.
9	2014	PLESON et al.	China	Exploratory study sought to better understand older people's use and perceptions of community green spaces in Taipei, Taiwan.
10	2014	THOMPSON et al.	United Kingdom	A study developed from a street improvement program in the United Kingdom enabled a longitudinal study of the effect of changes on the activities of older adults, as well as on health and quality of life.
11	2013	CERIN et al.	China	Study designed to identify aspects of the neighborhood environment associated with leisure-time physical activity among older adults residents in an ultra-dense city.
12	2012	CARLSON et al.	United States	Study developed with older adults residents of Baltimore and Seattle evaluating psychosocial interactions and environmental correlates of physical activity.
13	2011	THOMPSON; ASPINALL	United Kingdom	Study designed to explore the relationship between access to open natural spaces and physical activity, health and quality of life.
14	2009	SUGIYAMA; WARD THOMPSON; ALVES	United Kingdom	Study designed to explore which aspects of neighborhood open spaces are associated with health, life satisfaction, and outdoor activity (walking) for older adults.
15	2008	SUGIYAMA; WARD THOMPSON	United Kingdom	Study examines which aspects of neighborhood open space are associated with walking for recreation and transportation for seniors.
16	2007	JORGENSEN; ANTHOPOULOU	United Kingdom	Study designed to explore the ways in which age affects the lives of urban residents. Aspirations, values and fears in relation to green areas and accessibility to the forest, focusing on the vision of older adults.

Table 1: Overview of papers included in the analysis.

Source: The authors (2020).

3. RESULTS AND DISCUSSION

This section describes the attributes identified in the systematic review that provide quality to public open spaces for leisure walking by the elderly population. The criteria were grouped by similarity for better textual cohesion, resulting in six categories: accessibility, landscape, safety, infrastructure, comfort, and activities in the urban environment (surroundings). In table 02 it is possible to find the frequency in which each attribute appeared in the analyzed studies.

Category	Atribute	Frequency	References
ACCESSIBILITY	ACCESSIBILITY ELEMENTS FOR REDUCED MOBILITY	10	ZHAI, BARAN, 2017; YUNG, CONEJOS, CHAN, 2016; SCHUETT et al., 2016; LOUKAITOU-SIDERIS et al., 2016; FINLAY et al., 2015; MITRA, SIVA, KEHLER, 2015; PLESON et al., 2014; CERIN et al., 2013; THOMPSON et al., 2014; JORGENSEN, ANTHOPOULOU, 2007;
	PRESENCE AND QUALITY OF SIDEWALKS	9	ARTMANN et al., 2017; ZHAI; BARAN, 2017; LOUKAITOU-SIDERIS et al., 2016; FINLAY et al., 2015; MITRA, SIVA, KEHLER, 2015; THOMPSON et al., 2014; CARLSON et al., 2012; SUGIYAMA, WARD THOMPSON, ALVES, 2009; SUGIYAMA, WARD THOMPSON, 2008.
	PROXIMITY OF PUBLIC OPEN SPACES TO RESIDENCES	7	COLOM et al., 2018; YUNG, CONEJOS, CHAN, 2016; MITRA, SIVA, KEHLER, 2015; PLESON et al., 2014; FINLAY et al., 2015; THOMPSON, ASPINALL, 2011; SUGIYAMA, WARD THOMPSON, ALVES, 2009.
	ACCESS TO PUBLIC TRANSPORTATION	4	YUNG, CONEJOS, CHAN, 2016; PLESON et al., 2014; THOMPSON et al., 2014; LOUKAITOU-SIDERIS et al., 2016.
LANDSCAPE	NATURAL LANDSCAPE	10	ZHAI, BARAN, 2017; YUNG, CONEJOS, CHAN, 2016; LOUKAITOU-SIDERIS et al., 2016; FINLAY et al., 2015; MITRA, SIVA, KEHLER, 2015; THOMPSON et al., 2014; CERIN et al., 2013; THOMPSON, ASPINALL, 2011; SUGIYAMA, WARD THOMPSON, ALVES, 2009; SUGIYAMA, WARD THOMPSON, 2008
	RELATIONSHIP WITH WATER	7	ZHAI, BARAN, 2017; LOUKAITOU-SIDERIS et al., 2016; YUNG, CONEJOS, CHAN, 2016; THOMPSON et al., 2014; THOMPSON, ASPINALL, 2011; FINLAY et al., 2015; SUGIYAMA, WARD THOMPSON, 2008
	VISUAL/AESTHETIC QUALITY OF THE LANDSCAPE	6	YUNG, CONEJOS, CHAN, 2016; CERIN et al., 2013; CARLSON et al., 2012; THOMPSON, ASPINALL, 2011; SUGIYAMA, WARD THOMPSON, ALVES, 2009; SUGIYAMA, WARD THOMPSON, 2008
	MAINTENANCE	4	YUNG, CONEJOS, CHAN, 2016; THOMPSON et al., 2014; CERIN et al., 2013; THOMPSON, ASPINALL, 2011
	LEGIBILITY	2	LOUKAITOU-SIDERIS et al., 2016; JORGENSEN, ANTHOPOULOU, 2007
SAFETY	SAFETY	9	YUNG, CONEJOS, CHAN, 2016; LOUKAITOU-SIDERIS et al., 2016; FINLAY et al., 2015; MITRA, SIVA, KEHLER, 2015; PLESON et al., 2014; CERIN et al., 2013; SUGIYAMA, WARD THOMPSON, ALVES, 2009; SUGIYAMA, WARD THOMPSON, 2008; JORGENSEN, ANTHOPOULOU, 2007

