The built environment and active life-styles in older adults: an analysis of the location of care services in Portugal

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Abstract: The relationship between the built environment and people's health has been a frequent scientific subject. The ageing populations of many developed countries has further increased the interest in this relationship. At the core of these studies is the assumption that, as people age, they become more sensitive to the physical space they live in, which can form barriers or, on the contrary, contribute to active life styles. But the role the institutions for older adults can assume in this context, and how their location and surrounding built environment can affect their users' mobility, has often been ignored by this discussion. This paper focusses on this relation, by analysing 17 care facilities in Portugal. For this analysis, interviews were conducted with 36 professionals and 137 users, and i*n locu* assessments of their location was made. Through this methodology, it was found that the proximity to primary services is fundamental for an active lifestyle in institutionalized older adults and their integration in the neighbourhood. Particular attention should thus be paid to the broader location of these facilities in the urban context, and not only to the assessment of the surrounding environment's walkability levels.

Keywords: Ageing; built environment; care facilities, proximity, active lifestyles

Introduction

The impact of the built environment on people's health has been acknowledged since the XIX century. In particular in Europe and the USA, the urbanization processes of the industrial revolution was accompanied by epidemics of infectious diseases (Hall 1980), leading to the integration of public health issues in spatial planning regulations which allowed for more ample and green spaces, better ventilation and insulation or the separation of urban functions. The joint consideration of spatial planning and public health continued to be relevant in the following decades, but tended to weaken after the Second World War, with a decrease in infectious diseases and a "shift of power and resources to therapeutic hospital-based health services" in the medical field (Kidd, 2007, p.170). More recently, the relation between these two areas gained a renewed impetus, as broader health definitions became accepted and as the impacts of housing types and locations on the physical, mental and social well-being became evident (Kidd, 2007).

The aging population of many developed countries has also increased the interest in the relation between the built environment and the public health of older people. At the core of this interest is the assumption that, as people age, they become more sensitive to the physical space they live in, which can form barriers or, on the contrary, contribute to healthier and more active life-styles. Within the discussion concerning the relationship between the build environment and aging, mobility and accessibility are fundamental. In fact, more than designing dwellings according to older adults' needs, the idea that all the surrounding built environment must be planned according to their needs has been put forward (Burton and Mitchell, 2006). Prompted by the idea of aging in place, which aims to keep older adults in their original residences even when there are significant changes in their living conditions (Martins *et al*, 2012), initiatives such as elderly-friendly communities, age-friendly cities, livable communities or streets for life emerged.

By assuming that older people should stay in their communities as long as possible, these initiatives tend, however, to neglect the broader role elderly care facilities can assume in a society. Over the past decades, several studies stressed the impact of institutionalization in older adults, pointing to the depersonalizing effects of such environments. In the 1970's, Kahana (1973) noted that the accounts of the living conditions in institutions for older adults tended to invoke images of 'Dante's Inferno'. This perspective is still recurrent. Despite this, institutional settings are a valid (and sometimes the only) solution for a substantial number of seniors. And not just for those who are increasingly becoming dependent, live alone or lack family support – although these tend to be the main users (Freitas and Scheicher, 2010). Understanding the effects of environmental settings on older adults is therefore of utmost importance to assure them a better quality of life.

Studies concerning the location of these institutions are, nonetheless, scarce, leaving many unanswered questions. The goal of this article is to analyze the location and the neighborhood environment of senior institutionalized settings and the way in which they influence the behavior of their users.

Material and methods

Seventeen non-profit day-care centers and senior care homes were analyzed in the district of Aveiro (table 1), between 2015 and 2017, twelve of which located in predominantly urban areas and five in non-urban areas, according to the classification of the National Statistical Institute. For this analysis, a mixed methodology was adopted that included *in loco* observations and semi-structured interviews with professionals and users.

Table 1: Facilities included in the study

	Name	Type of service	Users' average age	Municipality
1	Associação Pró Deficiente Integrado	DC+ SC	79	Sever do Vouga
2	Centro Formação e Cultura Costa do Valado	DC+ SC	82	Aveiro
3	Santa Casa da Misericórdia de Aveiro	DC	89	Aveiro
4	Centro Comunitário da Gafanha do Carmo	DC	79	Ílhavo
5	Centro Social de Oiã	SC	84	Oliveira do Bairro
6	Centro Social Paroquial da N. Sª da Nazaré	DC+ SC	74	Aveiro
7	Centro Social Santa Joana Princesa	DC+ SC	77	Aveiro
8	O Abrigo	DC	76	Sta. Maria da Feira
9	Santa Casa da Misericórdia de Vagos	SC	83	Vagos
10	Lar Paroquial Amélia Madaíl	SC	87	Aveiro
11	Centro Social e Paroquial de Argoncilhe	SC	75	Sta. Maria da Feira
12	Assoc. Obras Sociais de S. Vicente de Paulo	SC	76	Sta. Maria da Feira
13	Centro Paroquial de São Bernardo	SC	83	Aveiro
14	Os Pioneiros	SC	83	Águeda
15	Centro Comunitário da Vera Cruz	SC	85	Aveiro
16	Fund. Casa Pessoal da SS e Saúde de Aveiro	SC	85	Aveiro
17	Lar São José Ílhavo	SC	75	Ílhavo

