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Article

Urban Green Spaces and Their Influence on Global Population Health and Quality of Life: An Integrative Review

Marcello de Lima Capucho[1], Frederico Monteiro Neves[2]

[1] Master's Student. Universidade Federal do Sul da Bahia. ORCID: 0009-0006-6425-3893. E-mail: marcellocapucho@hotmail.com.

[2] PhD in Environment and Development. Lecturer at Universidade Federal do Sul da Bahia. ORCID: 0000-0002-8836-1307. E-mail: frederico.neves@ufsb.edu.br

ABSTRACT

The rapid and unplanned urbanization has become a global phenomenon in recent decades, bringing significant challenges related to quality of life, sustainability, and public health, especially in developing countries. Although urban areas represent less than 1% of Brazil's territory, approximately 87% of the population resides in these spaces. The growing urbanization has led to environmental problems, notably the reduction of Urban Green Spaces (UGSs), which have a direct impact on biodiversity and the well-being of urban communities. The objective of this study is to analyze the state of the art regarding the perception of urban populations on the provision of ecosystem services by UGSs and their relationship with quality of life and health. For this purpose, an integrative review was conducted through the CAPES Journal Portal, which compiles national and international scientific journals. The research was carried out using the MeSH English terms "Physical activity," "Ecosystems," "Urban," and "Perception," with the Boolean operator "AND." Only peer-reviewed articles published in the last five years were selected. The integrative review revealed that UGSs play an important role in promoting health and urban well-being, highlighting their even greater relevance during the COVID-19 pandemic, which underscored the need for accessible and well-planned green spaces. However, the analysis also indicated that physical and social barriers continue to limit the full use of these spaces. Urban planning strategies that address these barriers are essential to maximize the benefits of UGSs. The integration of cultural ecosystem services and community participation stand out as essential factors to ensure the success and sustainability of these spaces. This study offers elements for the improvement of public policies aimed at sustainable urban development, in addition to opening avenues for future research in this emerging area.
Keywords: urban development; leisure; physical activity; cultural ecosystem services

RESUMO

A rápida e desordenada urbanização tem se consolidado como um fenômeno global nas últimas décadas, acarretando desafios significativos relacionados à qualidade de vida, sustentabilidade e saúde pública, especialmente nos países em desenvolvimento. Essa crescente urbanização tem gerado problemas ambientais, destacando-se a redução dos Espaços Verdes Urbanos (EVUs), que exercem impacto direto na biodiversidade e no bem-estar das comunidades urbanas. O objetivo deste trabalho é compreender de que forma a produção científica dos últimos anos tem abordado a relação entre a percepção da população sobre a oferta de serviços ecossistêmicos pelos EVUs e a qualidade de vida e saúde nas áreas urbanas. Para isso, foi realizada uma revisão integrativa por meio da base de dados Periódicos da CAPES, que reúne revistas científicas nacionais e internacionais. A pesquisa foi conduzida com os termos MeSH em inglês "*Physical activity*," "*Ecosystems,*" "*Urban*" e "*Perception*", utilizando o operador booleano "*AND*." Foram selecionados apenas artigos revisados por pares, publicados nos últimos cinco anos. A revisão integrativa revelou que os EVUs desempenham um papel importante na promoção da saúde e do bem-estar urbano, evidenciando sua relevância ainda maior durante a pandemia de COVID-19, que sublinhou a necessidade de espaços verdes acessíveis e bem planejados. Entretanto, a análise também indicou que barreiras físicas e sociais continuam a limitar o uso pleno desses espaços. Estratégias de planejamento urbano que abordem tais barreiras são fundamentais para maximizar os benefícios dos EVUs. A integração dos serviços ecossistêmicos culturais e a participação comunitária destacam-se como vetores essenciais para garantir o sucesso e a sustentabilidade desses espaços. Este

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estudo oferece elementos para o aprimoramento de políticas públicas voltadas ao desenvolvimento urbano sustentável, além de abrir espaço para futuras investigações nesta área emergente.
Palavras-chave: desenvolvimento urbano; lazer; atividade física; serviços ecossistêmicos culturais.