Category	Atribute	Frequency	References
INFRASTRUCTURE	PRESENCE OF SUITABLE WALKING PATHS	7	ARTMANN et al., 2017; ZHAI, BARAN, 2017; YUNG, CONEJOS, CHAN, 2016; SCHUETT et al., 2016; LOUKAITOU-SIDERIS et al., 2016; FINLAY et al., 2015; JORGENSEN, ANTHOPOULOU, 2007
	BENCHES	7	ZHAI, BARAN, 2017; YUNG, CONEJOS, CHAN, 2016; MITRA, SIVA, KEHLER, 2015; JORGENSEN, ANTHOPOULOU, 2007; LOUKAITOU-SIDERIS et al., 2016; FINLAY et al., 2015; CERIN et al., 2013
	PUBLIC RESTROOMS	6	YUNG, CONEJOS, CHAN, 2016; THOMPSON, ASPINALL, 2011; SUGIYAMA, WARD THOMPSON, ALVES, 2009; LOUKAITOU-SIDERIS et al., 2016; FINLAY et al., 2015; CERIN et al., 2013
	PRESENCE OF PLAYGROUND EQUIPMENT	3	YUNG, CONEJOS, CHAN, 2016; SUGIYAMA, WARD THOMPSON, ALVES, 2009; SUGIYAMA, WARD THOMPSON, 2008
	EXERCISE AND RECREATION EQUIPMENT	2	PLESON et al., 2014; LOUKAITOU-SIDERIS et al., 2016
	LIGHTING	2	ZHAI; BARAN, 2017; LOUKAITOU-SIDERIS et al., 2016
COMFORT	RESTING AREAS	6	ZHAI, BARAN, 2017; SCHUETT et al., 2016; LOUKAITOU-SIDERIS et al., 2016; MITRA, SIVA, KEHLER, 2015; SUGIYAMA, WARD THOMPSON, ALVES, 2009; SUGIYAMA, WARD THOMPSON, 2008
	POLLUTION PERCEPTION	1	CERIN et al., 2013
ACTIVITIES IN THE URBAN ENVIRONMEN	TRAFFIC CONDITIONS	3	MITRA, SIVA, KEHLER, 2015; LOUKAITOU-SIDERIS et al., 2016; FINLAY et al., 2015
	LAND USE DIVERSITY	2	MITRA, SIVA, KEHLER, 2015; SUGIYAMA, WARD THOMPSON, 2008

Table 2: Attributes identified in the systematic review that provide quality to public open spaces for leisure walking by older adults.
Source: The authors (2020).

3.1. Accessibility

Within the accessibility category, the following attributes were identified: accessibility elements for reduced mobility, presence and quality of sidewalks, proximity and access to public transport.

