

Towards Healthier Cities

Urban Green Spaces (UGS) in the Neighbourhood

Benfica, Lisbon

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Abstract

The World Health Organization and the European Healthy Cities Network recommend that urban planning and design focus on communities and enhance their well-being. In recent years, urban planning and design have provided urban redevelopment in formerly peripheral or cross-border areas. It has offered the opportunity to redesign the public sphere toward sustainable and healthier cities. Benfica is a District of Lisbon in Portugal, which evolved from an overlap of a rural village and a suburbanisation process led by a railway line. It has its character, excellent urban livelihood, and high centrality potential. Benfica is a whole area of green spaces: old rural areas such as Quinta da Granja, urban pockets, the Monsanto Forest Park, and the heritage rehabilitation that allowed the Baldaya Palace gardens to be opened to the public. The study explores the role and impact of proximity green spaces in healthier cities through a mixed methodology, applied to the Green Capital of Lisbon 2020 and Benfica, which is seen as a representative neighbourhood (1) Literature review, policies, urban planning, (2) observation methods, mapping, and spatial analysis of types of green spaces and their correlation with different parameters.

Keywords

Healthy City, Urban Green Spaces (UGS), Urban planning, Neighbourhood, Benfica - Lisbon

1. Introduction

In recent years, exponential urbanisation and population concentration have become one of the many global challenges Humanity has to tackle, although the scale and rate of growth differ so much, e.g. between Europe and Sub-Saharan Africa.

According to the United Nations (2020), currently, half of the world's population lives in urban areas - that is: 3.5 billion people - and the expectation is that this number could reach 5 billion as early as 2050. Therefore, the urban space, social and environmental issues gain greater expression when promoting quality of life, sustainability, well-being, and fostering healthier living conditions.

Health has been at the centre of issues concerning urban areas. Industrialisation and increasing uncontrolled urbanisation have reflected in the deterioration of the living conditions of populations and, consequently, generated health inequities in local communities (Takano, 2003; Valhov, Gible, 2004, Freudenberg, & Galea, 2004, Simões, 2007; Lawrence, 2013, Williams, 2013), implying an increase in non-communicable and communicable diseases (Alirol et al., 2011, WHO, 2014) and the increased risk of emerging infectious diseases (Neiderud, 2015), such as Covid-19 (Pineo, 2020).

According to the World Health Organization - WHO (1946), the concept of *health* is presented as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity", it should be promoted by strategies and actions aimed at its improvement and contributing to well-being (WHO, 1986).

The evolution that cities have undergone over time presents consequences, among them the need for UGS, which should be considered key elements in urban policies with a view of sustainable cities' development. Several public health and urban planning policies mention the importance of having green spaces close to places of residence and the association of short distance with increased use (Schipperijn et al., 2010; Franco & Costa, 2021; Louro, Franco, & Costa, 2021). In this sense, it is vital to understand how the urban environment influences the use and access to these spaces, what spaces we have and what characteristics they possess to leverage their benefits for the entire urban population.

This study explores the contributions of UGS in the construction of healthier cities and aims to characterise the supply and evaluate the degree of insertion of green spaces in the urban network, trying to verify how they reflect in the lives of populations, namely in their physical and mental health.

The analysis has as a case study the UGS in the Benfica, in Lisbon, Portugal.

This paper consists of five parts: the first part is the introduction; the second part contains a literature review focused on the green spaces issues and their relation with the healthy environment; the third part contains a description of the methods and the study area; the fourth part corresponds to the presentation and discussion of the results of the observation grid carried out in Benfica's green spaces and, finally, the last part reports the main conclusions.

2. Green spaces and the healthy urban environment

The interaction between urban environment and health is more intimate than commonly thought and directly affects the quality of life of the urban population (Marques da Costa and Kállay, 2020). The environment emerges as an interaction between disease agents and the susceptible human host (Gouveia, 1999). Therefore, there is an increasing concern among citizens about the potential impacts of the environment on health (Meira & Carvalho, 2012). The way the environment is built and developed is linked to and dependent on urban planning and design, since it seeks the best solutions in land use, is associated with economic and other criteria that lead to the promotion of well-being (Rawls, 1993; Queirós, 2000).