Introduction

Accelerated urbanization has been a global phenomenon that, in recent decades, has significantly transformed territories (DI CLEMENTE; STRANO; BATTY, 2021). This process has intensified the concentration of people in urban centers, resulting in complex challenges that directly affect quality of life, sustainability, and public health. Added to this is the lack of adequate socio-environmental planning, which underscores the urgent need to revise development practices that neglect the balance between economic growth and sustainability (MUÑOZ; FREITAS, 2017; HU et al., 2023).

The degradation of natural resources is another factor that has led to serious consequences, such as the destruction of green areas, the pollution of water and air resources, and the worsening of global warming. These factors compromise ecosystem integrity and interfere with the quality of life of the urban population (VIANA; SILVA, 2016).

In Brazil, although urban areas account for less than 1% of the national territory, they are home to approximately 87% of the population (IBGE, 2022). Therefore, it is necessary to rethink the role of Urban Green Spaces (UGS), not only as aesthetic elements but as fundamental ecosystems for maintaining environmental balance and population well-being (MENEZES DA SILVA; VASCONCELOS BEZERRA; CRUZ NETO, 2023).

Ecosystem services are the benefits that humans derive from natural ecosystems and are classified into four main categories (MEA, 2005). Provisioning services are the products obtained or extracted from ecosystems, such as food, drinking water, wood, fibers, and medicinal resources. Regulating services are the benefits obtained through the regulation of ecosystem processes, including climate regulation, flood control, water and air purification, pollination, and pest and disease control. Supporting services are those necessary for the production of all other ecosystem services, such as nutrient cycling, soil formation, and primary production. Cultural services are the non-material benefits people obtain from ecosystems, such as spiritual inspiration, aesthetic values, recreation, physical activity, tourism, and cultural and social experiences (MISIUNE; JULIAN; VETEIKIS, 2021).

The mentioned categories can be classified and analyzed based on their utility and public perception. This includes methods to quantify ecosystem services monetarily, contributing to the incorporation of their value in economic analyses, public policies, and real estate valuation, as well as in the environmental context. Biodiversity conservation is also highlighted, with studies investigating the relationship between biodiversity and the capacity of ecosystems to provide essential services, especially in urban areas (MISIUNE; JULIAN; VETEIKIS, 2021).

Sustainable urban planning must consider research focused on the integration of urban green spaces and the promotion of ecosystem services in urban environments to improve population health and well-being. Community participation is also important, with approaches that emphasize local communities' perception and involvement in the design, planning, management, and conservation of ecosystems in UGSs. This can occur through collective activities and the development of projects such as cultural, sports, and recreational events. Thus, a combination of factors can contribute to health, well-being, and the promotion of ecosystem services in urban environments (TESSEMA; ABEBE, 2024).

UGSs have great potential to provide ecosystem services, especially cultural services, such as recreation and physical activity, which are strongly related to human health quality (MENEZES DA SILVA; VASCONCELOS BEZERRA; CRUZ NETO, 2023). Physical activity in UGSs, for example, brings additional benefits to physical and mental health, contributing to stress, anxiety, and depression reduction (GLADWELL et al., 2013). Exposure to nature during physical exercise stimulates the production of endorphins and serotonin—substances that promote a sense of well-being and happiness. Thus, outdoor exercise improves mental health to a greater extent than physical activities in indoor environments (LAHART et al., 2019).

Research on ecosystem services in urban areas and their relationship with human well-being has grown significantly in recent decades (CUNHA et al., 2022; TARSITANO et al., 2021; SUGIYAMA et al., 2018; ANDRADE; TURRA, 2021), indicating the relevance of this topic in the current context of increasing global urbanization. Within this context, this study aims to understand how recent scientific production has addressed the relationship between population perception of ecosystem service provision by UGSs and quality of life and health in urban areas.

Materials and Methods

This study is characterized as an integrative review. This approach was chosen for ensuring access to a wide range of high-quality studies, which is essential to answer the proposed research question. Searches were conducted in the CAPES Journals database, which includes national and international scientific journals and provides access to academic articles and publications with broad coverage and relevance.