DC: Day-Care Centre SC: Senior Care Homes

For the interviews, a set of topics which are relevant to understand the users' experiences and perceptions, such as the most relevant services and activities or constrains and motivations. Were developed. In each institution the interviews were applied to two or three professionals and an average of eight users, totaling 36 professionals and 137 users. The majority of the interviewed older adults were female (67,2%) and the criteria for being included in the study were: a) to be a user of the institution; b) to be able to speak coherently; c) to be able to move without the assistance of others; d) to be willing to participate in the study. The ethical recommendations of the Helsinki Declarations for research involving human subjects were followed.

A preliminary visit to each institution's neighborhood environment was conducted in order to map other facilities and services, as well as to detect potential barriers in terms of accessibility within a given distance. This process involved: i) the analysis of services/functions within a given radius of the facilities; ii) the analysis of the features of the surrounding built environment.

Regarding the first (i), several authors have pointed out the impact that the availability of services in the proximity to older adults' facilities can have on their mobility (see, inter alia, Day, 2008; Burton and Mitchell, 2006). This analysis draws on the concept of catchment area (or ped-shed), meaning the maximum distance a user is willing to make to access a given service (Newman and Kenworthy, 2006). This means that all persons within the catchment area have a reasonable access to those services or facilities, measured in distance (metres) or time travel (minutes). In this study, the services and amenities within a 400 m and 800 m radius from the facilities were identified.

Regarding the influence of the build environment on the number of trips made by older adults (ii), it is important to consider the global quality of the neighborhood environment and the barriers that might exist in potential routes. Following Santinha, Costa and Diogo (2018) it was possible to distinguish five factors that influence seniors' willingness to walk:

1. *Connectivity*, which assesses the presence of a continuous network of routes, without barriers, and which guarantee a good connection between the main poles of attraction and to public transportation;
2. *Convenience*, which means a network that is as direct as possible, combining pedestrian routes, sidewalks, crossings, mixed traffic streets and pedestrian zones;
3. *Comfort*, associating a plain and pleasant movement to a sensation of calm in a space without restrictions and with attractive and high-quality pavement, urban furniture, shelters and resting areas;
4. *Conspicuity*, which refers to the extent to which a facility, a route or an object is noticeable, eye-catching and legible; and
5. *Conviviality*, which expresses the goal of taking advantage of attractive spaces, architectural and cultural variety to stimulate social interactions.

In this study, these factors were used to evaluate the neighborhood environment of the institutional setting. For this, three observable criteria were defined for each factor and were evaluated from a binary perspective: positive or negative (see the results for a complete listing of the criteria).

Results

Location

The assessment of the services and amenities within 400 m and 800 m of the considered facilities included six major categories: food related services; open public spaces; general services; health and well-being; transportation; and others. Table 2 shows the availability of services within the catchment areas of 400 m and 800 m. Findings show that the amount of services cannot be directly equated with a rural or urban location.

Nonetheless, the facilities in urban areas tend to be close to more services than the non-urban ones and, in particular, have better access to open public spaces or general services.

Table 2: Share of institutions that have at least on service/amenity in their service area (%)

Category	Service/amenity	Service area of 400 m			Service area of 800 m		
		Rural	Urban	Total	Rural	Urban	Total
Food related	Pub or cafeteria	80	42	53	80	67	71
	Restaurant	40	8	18	60	33	41
	Grocery store	20	42	35	40	75	65
Open public space	Park	0	42	29	0	42	29
	Public square	0	17	12	0	17	12
General services	Bank	0	33	24	20	50	41
	Post-office	20	33	29	20	58	47
	Parish	0	33	24	20	42	35
	Stationery shop	0	17	12	20	17	18
	Clothing or shoe store	0	17	12	0	17	12
Health and well-being	Health centre	40	42	41	40	58	53
	Pharmacy	20	58	47	40	67	59
	Hairdresser and beautician	40	33	35	80	50	59
	Swimming pool	20	8	12	20	8	12
Transportation	Bus stop	40	50	47	40	58	53
	Train-station	0	8	6	20	25	24
Others	School	40	33	35	40	50	47
	Hotel	0	0	0	20	0	6
	Place of worship (church)	40	75	65	80	83	82

Urban design factors influencing mobility

The assessment of the build environment regarding its walkability for the senior population was made for five factors, each one comprising three observable criteria (Table 3). The assessment for a criterion given was then summed up to provide an overall score for each factor and institution. The factors with the worst scores were convenience and connectivity, given a tendency for inadequately sized walking areas (namely narrow or absent sidewalks), insufficient crossings and natural and topographic barriers. The highest scores were observed for comfort, conspicuity and conviviality, with positive marks for the criteria related to the overall quality of the urban design, such as the presence of urban barriers, the amount of lighting or signalization. In these dimensions, a criterion that stands out for its negative score is the amount of street furniture for resting, which was considered insufficient in most facilities.