Regarding **accessibility elements for reduced mobility**, older adults are aware of the limitations due to age, and since walking is perceived as a symbol of independence, accessible locations that allow this autonomy in movement were frequently mentioned as preferences by the elderly, appearing in 10 studies. Mobility-related aspects included spaces with ramps, no level changes, handrails, appropriate pathways without obstacles, and easy access by car or on foot (ZHAI; BARAN, 2017; YUNG; CONEJOS; CHAN, 2016; SCHUETT et al., 2016; LOUKAITOU-SIDERIS et al., 2016; FINLAY et al., 2015; MITRA; SIVA; KEHLER, 2015; PLESON et al., 2014; CERIN et al., 2013; THOMPSON et al., 2014; JORGENSEN; ANTHOPOULOU, 2007).

Moreover, the need for autonomy is strongly associated with park visits by older adults. Well-designed spaces that cater to this specific need, despite physical instability and frailty, motivate the elderly to use them. Although walking is considered the easiest outdoor activity, if accessibility is not designed properly, difficulties may arise for elderly use, reducing the visitation experience and the likelihood of returning (GIBSON, 2018).

Environmental features can be crucial for maintaining the ability to walk outdoors. Avoiding walking in environments perceived as barriers can reduce regular physical activity, leading to a sedentary lifestyle and a decline in mobility. When walking becomes difficult, outdoor walking is usually the first stage to be affected, and environmental challenges can further reduce it (ERONEN et al., 2014).

The loss of mobility is an important factor in the decline of well-being with aging and leads to increased muscle loss, social isolation, and cognitive decline. If certain places are hostile to any elderly person, their impact may be doubly disabling for those with dementia. Some of the restrictions imposed on older adults' mobility are due to urban landscape maintenance: quality of pavement, good public lighting, improved pedestrian crossing times, legible and easily accessible locations contribute to the impression of an elderly-friendly environment (GILROY, 2008).

The **presence and quality of sidewalks** were another significant theme that emerged from the analyzed articles. The absence, poor maintenance, and physical obstructions on sidewalks were frequently mentioned as potential barriers to walking. In contrast, wide sidewalks, well-demarcated from vehicle traffic, accessible, and with appropriate pavement were seen as promoters of leisure walking for older adults (ARTMANN et al., 2017; ZHAI; BARAN, 2017; LOUKAITOU-SIDERIS et al., 2016; FINLAY et al., 2015; MITRA; SIVA; KEHLER, 2015; THOMPSON et al., 2014; CARLSON et al., 2012; SUGIYAMA; WARD THOMPSON; ALVES, 2009; SUGIYAMA; WARD THOMPSON, 2008).

Due to limited mobility, older adults are more sensitive to uneven surfaces, preferring paths with regular pavement and avoiding cobblestones or grass-brick surfaces. Large stone pavements tend to have cracks, making walking surfaces uneven, which may explain why these paths are less used by the elderly. Additionally, knee muscle strength decreases with age, and appropriate pavement can cushion the pressure of walking (ZHAI, BARAN, 2017).

Regarding the **proximity of public open spaces to residences**, older adults reported that having a park or another nearby public open space (POS) within walking distance contributes to healthy aging. The proximity of these spaces encourages outdoor activities and increases the frequency of visits, helping maintain their abilities and promote healthy lifestyles (COLOM et al., 2018; YUNG; CONEJOS; CHAN, 2016; ; FINLAY et al., 2015; MITRA; SIVA; KEHLER, 2015; PLESON et al., 2014; THOMPSON; ASPINALL, 2011; SUGIYAMA; WARD THOMPSON; ALVES, 2009).

A study by Mowen et al. (2007) conducted in Cleveland, Ohio, revealed that the perceived proximity of a park (e.g., if a park was perceived as being within walking distance of home) was directly related to the frequency of visits by older adults. As expected, respondents who reported living within walking distance of a park were more likely to visit it frequently.

In a study conducted with older adults in Taiwan, some participants reported that their decision on where to live in Taipei was influenced by the proximity to community green spaces. Additionally, proximity to elderly housing influences their decision to use these areas, and living farther away was highlighted as a barrier to using these spaces. Most respondents reported walking to green spaces, indicating that it took 15 minutes or less to reach the location (PLESON et al., 2014). Furthermore, a study conducted in Korea revealed that older adults did not use public spaces with exercise infrastructure located far away if they were not satisfied with the physical activity environment at a shorter distance, in contrast to the results for young adults (AN, LEE, KIM, 2013).

