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Definitions of quality standards for open public spaces and their distribution in Pelotas, Rio Grande do Sul, Brazil

Definições de padrões de qualidade de espaços públicos abertos e sua distribuição em Pelotas, Rio Grande do Sul, Brasil

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ABSTRACT

Introduction: Open Public Spaces (OPS) are attributes that seek to expand access to leisure and physical activity (PA). Objective: To define OPS with good quality and suitability for use and PA practice, and to identify their distribution in Pelotas, Rio Grande do Sul, Brazil. Methods: Quantitative research that evaluated OPS using the Physical Activity Resource Assessment. The study analyzed items on PA, comfort, cleanliness, aesthetics, and safety. Three definitions with minimum criteria for a good-quality OPS were presented based on the flexibilization of requirement criteria. The study analyzed the distribution of good-quality OPS by average income and surrounding population density. Results: Of the 338 OPS evaluated, only 1.2% presented at least two structures for PA, lighting, benches, and trash cans in good condition, and a few signs of scattered litter, vandalism, and overgrown grass; 3.3% of the spaces have at least two good quality structures for PA, lighting, benches and trash cans in good condition, and little litter, vandalism, or overgrown grass, while 11.5% have at least two good quality structures for PA, lighting, benches, or trash cans in good condition, and few signs of litter, vandalism, or overgrown grass. We found a discrepancy in distribution across neighborhoods, as well as a directly proportional relationship between quality and household income. Conclusion: By defining OPS quality, we identified a small number of spaces and an unequal distribution across Pelotas neighborhoods.

Keywords: Green areas; Built environment; Leisure activities.

RESUMO

Introdução: Os Espaços Públicos Abertos (EPA) são atributos que buscam ampliar o acesso ao lazer e à prática de atividade física (AF). Objetivo: Definir os EPA com boa qualidade e adequação para utilização e prática de AF, identificando sua distribuição em Pelotas, Rio Grande do Sul, Brasil. Métodos: Pesquisa quantitativa que avaliou os EPA utilizando o Physical Activity Resource Assessment. Itens de estrutura para AF, conforto do usuário, condições de limpeza, estética e segurança foram analisados. Três definições para um EPA de qualidade boa foram apresentadas a partir da flexibilização nos critérios de exigência. A distribuição dos EPA de boa qualidade conforme renda média e densidade populacional do entorno foi analisada. Resultados: Dos 338 EPA avaliados, 1,2% apresentaram pelo menos duas estruturas para AF, iluminação, bancos e lixeiras em boas condições e poucos sinais de lixo espalhado, vandalismo e mato/grama alta; 3,3% dos espaços apresentam pelo menos duas estruturas para AF em boa qualidade, iluminação, bancos e lixeiras em boas condições e pouco lixo espalhado ou vandalismo ou mato/grama alta; e, 11,5% apresentam pelo menos duas estruturas para AF em boa qualidade, iluminação ou bancos ou lixeiras em boas condições e poucos sinais de lixo espalhado ou vandalismo ou mato/grama alta. Verificou-se uma discrepância quanto à distribuição entre os bairros e uma relação diretamente proporcional entre a qualidade e a renda familiar. Conclusão: Ao incluir uma definição de qualidade nos EPA, foi verificado um pequeno quantitativo de espaços e uma distribuição desigual entre os bairros de Pelotas.

Palavras-chave: *Áreas verdes; Ambiente construído; Atividades de lazer.*

Introduction

Low levels of physical activity (PA) among the world's population, particularly in low- and middle-income countries, are concerning indicators directly linked to the high occurrence of chronic noncommunicable diseases[1], highlighting the importance of regular PA for overall population health. Data from the 2019 National Health Survey (*Pesquisa Nacional de Saúde* – PNS), released by the Brazilian Institute of Geography and Statistics, showed that 40.3% of the Brazilian adult

population was insufficiently active[2], that is, did not achieve 150 minutes of moderate PA per week. Among PA domains, leisure-time PA stands out as the context in which the population could, ideally, choose to engage in PA and in which public authorities can intervene at the population level.