Table 3: Assessment of the environment surrounding the facilities

	Predominantly rural					Predominantly urban												
Institution	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Total
Connectivity	**2**	**1**	**1**	**1**	**1**	**2**	**1**	**2**	**1**	**0**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**23**
1- High density and abundant intersections in quarters	+	+	-	+	+	+	+	+	-	-	+	-	+	+	+	+	+	13
2- Absence of natural and topographic barriers	-	-	+	-	-	-	-	-	+	-	+	-	-	-	+	-	-	4
3- Multimodal transportation nodes	+	-	-	-	-	+	-	+	-	-	-	+	+		-	-	+	6
Convenience	**1**	**1**	**0**	**1**	**0**	**1**	**1**	**2**	**0**	**1**	**1**	**1**	**2**	**2**	**2**	**2**	**2**	**20**
1- Existence of alternative routes to reach point of interest	+	+	-	+	-	+	+	+	-	-	-	+	+	+	+	+	+	12
2- Adequate crossings given traffic volume	-	-	-	-	-	-	-	+	-	+	-	-	-	+	+	-	+	5
3- Adequately sized walking areas	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	+	-	3
Comfort	**2**	**1**	**1**	**2**	**2**	**1**	**2**	**2**	**2**	**3**	**2**	**2**	**2**	**3**	**1**	**1**	**2**	**31**
1- Absence of urban barriers	+	-	+	+	+	+	-	+	+	+	+	+	-	+	+	+	+	14
2- Lighting	+	+	-	+	+	-	+	+	+	+	+	+	+	+	-	-	+	13
3- Street furniture including structures for resting (benches)	-	-	-	-	-	-	+	-	-	+	-	-	+	+	-	-	-	4
Conspicuity	**3**	**0**	**1**	**2**	**2**	**1**	**3**	**2**	**3**	**0**	**1**	**2**	**1**	**2**	**3**	**0**	**2**	**28**
1- General and specific signalization	+	-	+	+	+	+	+	+	+	-	-	+	-	+	+	-	-	11
2- Architectonic diversity	+	-	-	-	-	-	+	-	+	-	-	+	-	-	+	-	+	6
3- Landmarks	+	-	-	+	+	-	+	+	+	-	+	-	+	+	+	-	+	11
Conviviality	**3**	**0**	**1**	**3**	**2**	**2**	**3**	**3**	**3**	**0**	**1**	**0**	**3**	**2**	**3**	**1**	**3**	**33**
1- Visually interesting environment	+	-	+	+	+	+	+	+	+	-	+	-	+	+	+	-	+	13
2- Safety	+	-	-	+	-	+	+	+	+	-	-	-	+	-	+	-	+	9
3- Spaces that facilitate interactions (public space)	+	-	-	+	+	-	+	+	+	-	-	-	+	+	+	+	+	11
Total	**11**	**3**	**4**	**9**	**7**	**7**	**10**	**11**	**9**	**4**	**7**	**6**	**10**	**10**	**11**	**5**	**11**	**135**

Users' perspective

Regarding the role of the urban layout for the elderlies' behavior, the interviews showed that in almost all institutions the users leave the facility on foot. Although walking for leisure or recreational purposes is very common, most of the trips are made with a destination in mind like accessing a specific service. The services mentioned most frequently in the interviews were cafeterias/pubs, post-offices, churches, hairdressers and pharmacies (in this order). This is in line with what was shown in figure 3.

Notwithstanding the broad tendency for leaving the institutions through active modes of transportation, several limitations were identified by the interviewed. These barriers mostly concern insufficient sidewalks, traffic, the lack of resting opportunities or high gradients.

One aspect that characterizes the mobility pattern of the elderly interviewed is the limited use of public transportation. This is mainly due to their distance (only six of the institutions had a bus stop within 800 m as shown in table 3), their limited frequency, the lack of experience of most of the older adults in using this type of transportation and also because transportation is often provided by the supportive care facilities.

Perceived walking behaviors of the interviewed older adults are, in general, related to the environment surrounding the facilities (as shown in table 3). In fact, older adults stating that they scarcely leave the institutions, are mostly from those institutions that present the lowest scores regarding the five urban design factors.

Conclusions

The general findings of this study show that institutionalized older adults value mobility, active lives and social connections, and leave the building by active modes of transportation, if the built environment of the institution's surrounding area provides appropriate conditions – which was not the case in many of the analyzed institutions. In particular, the quality of the sidewalks, the slope of pathways, the presence of urban barriers and the absence of places for resting (benches) form barriers to a more active life-style by older adults. It was also possible to conclude that walking for transportation occurs more frequently than walking for leisure, thus highlighting the importance of services and amenities in the proximity of the institutions.

These findings can provide useful insights for policymaking. When dealing with the challenges of aging and institutionalization, public policies must therefore take into account, not only the scale of the institution's environment, but also the institution's neighborhood environment, in close collaboration with other stakeholders, namely the institutions' directors and personnel. The extent to which institutions succeed in understanding older adults' requirements and provide an environment capable of addressing their needs, is a key issue to reduce stress and the pace of decline associated with institutionalization.

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