The relationship between socioeconomic conditions and availability of UGS, encompassing its quality, was first identified in Anglo-Saxon contexts due to the origins of the environmental justice movement (Holifield et al., 2009; Laurent, 2011). However, more recent studies conducted in European contexts have sought to highlight the existence of inequalities in the distribution of green spaces, emphasising that Southern European cities present values of green space availability below the European average, namely when compared to Northern European cities (Kabisch et al., 2016; Ribeiro et al., 2017). The lack of local UGS results from a particular cultural background in the cities, which became more evident as they sprawled and matured into metropolitan structures.

Due to the difficulty of getting around and lack of access to leisure areas, physical inactivity reflects in the urban population and is responsible globally for 3.2 million annual deaths (ref). In other words,

variations in populations' health, both physical and mental, can be associated with the availability and quality of nearby local level UGS. In this context, it is necessary to provide adequate UGS in quality and quantity, promoting sustainable urbanisation, for example, investing in the urban rehabilitation and regeneration of derelict sites within the urban centres.

The main green structure comprises spaces with different vegetation densities, offering a range of services and amenities and attracting many users with different social and age profiles. Such structure should comprise a broad offer of typologies such as gardens, urban and suburban parks, sports areas, urban gardens, special enclosures such as zoos, parks for attractions and exhibitions (Magalhães 1992).

The Municipal Master Plan of Lisbon of 2020 (Deliberação n.º 70/2020) may be a reference in this respect. The Municipal Ecological Structure is formed by the Fundamental and Integrated Ecological Structure, being the first one faced in a metropolitan scale, constituted by the system of structuring corridors and wet system and the second one in a municipal scale is constituted by green spaces, permeable green terraces to preserve, green spaces of framing to build areas and wooded axes.

These spaces are part of the integrated Municipal Ecological Structure, the consolidated green spaces and are subdivided into the following subcategories: I) Green spaces for recreation and production: are non-built, permeable, and planted spaces, on organic soil in natural terrain, public or private, including gardens, large patios of buildings or architectural groups of the Municipal Heritage Chart, Historic Estates, conventual enclosures and fences. They are intended for urban agriculture (kitchen gardens and commons) and recreation and leisure purposes and may include collective equipment and support infrastructures for recreation and leisure, including restaurants and beverages and recreational equipment associated with tourism. II) Green spaces for protection and conservation: these correspond to areas of greater environmental sensitivity and value, within the scope of which it is intended to conserve ecosystems, habitats, settlements or plant and mineral formations of high ecological or educational value, as well as plant structures for soil protection in situations of steep slopes or erosion risk, so they are defined in the Plan as *non-aedificandi*, except for recreational and fire control support infrastructures. III) Green spaces for framing road infrastructures: these are spaces destined for road and railroad framing functions, where only support facilities are allowed. IV) Riverside spaces: comprise areas without exclusive port use, with functions of ecological balance and hosting outdoor recreation and leisure activities (including restaurants and beverages, tourism, culture, sports, nautical activities, and recreational activities for public enjoyment), without prejudice to the conditions of pedestrian access to the riverbank and enjoyment of the landscape.

3. Study area and methodology

3.1. Case study

This study addresses Benfica as relevant within Lisbon regarding the municipality as a whole, specifically the UGS. Benfica is one of the 53 districts that make up the municipality of Lisbon, belonging to the Northwestern Zone of the city (fig. 1). It has an area of 8.02 km², which corresponds to 9.5% of the city of Lisbon.

The urban fabric evolved from a rural village, impelled by a suburban railway line with a station nearby. These days, Benfica is a consolidated neighbourhood, characterised by socio-spatial diversity, with solid acceptance due to its community dynamics and importance in the Lisbon context. It comprises high population density, excellent urban living environment, and high centrality potential (ref?)

Benfica stands out for its wide typological diversity of UGS, corresponding to old rural areas like Quinta da Granja, pockets spaces, smaller public spaces and the patrimonial rehabilitation that opened

Baldaya Palace's gardens to the community and the Monsanto Forest Park. The latter represents the most significant percentage of the city of Lisbon.