The study of leisure, understood within a multidisciplinary context, has gained considerable attention from researchers in recent decades. It is a phenomenon of modern society linked to various themes and fields of study, encompassing cultural, social, political, and economic aspects[3]. The 1988 Constitution of the Federative Republic of Brazil recognizes leisure as a social right and makes public authorities responsible for promoting it, aiming to foster social advancement[4]. Therefore, in light of this progress, the State has a duty to legislate and implement specific public policies to provide equitable access to leisure spaces, culminating in social justice.

Among the possibilities to increase leisure opportunities and expand access to PA practices are Open Public Spaces (OPS)[5], namely parks, squares, gardens, and green areas that are freely accessible to the general population. These spaces become essential when the intent is to enable the population to access leisure space and practice PA[6]. In this sense, leisure is closely linked to health promotion and quality of life; however, as in other areas, it also faces barriers and inequalities in access. Evidence shows that people with higher socioeconomic status engage in more leisure-time PA than those with lower socioeconomic status[7]. This finding demonstrates inequality in access to leisure activities and services and the need to implement measures and actions to democratize access.

Regarding PA practice, as important as the existence of a space intended for its use is, so are its access characteristics, perceived safety, and good-quality, well-maintained structures[8]. These attributes, along with the distance from residences to these spaces, favor and enhance access to and use of these locations[9], contributing to the enjoyment and benefits of leisure and PA.

In Pelotas, Rio Grande do Sul, Brazil, two studies were conducted, one in 2012 and another in 2023, to describe the distribution, quality, and suitability of OPS for PA practice[10,11]. In 2012, 57.6% of squares and parks presented at least one characteristic for PA practice. Regarding quality, 45.7% of structures were of good quality. Furthermore, census tracts with higher average household income had more public leisure spaces[10]. A decade later, to evaluate changes over time, an increase was found in the number of public leisure spaces, as well as an increase in the number of attributes for PA. However, the quality of PA structures decreased, and the distribution of spaces by average household income remained unchanged over the evaluation period [11].

In this sense, in addition to mapping and monitoring the presence and quality of OPS across different contexts, it is necessary to identify the characteristics required for an OPS to be considered of good quality for PA practice, which can help public authorities intervene in other spaces. Furthermore, it is essential to consider the quality of certain characteristics when distributing OPS to combat possible discrepancies in access to these locations. The objective of the present study was to define OPS of good quality and suitability for use and PA practice, and to identify their distribution in Pelotas, Rio Grande do Sul, Brazil.

Methods

This cross-sectional, quantitative study forms part of a broader study that identified OPS in the urban area of Pelotas, Rio Grande do Sul, Brazil, and assessed their quality for PA practice, conducted between October 2023 and January 2024[11]. The Secretariat of City Management and Urban Mobility of the Pelotas City Hall provided the locations of the assessed spaces and made available a map of the city's green areas. The assessed sites considered OPS were parks, squares, and usable green strips/median plots. The remaining non-assessable areas were defined as non-usable green strips/median plots, occupied areas, or inaccessible areas.

To assess the quality of the OPS, the Physical Activity Resource Assessment (PARA) instrument[12] was used, with a protocol translated and adapted for the Brazilian context[13], widely used in national studies[10,11,14,15], which has classification items referring to characteristics that enable PA practice, comfort attributes, and conditions of cleanliness, aesthetics, and safety. For the auditing process, a team of seven research assistants from the Physical Education course at the Federal University of Pelotas was formed, who participated in theoretical-practical training encompassing: (a) a study of the instrument; (b) practical application; and (c) a pilot study in pre-selected areas. These actions aimed at standardizing the assessments, and further methodological details are available in the literature[11].