Searches were conducted from May 4 to 6, 2024, and the following MeSH (Medical Subject Headings) terms were used in English: "Physical activity," "Ecosystems," "Urban," and "Perception," combined with the Boolean operator "AND." Peer-reviewed articles from the past five years were considered, discarding those not aligned with the area of interest. The software StART (State of the Art through Systematic Review), version 3.3, was used to manage and analyze relevant literature. StART supports systematic reviews by assisting with data collection, organization, analysis, and visualization, facilitating the identification of duplicate articles and reference organization.

A total of 109 peer-reviewed articles were found, of which 52 were manually excluded after reading and analysis due to lack of relevance to the study's objectives. Thus, 57 articles were selected based on relevance, quality, and alignment with the research theme. These articles, after detailed analysis, were organized into thematic discussion categories, favoring the systematization and analysis of data collected by the studies.

Inclusion criteria, in addition to those mentioned above, required articles to be available in the CAPES Journals databases in May 2024 and address the relationship between urban green spaces, ecosystem services, health, or well-being. Duplicated publications, studies outside the thematic scope, or those with insufficient data were excluded.

The results were imported into the StART software. Subsequently, article screening was carried out based on titles and abstract readings to verify relevance and adherence to the inclusion criteria. Classification scores were assigned within StART, allowing the articles to be ranked by relevance. After the initial selection and screening, the selected articles were read in full to confirm their eligibility, as illustrated in the flowchart (Figure 1).