A study with older adults in Great Britain showed that having a pleasant and safe open space, whether a park, square, or beach, within walking distance was significantly associated with health status, life satisfaction, and time spent walking. The availability of open spaces near residences has practical implications for older adults, especially for those with less strength or endurance, who are slower and may need opportunities to rest (SUGIYAMA; WARD THOMPSON; ALVES, 2009).

Regarding **access to public transportation**, although older adults usually walk to public open spaces, the ease of accessing public transport contributes to the use of these spaces, offering options for elderly individuals with limited mobility or who live farther away, beyond walking distance (YUNG; CONEJOS; CHAN, 2016; LOUKAITOU-SIDERIS et al., 2016; PLESON et al., 2014; THOMPSON et al., 2014).

Yung et al. (2016) conducted a study with older adults in Hong Kong and identified three factors considered barriers to visiting public spaces: lack of accessibility, inadequate public transportation, and distance. This issue is also related to the distribution of public open spaces within the urban network, which often lack connectivity to the rest of the infrastructure, making them isolated points.

3.2. Landscape

Within the landscape category, the following attributes were identified: natural landscape, relationship with water, visual quality of the landscape, maintenance, and legibility.

The **natural landscape** and connection with nature were elements highly preferred by the elderly population, appearing in 10 of the analyzed articles. Natural areas (green and blue spaces) contribute to passive recreation, social interaction, and physical

activity, improving the quality of life of the elderly, especially due to their therapeutic capacity and symbolic benefits (ZHAI; BARAN, 2017; YUNG; CONEJOS; CHAN, 2016; MITRA; SIVA; ; LOUKAITOU-SIDERIS et al., 2016; FINLAY et al., 2015; KEHLER, 2015; THOMPSON et al., 2014; ; CERIN et al., 2013; THOMPSON; ASPINALL, 2011; SUGIYAMA; WARD THOMPSON; ALVES, 2009; SUGIYAMA; WARD THOMPSON, 2008).

A study conducted in Edinburgh aimed to explore the elderly's responses to different urban locations and their mobility in the built environment, using mixed methods, one of which was electroencephalography. Urban green spaces were preferred by participants for being calmer and quieter than busy street segments. Flowers and natural elements of the space provided pleasure to participants and contributed to a calming effect. The urban occupied spaces had more negative associations, caused by litter, uneven pavements, and obstacles, resulting in participants being more alert and more likely to ask for directions. This indicates that built urban spaces tend to impose a higher cognitive load on the elderly, potentially leading to more negative mood states (TILLEY et al., 2017).

Finlay et al. (2015) complement these findings on the crucial role the natural landscape plays in the daily lives of the elderly. In this study with elderly participants from Vancouver, Canada, interactions with therapeutic landscapes such as parks, gardens, street vegetation, lakes, and the ocean influenced participants' perceptions of physical, mental, and social health. For physical well-being, interviewees felt motivated to leave their homes for exercise and to enjoy fresh air. For mental well-being, the experiences evoked feelings of renewal, rejuvenation, and restoration. Rachel Kaplan and Stephen Kaplan were pioneers in this field, conducting research showing that individuals with access to nearby natural environments are healthier than others.

In the study published by Sánchez-Gonzáles et al. (2018), the results indicated that exposure to natural landscape features such as trees and flowers contributes to healthy aging, promoting daily leisure activities and social relationships, improving health perception, and reducing the need for assistance. Health perception was significantly associated with proximity to a park, frequency of park visits, presence of memories and experiences, frequency of leisure activities, and frequency of social interactions, highlighting the importance of the natural landscape for the physical and mental health of the elderly population.

Regarding the **relationship with water**, the elderly's preference for contact with rivers, lakes, and beaches emerged as a motivating attribute in the articles reviewed. This relationship can be visual or through paths laid out along waterways, making the visitation experience more pleasant (ZHAI; BARAN, 2017; YUNG; CONEJOS; CHAN, 2016; LOUKAITOU-SIDERIS et al., 2016; FINLAY et al., 2015; THOMPSON et al., 2014; THOMPSON; ASPINALL, 2011; SUGIYAMA; WARD THOMPSON, 2008).