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The indicators described in the present study include comfort structure, PA structure, and cleanliness, aesthetics, and safety conditions. Based on previous evidence, the researchers sought to define criteria for attributes that favor PA practice and for an OPS model considered adequate, safe, and effective for use, to serve as a quality-standard reference. We considered spaces with high-quality PA equipment, good aesthetics, and a strong perception of safety important for PA practice, compared with those lacking these attributes. In light of these statements, we selected attributes considered essential to promote PA practice and the use of OPS. The indicators include attributes for PA practice, comfort, cleanliness, aesthetics, and safety[5]. Having defined the categories, we progressively made the indicators' requirement levels more flexible to analyze how the number of qualifying spaces would behave.

We created three indicators following a decreasing order of requirement levels, namely: (a) Indicator 1 – spaces that present at least two PA structures in good quality, lighting, benches, and trash cans in good condition for use, and few signs of scattered litter, vandalism, and overgrown grass; (b) Indicator 2 – spaces with at least two PA structures in good quality, lighting, benches, and trash cans in good condition for use, and few signs of scattered litter or vandalism or overgrown grass. This second indicator maintains the requirements for PA structures and user comfort, but diminishes the requirements related to cleanliness, aesthetics, and safety; and (c) Indicator 3 – spaces that present at least two PA structures in good quality, lighting or benches or trash cans in good condition for use, and few signs of scattered litter or vandalism or overgrown grass. The third and final indicator includes only the requirements for PA structures, disregarding user comfort, cleanliness, aesthetics, and safety. We revised the indicators by replacing the conjunction "and," which refers to the sum of requirements, with "or," which refers to alternation. After identifying OPS meeting this standard, we observed their distribution in the city's urban area.

We performed descriptive analyses in Stata 17.0, presenting the absolute and relative numbers of OPS characteristics, as well as their distribution in the city. To count public spaces by Pelotas macro-region for each OPS indicator with adequate quality, we used the Summarize Within tool in ArcGIS Pro (version 3.2.0). Pelotas is territorially organized into seven administrative regions, according to the Master Plan (Plano Diretor)[16], called macro-regions, namely Areal, Três Vendas, Fragata, Barragem, São Gonçalo, Laranjal, and Centro. To characterize the spaces by indicators, we marked a 500 m buffer around each space and analyzed the average population density and income data of the census tracts within each buffer. We chose a 500 m radial buffer because it is a distance people can walk in 10 to 15 minutes and because recreational spaces close to residences influence PA[17]. We obtained population density data (inhabitants per km^2) and the income of the household head from the 2022 Demographic Census[18]. Results are presented as median, minimum, maximum, and interquartile range.

The Global Moran's Index was used to identify global spatial clusters, assessing whether the averages of population density and income of the household head within 500 m of each space, according to each indicator, are distributed according to spatial distance in a clustered, dispersed, or random manner throughout the municipality's urban area. The Index tests the null hypothesis that population density and income are randomly distributed in the urban area of Pelotas. Results range from -1, indicating total dispersion, to +1, indicating total clustering. We assessed spatial relationships using inverse distance with the Euclidean distance method.

Results

We assessed 338 OPS, comprising 193 squares, 17 parks, and 128 usable green strips/median plots. Table 1 shows the characteristics of the structures present in Pelotas OPS. The most frequently present PA structures were playgrounds (23.0%), walking/running tracks (20.7%), bicycle paths (18.9%), and soccer fields (18.1%), respectively. The least available structures were skateboard/skating rinks (1.4%) and volleyball courts (2.4%). Based on the instrument used for data collection, "field" (campo) refers to grass-covered structures; "court" (cancha) to sand-covered structures; and "court" (quadra) to structures covered with asphalt, cement, or wood. Regarding conditions of cleanliness, aesthetics, and safety, there was a higher incidence of scattered litter and a lower incidence of signs of vandalism (Table 1).