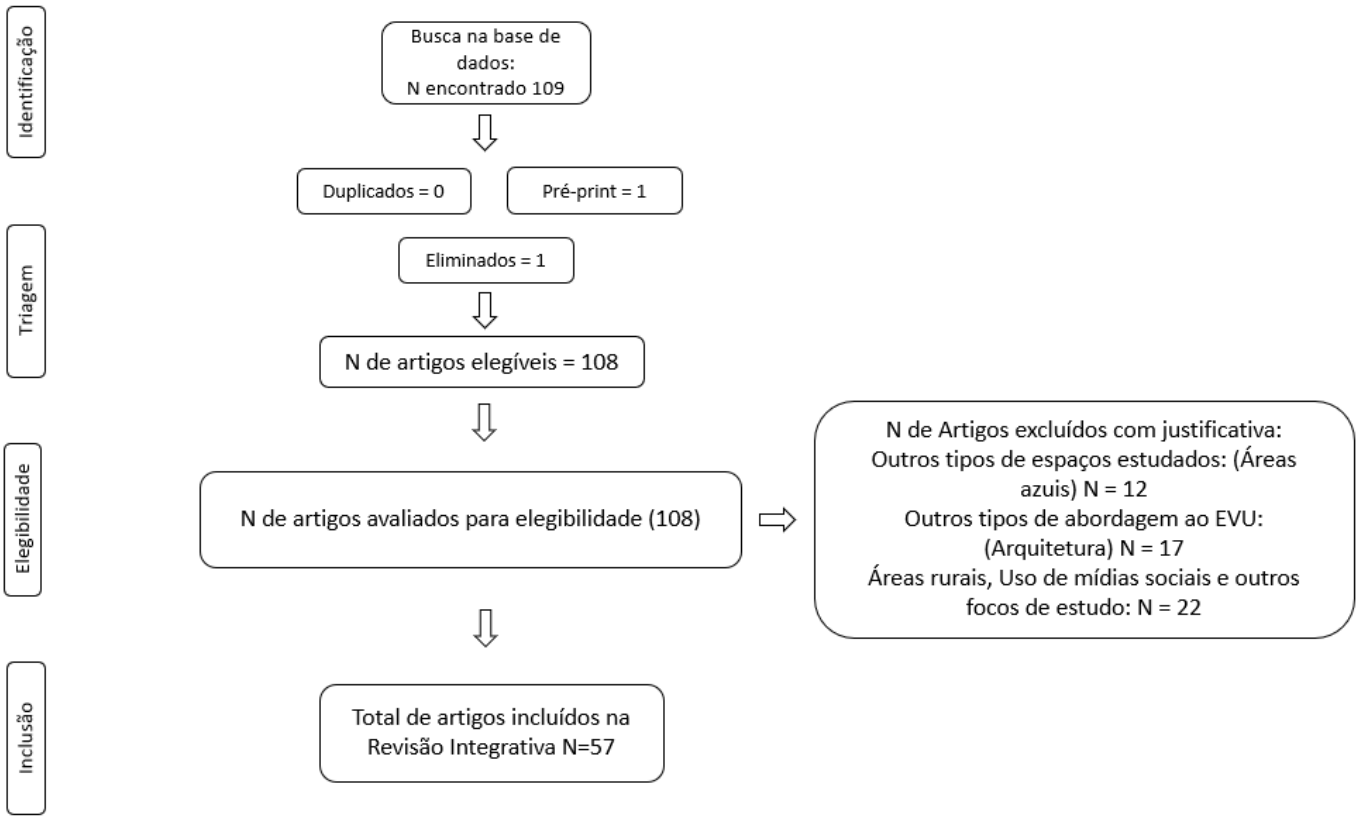

Figure 1 – Flowchart of research results. Source: author's own work using Microsoft PowerPoint, Office 2019 package.

The quality assessment of the included studies was carried out using an adaptation of the criteria proposed by StART, focusing on:

- **Methodology**: Study design, methodological rigor, and data collection procedures.
- **Sampling**: Sample size, representativeness, and sampling techniques.
- **Internal and External Validity**: Bias control, validity of measurement instruments, and generalizability of findings.
- **Data Analysis**: Adequacy of data analysis techniques and clarity in presenting results.
- **Clarity of Results**: Transparency in presenting results and discussion of study limitations.

After reading and analyzing all the articles included in the review, several key themes addressed in the studies emerged, leading to the classification of the articles into main thematic categories. These themes include: perception and use (PU) of urban green spaces (UGSs) by the community; cultural ecosystem services (CES); impacts of the COVID-19 pandemic (ICP); challenges and barriers (CB) in the creation and maintenance of UGSs; health and well-being (HWB) associated with UGSs; and finally, planning and management (PM) of green infrastructure. Each article could address just one of these themes or multiple themes simultaneously.

Table 1 – Category Framework

Category	Acronym	Description
Perception and Use of UGSs by the community	PU	Analysis of how the community perceives and uses UGSs, including cultural, recreational, and environmental aspects.
Cultural Ecosystem Services	CES	Study of the cultural services provided by UGSs, such as recreational, spiritual, aesthetic, and educational activities.
Impacts of the COVID-19 Pandemic	ICP	Investigation into the impacts of the pandemic on the frequency and use of UGSs, considering changes in social behavior.
Challenges and Barriers in the creation and maintenance of UGSs	CB	Identification of barriers and challenges faced in the creation and maintenance of UGSs, such as lack of resources and ineffective planning.
Health and Well-being associated with UGSs	HWB	Exploration of the relationship between UGSs and the promotion of physical and mental health, as well as population well-being.
Planning and Management of Infrastructure	PM	Strategic planning and efficient management of infrastructure and resources to ensure the functionality and accessibility of UGSs..

Source: Author's own work

Results and Discussion

The quality assessment results indicate that the majority of the included studies demonstrate high methodological quality, a characteristic of the articles found in the CAPES database. Studies such as those by Menezes da Silva, Vasconcelos Bezerra, and Cruz Neto (2023), Hegetschweiler et al. (2022), and Li et al. (2022) received high scores in the *StArt* classification, as shown in Table 2, reflecting methodological rigor, robust sampling, and appropriate data analysis.

Table 2 – Overview of the Main Cited Studies

Article Title	Authors	Year of Publication	StArt	Study Location	Categories
Associations between the perception of ecosystem services and well-being in urban parks	Menezes, et al.	2023	70	Brazil	PU, CES, ICP, HWB, PM
Factors Influencing Use–diversity of Urban Parks: A Cross-cultural Study Between Chengdu (China) and Perth (Australia)	Swapan, et al.	2022	31	China and Australia	PU, CES, ICP, CB, HWB, PM