In a study conducted with elderly participants in the UK, they revealed a preference for walking in spaces near water, such as by the sea or along a canal. The study indicated that this linear water feature is more interesting for promoting walking than the sparse presence of water in parks (SUGIYAMA; THOMPSON, 2008). Furthermore, in a study conducted with elderly participants in China, it was found that shaded paths along a body of water, providing lateral visibility and visual connection with the water, also encourage the elderly to walk (ZHAI; BARAN, 2017).

However, the relationship with water is not limited to the elderly population. A study by Bauman et al. (1999) investigated the effect of the coast on the physical activity of residents of New South Wales, Australia, and found that proximity to the coast was independently associated with higher levels of physical activity. After adjusting for other significant demographic factors, those living in a coastal postal code were 23% less likely to be sedentary, 27% more likely to report adequate activity levels, and 38% more likely to report high levels of physical activity.

In the Brazilian context, a study conducted in Recife sought to evaluate physical activity in parks that were either part of or not part of the "Academia da Cidade" program. Most users were engaged in walking activities, particularly in beach areas. It is worth noting that three out of the four locations observed along the coast have infrastructure for walking and running, explaining the higher percentage of people engaged in walking and vigorous activities compared to other areas (PARRA et al., 2010b).

Regarding the **visual/aesthetic quality of the landscape**, an attractive and aesthetically pleasant environment was found to encourage the use of public leisure spaces by the elderly. Being active and going out depends largely on the individual, but the importance of environmental aesthetics and attractiveness should not be underestimated (YUNG; CONEJOS; CHAN, 2016; CERIN et al., 2013; CARLSON et al., 2012; THOMPSON; ASPINALL, 2011; SUGIYAMA; WARD THOMPSON; ALVES, 2009; SUGIYAMA; WARD THOMPSON, 2008).

According to the study published by Sang et al. (2016), urban green spaces are more aesthetically appreciated as age advances. Green spaces classified as having a high perceived naturalness tend to generate more activities, higher aesthetic values, and greater well-being for elderly individuals living near these areas. It was found that, in the perception of green spaces, the older the interviewee, the higher the evaluation of characteristics such as species diversity, lush space, beautiful space, and varied space.

Issues related to site **maintenance** indicate that places with signs of vandalism, disorder, damaged equipment, and scattered litter provide negative perceptions for the elderly (YUNG; CONEJOS; CHAN, 2016; THOMPSON et al., 2014; THOMPSON; CERIN et al., 2013; ASPINALL, 2011). The presence of vandalism is a barrier to the use of public spaces, as the elderly consider these signs to indicate the presence of individuals who may compromise the personal safety of this more vulnerable age group (THOMPSON, ASPINALL, 2011).

Site **legibility** was considered relevant to the elderly, as it is also related to personal safety. The fear of getting lost or disoriented in places can prevent them from frequenting public spaces (LOUKAITOU-SIDERIS et al., 2016; JORGENSEN; ANTHOPOULOU, 2007). Wayfinding strategies suggested range from a clear and well-defined urban design that enables a sense of orientation and environmental understanding to good signage through signs (LOUKAITOU-SIDERIS et al., 2016).

3.3. Safety

Perception of **safety** and protection ranks among the top three most significant criteria for the elderly population, appearing in nine of the analyzed articles. The studies show that, in addition to the fear of being victims of robbery or other physical violence, the elderly are concerned with situations such as falls due to poorly maintained sidewalks, being hit by cars because of heavy traffic, and the fear of getting lost or disoriented due to urban design or lack of legibility in the area (YUNG; CONEJOS; CHAN, 2016; LOUKAITOU-SIDERIS et al., 2016; FINLAY et al., 2015; MITRA; SIVA; KEHLER, 2015; PLESON et al., 2014; CERIN et al., 2013; SUGIYAMA; WARD THOMPSON; ALVES, 2009; SUGIYAMA; WARD THOMPSON, 2008; JORGENSEN; ANTHOPOULOU, 2007).