Of all spaces assessed, only 1.2% (n = 4) met the first indicator's requirements, meaning they had at least two PA structures, lighting, benches, and trash cans in good condition, with little scattered litter, signs of vandalism, and overgrown grass. For indicator 2, when we analyzed the presence of the previously mentioned items but not applying aesthetics and safety require-

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ments, 3.3% (n = 11) of the spaces met the criteria. For indicator 3, 11.5% (n = 39) of the assessed spaces presented at least two PA structures in good condition, without requirements of user comfort, cleanliness, aesthetics, and safety categories.

Regarding the distribution among the macro-regions of the urban perimeter of the city of Pelotas (Areal, Três Vendas, Laranjal, São Gonçalo, Fragata, Centro, and Barragem), OPS meeting indicator 1 was distributed across two neighborhoods of the city, OPS meeting indicator 2 across five neighborhoods, and OPS included under the criteria of indicator 3 across seven neighborhoods (Table 2); that is, the lower the flexibilization of the OPS characteristics, the lower their presence distributed across the city.

Table 1 – Characteristics of the structures present in the open public spaces, Pelotas, Rio Grande do Sul, Brazil.

Variables	Open public spaces		
	Absent n (%)	Poor or average quality n (%)	Good quality n (%)
Comfort structures			
Benches	176 (52.2)	161 (47.8)	-
Lighting	147 (43.6)	124 (36.8)	66 (19.6)
Trash cans	245 (72.7)	92 (27.3)	-
Physical activity structures*			
Soccer field	285 (84.6)	51 (15.1)	1 (0.3)
Soccer sand court	320 (94.6)	16 (4.8)	2 (0.6)
Soccer court	321 (94.9)	6 (1.8)	11 (3.3)
Volleyball field	328 (97.0)	9 (2.7)	1 (0.3)
Volleyball sand court	329 (97.6)	6 (1.8)	2 (0.6)
Volleyball court	329 (97.9)	4 (1.2)	3 (0.9)
Basketball court	328 (97.0)	5 (1.5)	5 (1.5)
Exercise station	316 (93.5)	8 (2.4)	14 (4.1)
Outdoor gym	314 (93.1)	11 (3.3)	12 (3.6)
Walking/running track	268 (79.3)	41 (12.1)	29 (8.6)
Walking/running trail	293 (86.6)	36 (10.7)	9 (2.7)
Bicycle path	272 (81.2)	39 (11.6)	24 (7.2)
Bicycle trail	310 (92.0)	22 (6.5)	5 (1.5)
Skateboard/skating rink	333 (98.5)	1 (0.3)	4 (1.2)
Playground	192 (57.0)	77 (22.9)	68 (20.1)
Conditions of cleanliness, aesthetics, and safety	Large amount present	Moderate amount present	Absent or small amount present
Scattered litter	214 (63.5)	73 (21.7)	50 (14.8)
Signs of vandalism	7 (2.1)	61 (18.2)	267 (79.7)
Tall weeds or grass	32 (9.5)	106 (31.4)	199 (59.1)

*field: grass-covered structure; sand court: sand-covered structure; and court: cement, asphalt or wood-covered structure.

In the analysis of OPS distribution by population density and income, we found that the higher the indicator's requirement level, the more frequently good-quality OPS were observed in locations with higher income and lower population density. In indicator 3, the most flexible in terms of criteria stringency, population density is higher, as it encompasses more OPS; however, average household income remains lower than in indicators 1 and 2. These findings show a discrepancy in access to quality OPS, as higher-quality spaces benefit only a smaller portion of the population analyzed (Table 3).

OPS meeting the higher requirements (indicators 1 and 2) are distributed across locations with both higher and lower population density and income, showing a random and non-significant spatial pattern. In contrast, the indicator with the greatest flexibility (indicator 3) presented a clustered and highly significant spatial pattern, showing that OPS with similar population density and income are close to one another (Table 3).