How do the green components of urban green infrastructure influence the use of ecosystem services? Examples from Leipzig, Germany	Palliwoda, Julia and Banzhaf, Ellen and Priess, Jörg A.	2020	55	Germany	PU, CES, ICP, HWB, PM
Impact of COVID-19 pandemic on cultural ecosystem services from urban green spaces: a case from English Bazar Urban Agglomeration Eastern India	Das, et al.	2023	45	India	PU, CES, ICP, HWB, PM
Indicator development for assessing recreational ecosystem service capacity of urban green spaces – A participatory approach	Nigussie, Senait and Liu, Li and Yeshitela, Kumelachew	2021	19	Ethiopia	PU, CES, ICP, HWB, PM
Is disability a conditioning factor to perceive cultural ecosystem services? Assessing social perception in a coastal protected dunefield	Santana-Santana, et al.	2022	43	Canary Islands, Spain	PU, CES, ICP, CB, HWB, PM
Planning the “unknown”: Perception of urban green infrastructure concept in Romania	Gavrilidis, et al.	2020	46	Romania	PU, CES, ICP, HWB, PM
Residents' perceptions of the role and management of green spaces to provide cultural ecosystem services in Dhaka, Bangladesh	Sultana, Rumana and Selim, Samiya Ahmed	2021	53	Bangladesh	PU, CES, ICP, HWB, PM
Understanding the benefits of public urban green space: How do perceptions vary between professionals and users?	Ugolini, et al.	2022	44	Europe (5 countries)	PU, ICP, CB, HWB, PM
Urban green space qualities: An integrated approach towards GIS-based assessment reflecting user perception	Stessens, et al.	2020	48	Belgium	PU, CES, ICP, HWB, PM

What to do in and what to expect from urban green spaces – Indicator-based approach to assess cultural ecosystem services	Krellenberg, et al.	2021	44	Germany	PU, CES, ICP, CB, HWB, PM

Source: Author's own work

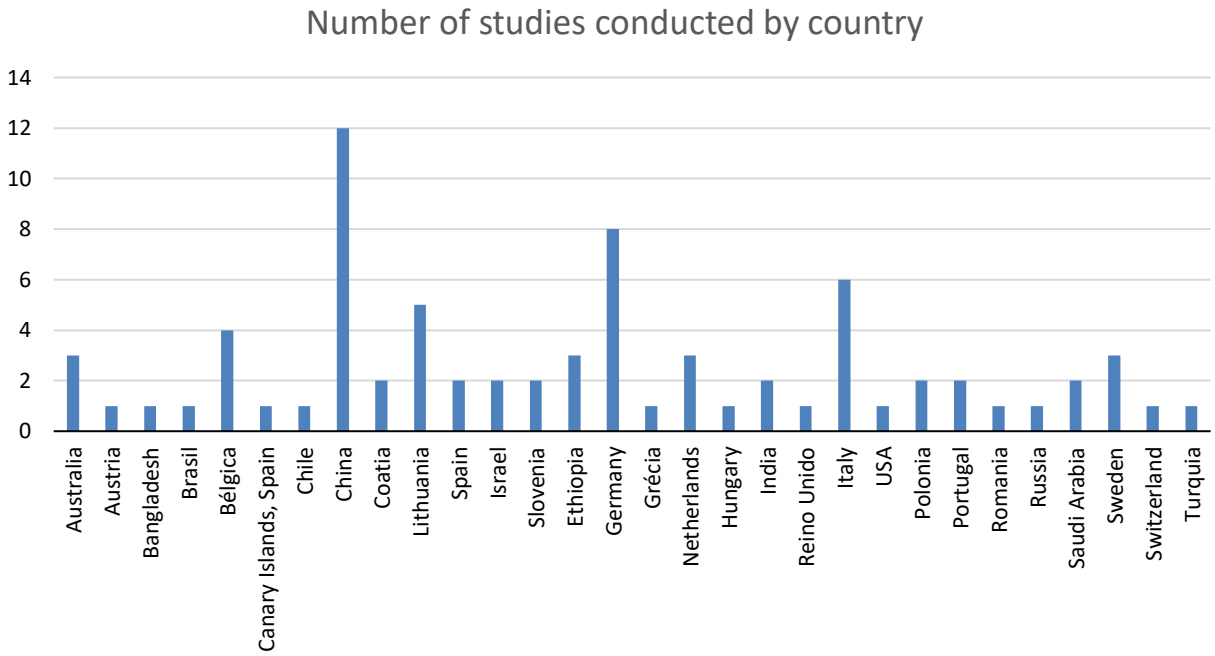

Figure 2. Distribution chart of the number of studies by country. Source: Author's own work.