In the study conducted by Sugiyama and Thompson (2008), safety was considered a key factor for recreational walks among elderly people in the UK, referring both to the green space itself and the surrounding area. Among elderly residents of Los Angeles, the perception of a lack of safety was considered a significant barrier to park visitation. Focus group participants reported being victims of robbery, theft, and "disrespectful behaviors" from young people in public spaces. Additionally, they expressed concerns about homeless people, drunk individuals, gang members, drug dealers, and loiterers in parks. These perceived threats and the psychological factors associated with insecurity largely prevent many elderly people from visiting parks (LOUKAITOU-SIDERIS et al., 2016).

3.4. Infrastructure

Within the category of infrastructure, the following attributes were identified: walking paths, the presence of benches, public restrooms, playground equipment, exercise equipment, and lighting.

The **presence of suitable walking paths** was mentioned in several articles as encouraging active aging. Seniors highlighted that pathways and trails should be comfortably wide, have appropriate paving, be continuous, and lead to interesting points in the area, along with resting areas along the route (ARTMANN et al., 2017; ZHAI; BARAN, 2017; YUNG; CONEJOS; CHAN, 2016; JORGENSEN; ANTHOPOULOU, 2007; SCHUETT et al., 2016; LOUKAITOU-SIDERIS et al., 2016; FINLAY et al., 2015).

A study with elderly Koreans investigated their behavior, preferences, and experiences visiting Seoraksan National Park. Overall satisfaction was very positive, with the trail being a significant factor in their enjoyment (SCHUETT et al., 2016).

While individuals can walk on streets and sidewalks, walking paths in parks provide an opportunity to walk in nature, away from vehicle traffic interruptions. A U.S. study comparing 174 parks found that those with walking paths had 80% more users and 90% higher levels of moderate-to-vigorous physical activity, especially among elderly visitors (COHEN et al., 2017). Parks with walking paths attracted more seniors, who tend to have reduced mobility, as they could walk more comfortably without interruptions. Given the decline in physical activity with age, walking paths may offer a viable, accessible way to reduce sedentary behavior in seniors and the general population (COHEN et al., 2017).

Benches are important for elderly walkers. Since they tire easily, places with rest areas are essential. Benches along trails and paths can encourage seniors to engage

in physical activity and visit public spaces. Seniors also value diverse seating options, allowing for both solitude and social interaction, and prefer benches in both sunny and shaded areas (ZHAI; BARAN, 2017; YUNG; CONEJOS; CHAN, 2016; LOUKAITOU-SIDERIS et al., 2016; MITRA; SIVA; KEHLER, 2015; FINLAY et al., 2015; CERIN et al., 2013; JORGENSEN; ANTHOPOULOU, 2007).

Zhai and Baran (2017) conducted a study in China, examining the relationship between infrastructure in two Beijing parks and elderly walking behavior. They found that paths with more benches were more frequently used by seniors, who also suggested more benches should be installed.

Regarding **public restrooms**, seniors have a significant demand for them in public spaces due to physical limitations and the time they spend in parks (YUNG; CONEJOS; CHAN, 2016; THOMPSON; LOUKAITOU-SIDERIS et al., 2016; FINLAY et al., 2015; CERIN et al., 2013; ASPINALL, 2011; SUGIYAMA; WARD THOMPSON; ALVES, 2009). In a study by Thompson and Aspinall (2011), the provision of facilities such as restrooms, along with the quality of green spaces and the absence of vandalism, were the most relevant attributes for park enjoyment among seniors.

The **presence of playground equipment** was identified as an attraction in public leisure spaces. As many seniors take care of children or accompany their grandchildren in outdoor activities, playgrounds contribute to social engagement and promote a more active lifestyle (YUNG; CONEJOS; CHAN, 2016; SUGIYAMA; WARD THOMPSON; ALVES, 2009; SUGIYAMA; WARD THOMPSON, 2008).

Regarding **exercise and recreation equipment**, seniors mentioned these as important attributes in public spaces. Sports courts and outdoor gyms encourage healthy habits and physical activity (PLESON et al., 2014; LOUKAITOU-SIDERIS et al., 2016). In a study in Taipei, Taiwan, seniors expressed satisfaction with how the government equipped green spaces, including age-appropriate exercise equipment that promoted health and intergenerational interaction (PLESON et al., 2014).