Discussion

The number of OPS that met the indicator with the highest adequacy requirement (Indicator 1) is extremely low (n = 4) compared to the total number of OPS (n = 338). As the stringency of the OPS assessment criteria was reduced, the number of spaces meeting the adequacy requirement increased, indicating an inversely proportional relationship between quality and quantity. In addition, the inequalities in the distribution of assessed spaces among the macro-regions of the analyzed city became evident.

Only four spaces meet the indicator with the highest adequacy requirement. One of these is a tourist at-

Table 2 – Distribution of indicators derived from the open public spaces according to the macro-regions of Pelotas, Rio Grande do Sul, Brazil.

Indicator	Areal n (%)	Centro n (%)	Fragata n (%)	Barragem n (%)	Laranjal n (%)	São Gonçalo n (%)	Três Vendas n (%)
1	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (25.0)	0 (0.0)	3 (75.0)
2	0 (0.0)	2 (18.2)	1 (9.1)	0 (0.0)	3 (27.3)	1 (9.1)	4 (36.4)
3	1 (2.6)	7 (17.9)	11 (28.2)	1 (2.6)	5 (12.8)	2 (5.1)	12 (30.8)

Note: The percentages of the amounts are based on the final n of each indicator.

Table 3 – Distribution of indicators derived from the Public Leisure Spaces of Pelotas according to population density, income of the household head, and the Global Moran's Index.

Population density (inhabitants/km²)					
Indicator	Median	Minimun-Maximun	Interquartile range	Global Moran's I	Global Moran's I p-value
1	404.5	51.4 - 1343.9	836.7; 118.9	-0.43	0.7667
2	1343.9	51.4 - 20423.9	3118.0; 681.6	0.11	0.3395
3	2226.3	16.9 - 7849.3	3868.8; 803.2	0.56	<0.0001
Income of the household head (reais)*					
1	3342.0	528.9 - 5948.4	4445.2; 2187.1	-0.22	0.7200
2	2739.9	528.9 - 5948.4	4046.8; 2421.9	-0.03	0.7501
3	2012.7	377.6 - 6615.6	3411.1; 1225.2	0.51	<0.0001

Note: All measures of central tendency and dispersion are based on the mean of measurements, according to each indicator.
*the minimum wage adopted as a reference during the 2022 Census data collection period was R$1,212.00.

traction of the city and therefore receives more attention from the Municipal Government, while the other three are part of real estate developments. When analyzed in light of the Inverse Care Law[19], the evidence aligns with this reflection. It suggests that those with greater access to quality spaces that encourage healthier, more active behavior are already socioeconomically privileged, as they live in areas with good infrastructure and resources and have greater purchasing power to hire private health and leisure services. In contrast, residents of peripheral areas, who lack infrastructure and resources and do not have favorable economic conditions to pay for health and leisure activities, are not provided with quality, adequate spaces that could support a more active and healthy lifestyle.

The aforementioned analysis reinforces the inequities experienced by historically, socially, and economically disadvantaged population groups, not only in the city of Pelotas, but in Brazil. This situation weakens the discourse that attributes responsibility for leisure-time PA practice solely to individuals and compels us to consider the individual circumstances surrounding this issue. In summary, PA practice is not merely a choice in a country as unequal as Brazil, but a privilege, highlighting the need to direct and build actions and public policies that combat these inequities[20].

This study aims to strengthen and contribute to the discussion, not only of the importance of the significant existence of OPS, but also of their adequate quality for their use to be effective. A study conducted with adults in the city of Curitiba/PR showed that the existence of an OPS close to the residence increases, on average, by 3% the likelihood of an individual practicing moderate or vigorous PA, and this figure increases to 5% if the space has one or more PA equipment items intended for adults. In addition, this study showed that for every 100-meter increase in distance from an OPS with PA equipment, the likelihood of engaging in moderate-to-vigorous PA decreases by 5%[21]. These findings corroborate the fact that freely accessible OPS contribute to greater PA practice among the population.