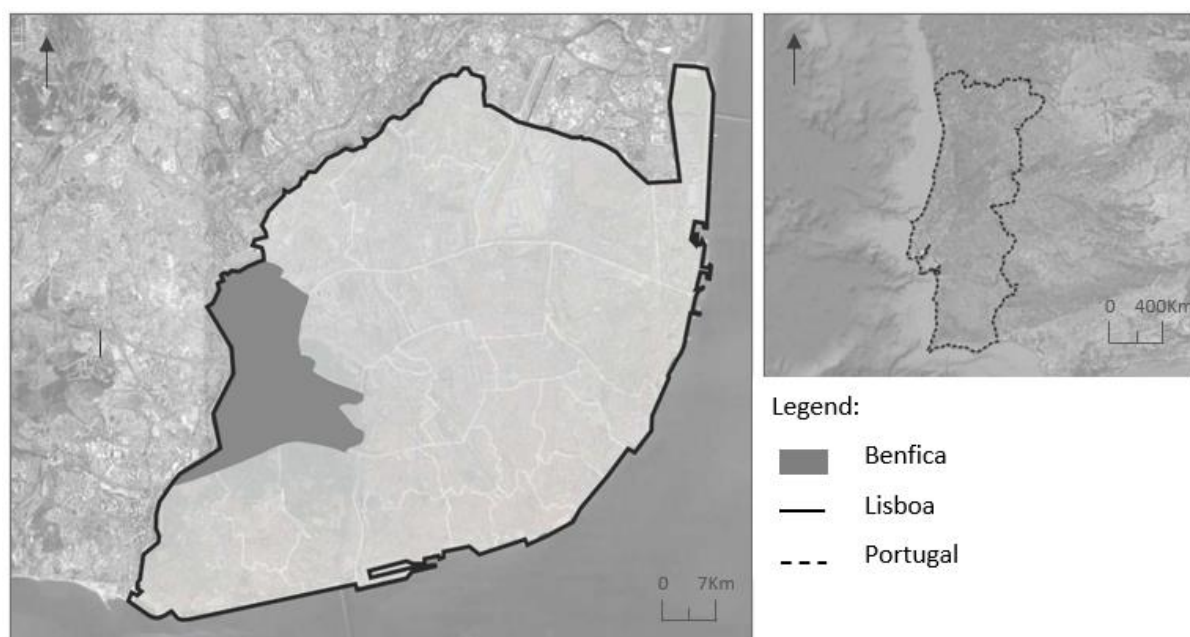


Figure 1: Geographic framing of the study area. Location of the municipality of Lisbon with all the districts. Highlighted in colour is Benfica. Source: Elaborated by Cunha based on Google Earth.

Through the data presented below, it is possible to verify that Benfica presents an inverse population dynamic since it suffered a population decrease in the last decade and saw the ageing of its population increase.

Data reference period	Place of residence	Total resident population	Population Density	Youth dependency ratio	Elderly dependency ratio
		N.º	(Inhab./km ²)	N.º	N.º
2011	Portugal	10562178	114,5	22,5	28,8
	Lisboa	552700	6448,2	20,4	37,8
	Benfica	36985	4639,5	18,4	48,2
2021	Benfica	35279	4425,5	not available	not available

Table 1: Characterisation of the study area. Source: INE, 2011 and 2021.

Age Groups	Number of residents			%		
	Resident Individuals	Gender		Resident Individuals	Gender	
		Male	Female		Male	Female
0 to 14 years	4064	2098	1966	11%	5,70%	5,30%
15 to 24 years	3373	1682	1691	9,20%	4,60%	4,60%
25 to 64 years	18662	8465	10197	50,70%	23%	27,70%
65 and older	10722	4248	6474	29,10%	11,50%	17,60%
Total	36821	16493	20328	100%	44,80%	55,20%

Table 2: Population living in Benfica by age group and gender. Source: INE, 2011.

Population aged between 25 and 64 consists of most of the resident population in Benfica, whereas population aged 65 or older corresponds to 29.1%, and the population aged between 0 and 24 corresponds 20.2% of the total. In Benfica, the elderly dependency ratio (EDR) is relatively high, i.e., 48 elderly per 100 individuals of working age.

3.2. Methods

In this study, a combined methodology through qualitative, quantitative, and cartographic techniques was used. In order to identify the physical and functional structures as well as the general quality of the green spaces object of study, direct observation was carried out, and the use of primary information was chosen, where the collected data was registered in a "grid of observation and characterisation of UGS", complemented by descriptive annotations and photographic records. This grid was structured in the following way: **i) the implantation/location regarding the urban fabric and its functions; ii) the landscape:** in the components view system, natural elements: vegetation (tree species, carriage and plant life, etc.) and urban art; **iii) the experience:** addressing the indicators related to mobility and accessibility (forms of access to space, public transport, motorised and non-motorised means), activities that can be performed on site (spaces for sports practice, playground and place for animals, group activities, which groups of people they serve), safety, urban comfort (identification of lighting network, safety signs, surveillance, its state of conservation, etc.) and maintenance (state of conservation of the sidewalks, existing equipment in the space), urban furniture, equipment and services, **iv) SWOT analysis** recording the observed realities (identifying the "strengths, weaknesses, opportunities and threats") that allows, finally, to draw conclusions and point **v) the proposals** for the qualification and preservation of these spaces as well as, for the design of new green spaces. The information collected also allowed clarifying the stress reduction spaces offered by the UGS. Although Benfica integrates a large part of the Monsanto Forest Park, the urban parks Silva Porto and Quinta da Granja, the gardens of Baldaya Palace, Jardim das Marias, Jardim do Eucalipto, and Jardim do Charquinho are defined as objects of study.

