PUBLIC URBAN GREEN SPACES: COMBINING GOALS FOR SUSTAINABILITY, URBAN HEALTH AND WELL-BEING

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Abstract Urban green public spaces offer healthy and environmentally friendly solutions to the effects of rapid, unsustainable urbanization on health and well-being. Public green spaces available for walking, running, cycling, scootering, walking, informal play and other outdoor activities can improve the safe mobility and access to basic ecosystem, improving the health equity. Understanding the relationship between public urban green space characteristic and sustainability components can help the planning of these spaces. Nowadays, quantifying the impact of green spaces on health is receiving more and more attention in various interdisciplinary research activities. In this paper, we analysed the impact of proximity to urban green areas on health and well-being of the people in two Hungarian cities Debrecen and Szeged. In the first, descriptive phase of our research, we examined the amount of green space in two cities of the same relative status, the satisfaction of their inhabitants with green space and life expectancy. One of the targets of SDG 11 is to provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities. Our research focuses on SDG 11.

Keywords:
green and public spaces, SDGs, recreation, health, sustainability

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1 Introduction

In connection with climate change and with the strengthening of the urbanization trend, the role of green areas in settlements is increasingly important. Several types of economic benefits associated with urban green spaces are identified by Zhao and Chen (2018). It has been verified that the production of urban green spaces (UGS) has gradually become a profitable method of investment in macroeconomic capital flows and accumulation. Despite this, nowadays, the area and population density of cities are increasing, with the continuous growth of the built-in and the paved areas. Urban green spaces get a marginal role, their appearance is fragmented and they are distributed unevenly. Increase in urbanization and in the density of cities have growing health risk for the inhabitants. Several studies publish data about the health effects and benefits of time spent in nature. The thought that green spaces have beneficial effect on the health of inhabitants has been accepted as a general principle since as early as the 1800's: e.g. London organizations such as the commons preservation society and the national health society urged the preservation and accessibility of open green spaces, and they mentioned the squares and parks within the crowded inhabited areas as 'the lung of the city' (Hickman, 2013). According to the definition of the most recent healthy cities initiative of the who, "a healthy city is one that continually creates and improves its physical and social environments and expands the community resources that enable people to mutually support each other in performing all the functions of life and developing to their maximum potential" (World Health Organisation, 2016a). The amount and distribution of green space has not only environmental but also social impacts (Sax et al., 2022). In the previous decades, significant number of studies reported the positive effects of green space exposure on human health and well-being, with a special view to the correlation between the accessibility of the green spaces in the inhabited areas and the better health condition (Nielsen & Hansen, 2007; Van den Berg et al., 2010). Ecological degradation leads to environmental health and public health issues, therefore, the restoration of these affected areas supports the health of the environment and the inhabitants as well. More intense ecological degradation can be observed in the peri-urban and the rural areas due to various industries, therefore, the health condition of the inhabitants in this region is often worse (Marsch et al., 2003). Human health includes well-being and subsistence as well, which are determined by various social, cultural, economic and environmental factors. It is a demonstrated fact that ecological restoration and the restorations in various sample areas significantly

contribute to human health. In the practice of environmental management and during ecological restoration it is important to clarify and understand how the given restoration effort and process is related to human well-being and how it supports it (Bradby et al., 2021). Thus, the purpose is to redirect settlements into ecosystem and to create more livable and sustainable cities to provide an efficient response to environmental challenges because of the integrated and interdisciplinary development of the UGS. The increase in the population of cities, the ratio of the area of the available green spaces and the modern lifestyle in the 21st century result in lower and lower contact of people with nature. In our study, the beneficial effects of access to nature on health and general well-being are assessed in two Hungarian cities, Debrecen and Szeged, both cities are among the largest regional centers in Hungary. The study of minor cities, considered as potential growth poles, is a highly relevant issue in Hungary's unicentral spatial structure. The economic performance and relative economic position of Debrecen and Szeged are very similar (Molnár et al., 2018), both being major knowledge centers. Other research also confirms in terms of the well-being of city dwellers, it is not enough to look at GDP per capita, but all the other softer factors (e.g. UGS) must also be considered to ensure that the municipality projects the image of a livable city, to retain its population and to attract new ones (Michalkó, 2015).