Silva and colleagues showed that the quality of OPS in Belo Horizonte, Minas Gerais, Brazil is directly proportional to citizens' socioeconomic status[22]. This also reflects the Right to the City, which advocates for the population's use, appropriation, and sense of belonging to OPS as a form of exercising citizenship[22]. Therefore, residents of more peripheral areas with lower household income end up having this right denied due to lack of infrastructure. In Belo Horizonte, the low quality of PA equipment, limited diversity, and a high percentage of scattered litter were also noted[14], aligning with the findings of the present study and indicating that this problem is not isolated.

The systematic review conducted by Zhang et al.[23] consistently showed that factors such as trails/paths and lighting of OPS positively affect PA practice in the location, whereas the presence of incivilities, such as scattered litter and broken glass, negatively affects it[23]. PA practice is multifactorial and also depends on social and individual context. Nevertheless, several studies have demonstrated the relevance and effectiveness of a nearby, quality OPS in supporting this practice. Therefore, intervening bodies need to pay closer attention to this public health issue.

This study has limitations, such as the author's perspective in defining the attributes used to delimit a good OPS. Although this definition is grounded in literature, the process is also subjective. Moran's Index helps us to understand the distribution of spaces in a

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complementary way, the small number of spaces meeting the most stringent good-quality criterion requires caution in interpreting the results, given the low statistical power. Because this is a cross-sectional study, the results do not identify the mechanisms responsible for the observed distribution of OPS, nor do they establish causal relationships between space quality and the characteristics of the surrounding area. The results can support future interventions and investigations into the determinants of these distributions, as well as their relationships with the population's PA.

The present study provides updated data compared with the first study conducted in the city of Pelotas, Rio Grande do Sul, Brazil[10] and offers the advantage of having an OPS model as a reference. The indicators used have potential for application in different urban contexts. However, one should generalize and interpret the results of the present study with caution, considering the demographic, socioeconomic, geographic, and urban-planning specificities of each locality analyzed. Along with governmental changes, these assessed spaces may undergo modifications, both positive and negative, thus requiring studies and monitoring analyses of OPS over time.

In conclusion, the city of Pelotas has a small number of OPS with the defined adequate qualities. In addition to the low number of OPS in good condition, their distribution also differs from population density and household income around the OPS, resulting in the absence of spaces considered adequate for use and PA practice in most neighborhoods.

The results of the present study indicate the need for greater attention from public authorities to the OPS of the city of Pelotas. The evidence presented could guide urban management in planning and directing public policies that provide all neighborhoods in the municipality with access to an OPS adequate for use and PA practice. There is a demand for greater investment in maintaining spaces and expanding structures for PA practice and general comfort. Adequate, high-quality OPS for PA practice need to be democratized for the entire population, breaking with the current logic of access that favors only a privileged portion of the population.

Conflict of interest

The authors declare no conflict of interest.

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Author contributions

Lemos AR: Conceptualization; Methodology; Software; Investigation; Writing – Original Draft; Writing – Review & Editing; Approval of the final version of the manuscript. Botelho VH: Conceptualization; Methodology; Software; Formal Analysis; Investigation; Resources; Data Curation; Visualization; Writing – Original Draft; Writing – Review & Editing; Approval of the final version of the manuscript. Weege ML: Conceptualization; Methodology; Software; Investigation; Data Curation; Writing – Original Draft; Writing – Review & Editing; Approval of the final version of the manuscript. Müller WA: Conceptualization; Methodology; Software; Formal Analysis; Investigation; Resources; Data Curation; Supervision; Visualization; Writing – Original Draft; Writing – Review & Editing; Approval of the final version of the manuscript. Crochemore-Silva I: Conceptualization; Methodology; Software; Validation; Investigation; Resources; Data Curation; Supervision; Project Administration; Visualization; Funding Acquisition; Writing – Original Draft; Writing – Review & Editing; Approval of the final version of the manuscript.