This observation grid has particular importance regarding the knowledge of the characteristics of Benfica's urban green spaces. It presents a set of results that help to understand the importance of these spaces in the urban context. Since the objective of the present study is to verify the degree of insertion of these green spaces in the urban network, it was opted to discuss only the parameters "accessibility and mobility" and "the activities that can be carried out in these spaces".

Analysing the characteristics of green spaces allows identifying the variables that best describe the urban environment and how it interacts with people, individually or in groups. The spatial characteristics are analysed to evaluate the types, uses, functions, and benefits they generate in the urban space.

4. Results and discussion

Cartographic analysis shows that the existing green space structure in Benfica is formed by urban green corridors, framing spaces, gardens and landscaped spaces. The existing green structure in Benfica corresponds to 56% of the total urban area of the district. Large areas are reserved for future public use, mainly allocated to school activities (MMP, Deliberação nº 70/2020).

Urban Green Zones	
UGS (Km ²)	Density UGS (%)
4,5	56

Table 3: Area of "Urban Green Zones". Source: DGOTDU, 2018.

The current supply of the Benfica UGS was analysed according to the existing situation in the total Benfica area, based on the following parameters: i) the spatial identification of green spaces (Fig 2), ii) the minimum requirements of green space area per inhabitant, as presented above and presented below (Tab 4).



Figure 2: UGS Identification. Source: Prepared by Cunha based on the MMP, Lisbon City Council.

A simple and complete description of the different types of green spaces existing in a given study area is presented below, through several criteria, which establish the conceptual basis for the typification of the UGS. It was also identified (in the second column of the table below) to which categories the spaces characterised in the observation and characterisation grid belong.

Definition of existing spaces in Benfica	Identification of the spaces studied	Area	Sizing	Population base (inhab)	Diversity of uses	Vegetation types	
MGS	City Park	-	≥ 30 ha	10.000	Sectors of recreation, rest, isolated from noise. No allows circulation automobile	Diversified, long-lasting, forest, vegetation natural, massifs bushes, meadow, lawns	
	Urban Gardens	Quinta da Granja Park	200m ² / each				
	Free Sports	-	≥ 5 ha				
	Urban Park and Garden	Silva Porto Park; Baldaya Palace Gardens; Eucaliptal Garden	≥ 3 ha	30m ² / inhabitant	10.000	Sectors of recreation, rest, isolated from noise. Sectors of recreation (Playground playground) and playground) and leisure No allows circulation car.	Diversified, long-lasting, forest, vegetation natural, massifs bushes, meadow, lawns
SGE	Green spaces adjacent to housing	Charquinho Garden	Variable	10m ² / inhabitant	2.500	Sectors of recreation, rest, isolated from noise. No allows circulation automobile	Varied, sturdy, garden-like, instructive
	Green spaces near the dwelling	Marias Garden;		-			

Table 4: Summary table of the Urban Green Structure in Benfica. Source: Adapted by Cunha based on Magalhães, 1992.

In addition to the spaces identified above, Benfica has a vast network of urban green corridors materialised in the alignments of trees on the sidewalks and central separators, which connect the entire urban structure. Gardens and small garden spaces are found throughout the area, reinforcing the principle of the green continuum. The Park is the largest continuous urban green structure, associated with a public space to support the urban landscape, ensuring the generosity and quality of the urban public space. Following the proposed methodology, some elements of Benfica's green structure will be analysed to measure the insertion of green spaces in the grid and evaluate the patterns of collective living. In this sense, the parameters "accessibility and mobility" will be verified and "the activities that can be carried out" in the location.