Figure 3 presents the mapping of the studies found, using the online version of Google MyMaps, displayed on the world map, showing the location of these studies.

The theme of Cultural Ecosystem Services (CES) was the least explored, appearing in only 23% of the total studies. The theme of Perception and Use (PU) of UGS by communities was addressed in 33% of the studies, while Planning and Management (PM) was covered in 35% of the analyzed studies.

Next, the themes of Challenges and Barriers (CB) in the creation and maintenance of UGS, and Health and Well-being (HWB) associated with UGS stood out, being addressed by 74% and 72% of the studies, respectively.

The topic related to the Impacts of the COVID-19 Pandemic (ICP) showed the highest number of mentions and citations among the studies, with 86%, which is justified by the time in which the research was conducted and by the relevance of the topic to the focus of this work.

Having presented the initial results, the next step was to analyze the articles within each theme. Through careful reading, positive aspects, patterns, and relationships between the studies were identified, highlighting the main conclusions.

Figure 3. Locations of the studies conducted. Source: Author, using Google MyMaps software

In the first theme, CES, 13 articles were analyzed that addressed the importance of cultural ecosystem services provided by UGS. One of the main conclusions indicates a high valuation of cultural services such as recreation, social interaction, and environmental education, which contribute significantly to mental and social well-being. UGS were highlighted as spaces for social gatherings and recreational activities, strengthening community bonds (Li et al., 2024).

The studies also revealed a variety of uses for UGS, where different population groups perceive and use these services in diverse ways depending on cultural and individual factors. Pinto (2023) showed that communities with strong cultural traditions tend to use UGS for community events and festivities. Additionally, integrating cultural ecosystem services into UGS was found to enhance urban resilience and improve quality of life. Misiune, Julian, and Veteikis (2021) suggest that incorporating cultural elements into UGS can make cities more adaptable to climate and social changes.

The second theme, PU, includes 19 studies focused on investigating how different demographic groups perceive and use UGS. The conclusions show a generally positive perception and frequent use. The positive perception of UGS is correlated with frequent use and perceived health benefits. Studies such as Domokos et al. (2021) demonstrate that users who value UGS tend to use them more regularly, resulting in improved health and well-being.

Sociodemographic variables such as age, gender, socioeconomic status, and education level significantly influence UGS use. For example, Hegetschweiler et al. (2022) found that young adults and those with higher education levels use UGS more for physical and social activities. Regarding community involvement, the importance of engaging residents in the design and management of UGS was emphasized to improve their use and satisfaction. Säumel et al. (2021) highlight that co-creation with the community increases the relevance and effectiveness of UGS, enhancing their utilization.

The third theme, PM, includes 19 studies evaluating planning and management strategies that can maximize population benefits and promote the integration of diverse types of UGS. Urban planning should incorporate various types of UGS to improve accessibility and equity, emphasizing a holistic approach that considers parks, plazas, and green corridors (Krellenberg et al., 2021).

Planning tools such as GIS (Geographic Information Systems) and indicator-based models were found effective in identifying areas of need and guiding interventions. Tessema and Abebe (2024) highlight the effectiveness of using GIS to plan interventions in densely populated urban areas. Community participation in UGS planning and management is crucial for their success and sustainability, suggesting that involving residents in decision-making increases acceptance and use of green spaces (Tessema & Abebe, 2024).

The fourth theme, CB, was also widely addressed, with 42 studies discussing the challenges hindering broader use of UGS. Physical and social barriers such as safety and maintenance issues were frequently reported. Palliwoda, Banzhaf, and Priess (2020) identified lack of safety as a key reason for underutilization.

Overcoming these barriers can significantly increase UGS use and benefits. Improvements in maintenance and safety were shown to boost usage and perceived benefits (Stessens et al., 2020). Nigussie, Liu, and Yeshitela (2021) advocate for more inclusive urban policies that address these barriers to promote equitable access to UGS.

The SBE theme includes 39 studies, underscoring it as a central issue. UGS were found to positively impact mental health by reducing stress and enhancing general well-being. Exposure to green spaces was associated with lower levels of anxiety and depression (Gavrilidis et al., 2020).