Declaration regarding the use of artificial intelligence tools in the article writing process

The authors used artificial intelligence tools solely for translation purposes. The final version of the manuscript was reviewed and revised by the authors and an English-language specialist.

Data and materials availability

After publication, the data will be available upon request to the authors.

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Reviewers' assessment

The reviews of this article were originally conducted in Portuguese. This version has been translated using ChatGPT and subsequently reviewed by the Chief Editors.

Reviewer A

Anonymous

Dear Authors,

The study aims to define quality criteria for open public spaces intended for physical activity and to analyze their distribution in Pelotas, Rio Grande do Sul, Brazil. Its relevance lies in its contribution to addressing low levels of physical activity and inequalities in access to leisure opportunities by providing evidence that may support the planning of more equitable and effective public health policies. I would like to highlight that the manuscript addresses a relevant topic for the promotion of physical activity, uses a quantitative methodology based on recognized instruments (PARA) and geoprocessing tools, and that the results reinforce the existence of socioeconomic inequities in access to environments conducive to physical activity. Below, I present suggestions that may contribute to improving and strengthening the final manuscript.

Major Issues

- Page 1, line 9 and Page 5, line 6 – The authors should review the study objective. It is presented differently in the Introduction and Abstract. I suggest standardizing the objective throughout the manuscript.
- Page 1, line 24 – The conclusion is appropriate; however, it could be more directly focused on effective actions by public authorities, going beyond simply calling for greater attention. For example, this could include securing funding for OPAs in the municipality.
- Page 6, line 3 – The authors report at different points in the manuscript that there was an "arbitrary definition" of the indicators. Although the authors mention that they based their choices on the literature, the term "arbitrary" weakens the scientific rigor of the manuscript. It would be more appropriate to describe these as "criteria defined by the authors based on previous evidence regarding attributes that favor physical activity." Here, I suggest describing the rationale behind the choice and composition of the indicators and, in the Discussion, presenting the potential limitations associated with these choices.
- Page 6, line 18 – The authors propose the use of Moran's index to analyze spatial correlation. However, it seems to me that the small number of spaces included in each indicator may be considered a limitation of the study. Calculating spatial autocorrelation with extremely small samples (n=4) lacks statistical robustness and may lead to misleading conclusions regarding the randomness of the distribution. Caution is therefore recommended when interpreting these results, or alternatively, this specific analysis could be excluded for Indicator 1.
- Page 8, line 7 – The Results section presents macro-regions of the city of Pelotas. It would be important to describe these regions in the Methods section, including how they are defined, in order to facilitate the interpretation of the results.
- Page 9, line 9 – The authors state in the manuscript that there is an "inversely proportional" relationship between quality and income. Based on Table 3, the higher-quality spaces (Indicator 1) are located in areas with higher income (median 3,342.0), whereas those with lower quality requirements (Indicator 3) are located in areas with lower income (median 2,012.7), unless I have misunderstood the analysis. This would indicate a directly proportional relationship (higher income = higher quality). The text should be revised to avoid confusion between "income" and "vulnerability."
- Page 11, line 18 – The scientific rigor of the study would be strengthened by presenting its limitations and discussing how these limitations may affect the interpretation of the findings.

Minor Issues

- There is an inconsistency regarding the dates provided in the sources of Tables 1, 2, and 3 (Source: Authors, 2026). Considering that the study was conducted between October 2023 and January 2024, and that the current year is 2026, it is suggested that the date should reflect either the year of the study or the current year of submission.
- The abbreviation PA (Physical Activity) appears in

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the Abstract and Introduction. Please ensure that the first mention in the main text (and separately in the Abstract) defines the abbreviation in full.
- The in-text citations and reference list should be reviewed. For example, the text refers to "Silva (2017)" when discussing the Right to the City; however, in the reference list, item 10 is "Silva I. et al. 2015" and item 16 is "Silva K. 2017." I suggest standardizing the numerical references according to the journal's (RBAFS) guidelines, ensuring that the numbering in the text corresponds exactly to the cited author.