Concerning accessibility, the parks can be accessed in several ways (on foot, soft mobility, by private vehicle or by public transport). It is identified the railway infrastructure that serves this area - Benfica Station, and several green spaces of different dimensions and in different locations of Benfica. This component represents an essential factor because an inaccessible space is consequently a place of low affluence. Excellent or poor accessibility can be translated into several parameters, such as parking near the site or easy access on foot, and these are especially important when considering visiting the UGS. Thus, the accessibility that Benfica's green spaces show is essential to understand the relationship between the individual and the public space during urban life. The spaces are well located and are covered by public transport - especially the Quinta da Granja Park - which facilitates access for all.

The diversity of activities performed in each place is tied to the number of infrastructures and public facilities available there. People look for places where they feel encouraged (where there are no repeated

moments, where they allow these users to break out of their traditional moulds, expand their experiences, live and enjoy these spaces), so they look for pleasant and intelligible spaces that only a varied public space (environmental, functional, and social) can provide. In this way, it can be observed (Tab 6) that the green spaces of Benfica, in its UGS, present diverse possibilities associated with comfort and safety, serving all audiences. These sensations that the urban structure transmits to people when they walk through the public space in Benfica can enhance the variety of choices, places to go, things to buy, friendly places where to organise and express social relations.

5. Conclusion

Cities are increasingly organised in conformity and adequacy to human needs, highlighting the concern to create healthy environments that improve the population's living conditions. Therefore, there is currently a concern in inserting green spaces in cities, spaces that have as their primary function the softening of the tensions of city life, providing the cities with environmental, social, and economic well-being.

The UGS promote urban sustainability through different functions and characteristics, hence their relevance in the urban planning process.

This study sought to understand if the green spaces of Benfica are inserted in the urban network, through on-site observation to understand the uses, functions, and experiences in these spaces, with a view to a healthier city.

In this sense, it was confirmed that UGS represent an added value to the city and the population, mainly to the users. These spaces are inserted in the urban network and represent fundamental elements in it. Aspects that contributed to the sustainability of the site are highlighted.

Their ecological contribution is essential to reduce the harmful effects of the city on the environment, they contribute to the aesthetic enhancement and reduce the impact of the built spaces and play a pivotal role at the social level, providing areas for leisure, as well as the practice of recreational and sports activities.

These spaces were implemented in the city to create natural environments that allow the population to contact nature in an urban environment. As mentioned before, the proximity to residences is a fundamental factor in the affluence of the UGS.

It stands out the importance of good accessibility, effortlessly connecting the population to these spaces. The articulation between residential, work and leisure areas promote the encounter between people and groups, according to which they share the multiplicity of means that make daily life possible. In this sense, being elements with several benefits for the well-being and quality of life of the populations, they should provide as much infrastructure and equipment as possible to allow the realisation of diversified activities in the same space so that no group is privileged over another.

From the point of view of sociability, the centrality of the spaces favours proximity, encounters, communication, among other forms of exchange, all of which involve direct contact between people who seek spaces for leisure, recreation, and outdoor living, regardless of age, social or cultural background of these users.

It is crucial to promote environmental and socio-cultural enhancement by introducing new activities and finding integration spaces that enhance community life to fight the social isolation of the inhabitants and the loss of community values of solidarity and respect for the natural environment.

One may also conclude that Benfica is well served by green spaces that allow multiple activities. However, they need conditions that increase the frequency in these spaces, especially by the most evident population of Benfica, the elderly. These spaces must be adequate or designed considering adequate

conditions for these used, facilitating access and encouraging permanence. Active and healthy ageing today promotes the integration of the elderly with the different layers of society, increasing the opportunities for social participation while reducing the isolation they are, so often, subject to at this time of life (WHO, 2002).

The pandemic of COVID-19 unexpectedly highlighted several dysfunctions that were known in society and cities (Antunes, 2020). In this sense, from the urbanistic point of view, it is necessary to accelerate the interventions of solutions based on nature (public spaces of conciliation between the city and natural ecosystems), of actions that are integrated into the global effort of decarbonisation of the economy (soft mobility, energy efficiency) and of measures to enhance the logic of proximity, of neighbourhood life, of cafes and other physical places of social interaction and citizen participation (Lisbon City Hall, 2020). The UGS interconnect various elements that contribute to the satisfaction of human needs, present relevant and undeniable importance in the life of cities in their environmental, social, and economic domains.

There must be a balance of these factors in this scope when developing public policies, planning strategies, implementation and management of these spaces when inserted in the urban mesh.

The complexity of interactions, functions, uses, and benefits that UGS can perform means that their planning and management must be seen in an increasingly integrated way through multidisciplinary approaches, which actively involve the populations and understand these systems involved, to promote healthier cities.

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