Adequate **lighting** in public spaces is associated with a sense of safety for seniors. The presence of lighting along pathways was a quality attribute, particularly along walkways (ZHAI; BARAN, 2017; LOUKAITOU-SIDERIS et al., 2016). A study in Florianópolis, Brazil, found a correlation between public lighting and physical activity levels, with 80.6% of seniors reporting poor lighting being inactive or minimally active (CORSEUIL, 2011).

3.5. Comfort

Within the category of comfort, the following attributes were identified: resting areas and pollution perception.

Regarding **resting areas**, as previously mentioned, seniors need places to sit and rest. Spaces designed for passive leisure, shaded areas for rest and contemplation, were cited as necessary for elderly leisure walks in public open spaces (ZHAI; BARAN, 2017; SCHUETT et al., 2016; LOUKAITOU-SIDERIS et al., 2016; MITRA; SIVA; KEHLER, 2015; SUGIYAMA; WARD THOMPSON; ALVES, 2009; SUGIYAMA; WARD THOMPSON, 2008). In the absence of sufficient benches, some seniors reported using shopping centers or other public places as rest areas during regular walks. These spaces provided not only rest but also opportunities for informal socialization (MITRA; SIVA; KEHLER, 2015).

A study in Mexico found that 62.5% of elderly participants visited the national park one or more days per week, reporting high or very high levels of social interaction. Furthermore, 56.6% of Mexican seniors said they frequently engaged in leisure and rest activities, compared to 18.8% who reported little or no participation (SÁNCHEZ-GONZÁLEZ et al, 2018).

Regarding **pollution perception**, high noise levels, unpleasant odors, and the presence of smoke were reported as deterrents to elderly participation in physical leisure activities (CERIN et al., 2013). A study by Rey Gozalo et al. (2018) measured noise levels in the main green areas of Cáceres, Spain, and found a significant relationship between satisfaction with noise levels and overall space satisfaction. Elderly participants reported lower satisfaction with certain characteristics of green spaces and expressed greater annoyance with certain sound sources.

3.6. Activities in the urban environment

Within the category of activities in the urban environment, the following attributes were identified: traffic conditions and land use diversity.

Traffic conditions in the neighborhood and around leisure spaces impact the use of these areas for elderly leisure walking. Many report that heavy traffic not only causes noise pollution but also hinders mobility and intimidates seniors due to high speeds (MITRA; SIVA; KEHLER, 2015; FINLAY et al., 2015; LOUKAITOU-SIDERIS et al., 2016).

Canadian seniors discussed traffic conditions around their neighborhoods and their relationship with walking.

Regardless of residential location, participants expressed concern about wide and busy streets (i.e., "too many cars"), the importance of stop signs at intersections, and the need for pedestrian signals adjusted to the walking speed of older adults. The results suggest that high-quality and safe walking infrastructure can facilitate physical activity among seniors (MITRA; SIVA; KEHLER, 2015).

Regarding **land use diversity**, easy access to shops, banks, restaurants, and other establishments was mentioned as a facilitator of walking around seniors' residences (MITRA; SIVA; KEHLER, 2015; SUGIYAMA; WARD THOMPSON, 2008). Neighborhood shops are important and frequent destinations. Seniors appreciate the proximity and variety of commercial establishments as they often stop to sit and rest, use the restroom, have a coffee, and shop (MITRA; SIVA; KEHLER, 2015).

4. FINAL CONSIDERATIONS

As the population reaches an increasingly higher life expectancy, healthy aging has become a priority across various fields of study. This longer-living society has introduced specific needs that require urban planners to make cities accessible for all.

The influence of the environment on the behavior of older adults has emerged as a crucial strategy in promoting health and quality of life, potentially encouraging or creating barriers to active behavior among this demographic. This systematic review aimed to identify the attributes that enhance the quality of public open spaces for elderly walking.

After analyzing the 16 selected articles, it was possible to categorize the identified attributes into six categories: accessibility, landscape, infrastructure, safety, comfort, and activities in the urban environment. The characteristics most frequently mentioned in the studies were related to accessibility and landscape. Respondents reported that accessible locations allow for the independence and autonomy of older adults, while green areas, in addition to providing contact with nature and restorative environments, offer leisure and contemplation.

Understanding the needs and preferences of older adults can aid in the creation of more inclusive cities, contributing to the quality of urban spaces and the promotion of active aging.

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