Final decision
- Substantial revisions are required.

Reviewer B

Rildo de Souza Wanderley Junior
University of Pernambuco, Recife, Pernambuco, Brazil.

General Considerations
- The manuscript entitled "Definitions of Quality Standards for Open Public Spaces and Their Distribution in Pelotas, RS" addresses a highly relevant topic for public health and urban planning. The assessment of Open Public Spaces (OPS) and the spatial analysis (Moran's Index) add scientific value to the study. However, weaknesses were identified in the structure of the manuscript, the justification of methodological choices, the presentation of the results, and the clarity of the tables, all of which need to be addressed.

Title and Abstract
- Abstract: The current wording lacks precision in reporting the findings, which compromises the initial understanding of the study.
- The number of indicators mentioned needs to be reviewed. The manuscript reports the creation of indicators, but the text leaves uncertainty as to whether three or four indicators were operationalized in the study.
- The Results section of the Abstract lacks objectivity and precision. The authors state that there was a "discrepancy" and an "inversely proportional relationship regarding family income." It is essential to provide greater detail and quantify these findings: what specific discrepancies were identified? What does this inversely proportional relationship mean in practical terms based on the data obtained?

Methods
- Data Collection Instrument: The authors used the Physical Activity Resource Assessment (PARA). It is essential to clarify whether this instrument has been validated for use in the context of OPS in Brazil. The authors should provide references indicating whether the PARA has previously been used and validated in similar studies within the Brazilian context.
- Spatial Analysis Criteria: A 500-meter buffer was established as the area of coverage. The authors need to provide a methodological justification or theoretical framework supporting this choice. Why was a 1-km buffer not used, for example?

Results
- Relocation of Section: In the second paragraph of the Results section, the authors present the "arbitrary" definition and operationalization criteria for the three indicators. This information is strictly methodological and should be moved to the Methods section.
- Operationalization of the Indicators: In addition to moving this section, the definition of the criteria used to operationalize the indicators is unclear and does not allow for replication. The authors need to substantially improve the description of how these groupings were constructed.
- Data Contradiction: In the first paragraph of the Results section, the manuscript explicitly states: "None of the assessed spaces had good-quality benches and trash bins." Immediately afterward, when describing Indicator 1, the authors state that 1.2% (n=4) of the spaces had "good-quality benches and trash bins." This direct contradiction needs to be urgently corrected, as it undermines the interpretation of the primary outcome.

Tables
- Table 2: The table is very confusing, and its formatting makes it difficult to read. The authors need to reconsider what information they actually intend to present in this table. How does the crude distribution across the macro-regions help address the central objective of the study? It is recommended that the presentation be simplified or that the central message be more clearly highlighted.
- Table 3: The current title ("Distribution of indicators derived from Public Leisure Spaces in Pelotas

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according to sociodemographic information and spatial autocorrelation") lacks objectivity and precision. The title should be self-explanatory and accurately reflect the variables being cross-tabulated.

Final Comments

- The manuscript has merit, and the topic is highly relevant to the scope of the *Revista Brasileira de Atividade Física & Saúde*. However, acceptance in its current form is not recommended due to important structural and methodological gaps.
- First, there is a critical need to justify methodological choices, such as the validation of the PARA instrument in Brazil and the rationale for using a 500-m buffer. Second, there is an important structural issue concerning the presentation of the construction of the indicators, which is a methodological procedure, in the Results section. Third, Tables 2 and 3 require substantial restructuring to improve clarity and objectivity. Finally, the direct contradiction in the descriptive data regarding the quality of "benches and trash bins" compromises the reliability of the reported findings.
- If the authors address these points and revise the manuscript with greater precision and rigor in methodological reporting, the study has excellent publication potential.

Final decision

- Substantial revisions are required.

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