Usage preferences varied with age, health status, and other demographic factors. Swapan, Iftekhar, and Li (2022) found that older adults prefer quieter and more accessible spaces, while younger people favor areas for intense physical activity. From a public health perspective, investments in UGS can yield substantial returns in health and quality of life. Policies promoting UGS use could lead to a healthier, more active population (Santana-Santana et al., 2022).

The final theme, ICP, was cited in nearly all studies—49 out of 57—reflecting the inclusion of pandemic years in the review. Many studies discussed UGS, social isolation, and physical activity during COVID-19. The pandemic altered UGS use and perceptions, with increased appreciation for nearby green spaces due to mobility restrictions, leading people to frequent local parks more during lockdowns (Das et al., 2023; Marchi et al., 2022; Cao et al., 2023; Isabella et al., 2022; Petrunoff et al., 2022).

There were also changes in perceived benefits: while overall use decreased during lockdowns, perceived mental health benefits increased. Menezes da Silva, Vasconcelos Bezerra, and Cruz Neto (2023) reported that users became more aware of UGS benefits for stress relief and mood improvement. Planning, resilience, and accessibility were highlighted, emphasizing the need for inclusive UGS planning (Sultana & Selim, 2021).

Analysis across themes revealed connections between studies. A positive perception of cultural ecosystem services increases UGS use. Authors like Palliwoda and Priess (2021) show that integrating cultural elements into green spaces attracts more visitors and enhances usage. Community involvement in planning and management also improves perception and use, with active participation resulting in more valued and utilized spaces (Nigussie, Liu, & Yeshitela, 2021).

UGS perception and use were also linked to the pandemic period. Studies emphasized their importance for mental health and well-being during lockdowns, portraying them as safe and natural refuges and highlighting the need for resilient urban planning (Sultana & Selim, 2021). Reports indicated a significant increase in the use of small parks and nearby green areas (Palliwoda, Banzhaf, & Priess, 2020).

Cultural ecosystem services were highly valued during the pandemic, with significant increases in recreational and cultural activities in green spaces (Stessens et al., 2020). The need to integrate cultural services into UGS became more evident, suggesting that their inclusion can enhance urban resilience and quality of life during crises (Nigussie, Liu, & Yeshitela, 2021).

Nonetheless, barriers to UGS use still directly affect residents' well-being. Gavrilidis et al. (2020) emphasize that removing barriers such as poor maintenance and lack of safety can significantly improve public health.

Policies addressing these barriers can also promote more equitable and effective UGS use (Santana-Santana et al., 2022).

Assuming urban planning that integrates UGS improves health and well-being, Ugolini et al. (2022) found that including UGS in urban plans is associated with better physical and mental health. UGS should be designed with health benefits in mind, considering the needs of different demographic groups (Krellenberg et al., 2021).

In terms of urban resilience, the pandemic highlighted the importance of a well-planned, accessible green infrastructure. Urban resilience can be strengthened by better UGS integration and maintenance (Sultana & Selim, 2021). Planning should address both resilience and universal accessibility, ensuring all population groups benefit from UGS (Palliwoda, Banzhaf, & Priess, 2020).

This review's results indicate a need for more research in the Americas, where fewer studies were conducted compared to Europe and Asia. The findings also provide a foundation for future research and public policies aimed at sustainable urban development, highlighting the importance of inclusive planning that promotes human well-being, community resilience, and the integration of UGS as part of nature.

Conclusions

This integrative review reveals that Urban Green Spaces (UGS) play a significant role in promoting health and urban well-being, and that the COVID-19 pandemic further highlighted this reality for the population. It underscores the need for UGS to be accessible and well-planned, including community participation in the design of these spaces, whether for creation or revitalization. Accessibility and the target audience of these spaces must also be carefully considered.

The study also demonstrated a positive association between the use of UGS and their importance to the community. Community traditions and cultures enhance the use of UGS as well as the physical and mental health benefits they provide. This association was evident in findings such as reduced stress, improved overall well-being, and lower levels of anxiety and depression, with a clear correlation: the greater the use of UGS, the stronger the sense of health and well-being.

However, some physical and social barriers still prevent the full use of these spaces. Planning strategies must address these issues to maximize public access and the continued use of UGS, enhancing their benefits and prioritizing safety.

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