2 Theoretical Background

Until 2050, the two-thirds of people - almost 6.5 billion people - will live in cities, predictions say. High-rate urbanization is accompanied with the decrease of UGS and related to the deterioration of quality of life (Dewan & Yamaguchi, 2009). In the level of cities, sustainable development cannot be ensured without rethinking and redesigning the urban environment that provides long-term benefits and opportunities. UGS play a distinguished role in the sustainable development of cities. Green space interventions nurture the existing character of the city, improve environmental conditions, promote outdoor recreation places and active lifestyle, and they protect biodiversity by establishing a habitat for wild animals. They also highly decrease heat island effect and surface run-off. Recently, the role of these interventions in the decrease of carbon-dioxide emission and the improvement of the health of citizens appeared in literature and practical life as well (Haq, 2011). By 2030, it is a priority goal to be able to provide universal access to safe, inclusive and accessible green and public spaces, especially for women, children, the elderly and

the disabled (Goal 11). The development and support of economic, social and environmental relations can ensure sustainability between the urban, peri-urban and rural areas. In the previous decades, the design of cities was characterized mainly by the establishments of building, contiguous housing estates and new city parts, therefore, insufficient attention was paid to green spaces, which affected social and societal sustainability relations. In the previous decades, the design of cities was characterized by the construction of buildings paying little attention to green spaces, which affected the social sustainability of urban areas (Teimouri, 2019). Green spaces play a key role in the support or urban ecological, social and societal systems (Barbosa et al., 2007). UGS are important for human well-being, contribute to quality of life and promote social interaction and inclusion (Pinto et al., 2022). Healthy people, the environment and the healthy people - environment interactions create synergetic relationships which influence the sustainability of cities (Liu et al., 2007). According to a WHO report "there is no universally accepted definition of UGS. Generally, green spaces in urban areas are public parks; other definitions may also include private gardens, woodlands, children's play areas, non-amenity areas (such as roadside verges), riverside footpaths, beaches, and so on" (World Health Organization, 2016; Teimouri,2019). There is a difference between UGS and open areas: open areas are urban areas currently not subject to development/construction, and they are freely accessible for inhabitants. Open areas include green areas covered by vegetation, kindergarten or school yards, vacant lots, public amenities - seating areas, playgrounds and the community green spaces of living estates (Teimouri, 2019). UGS can be interpreted as an urban area covered by natural or non-natural vegetation, and by its use, it has social and ecological significance (Bahram, 2008).

3 Methodology

Our research question is to investigate whether there is likely to be a positive relationship between health, satisfaction and the amount of green space. In two selected cities (Debrecen and Szeged, Hungary) 1000-1000, i.e. altogether 2000 people were asked via phone. Their responses were immediately recorded online. Data collection required 3 months. The sample size was 1000 for both cities. In this case, the margin of error was +/- 3.1 percent in case of 95 percent probability. By considering the whole sample of 2000 people, the margin of error was +/- 2.2 percent in case of 95 percent probability. These margins of error are valid for a result of 50 percent. In case of an incremental sample and lower percentage ratio, margin

of error can be lower. The sample is representative for the inhabitants of Szeged and Debrecen based on sex and age. During the research, people aged 15 or more were interviewed. The questionnaire had 16 questions: sex and age of the respondent; purpose and frequency of visitation green spaces (parks); satisfaction with the number of green spaces in the city; satisfaction with the area of green spaces in the city; tidiness/cleanliness of green spaces; way of travel to a green space; time of getting to a green space on foot; time spent in green space; number of green spaces used by the respondent in the city; characteristics of the preferred green spaces; infrastructural aspects of the selection of the green space; satisfaction with the infrastructure of green spaces; type of the real estate the respondent lives in. The questionnaire survey was carried out with the involvement of the staff of the Partiszkon Social Research Nonprofit Organization, and the research was subsidized by the Ecopolis Foundation. In the questionnaire survey, quantitative and qualitative data were collected, and it asked questions about the habits, ways and frequencies of green space use in a broad range. Due to the exploratory nature of the research, we used the relationships and trends revealed based on the questionnaire responses during the analysis. First the sociodemographic and other background variables, and the basic distribution was assessed for each question. Afterwards, the responses to the questions were compared to the background variables. In the first phase of our research, we publish a descriptive statistical analysis of the questionnaire. During the analysis, mostly the differences between the cities were focused on. The results obtained were compared with the databases of the KSH (Central Statistical Office of Hungary), which includes the area of the cities (KSH, 2019) and the area of the green spaces managed by the local governments (KSH, 2021). We have also compared life expectancy at birth based on the KSH (2022) census database (this dataset is available at the county level).

4 Results

In terms of demography and background variables it can be stated that the ratio of sexes in the full sample (N = 2000) is balanced, practically 50-50, however, women are slightly overrepresented (52.4%). Broken down by cities, the ratios more or less accurately depict the real distributions, showing a slight majority of women in case of both settlements, similar to the national data. The age groups of the inhabitants of the two cities have a similar distribution in the sample. In Szeged, the ratio of people living in a flat with a balcony or a common yard is about twice as high as

people living in flats without a balcony or a common yard. In Debrecen, however, this ratio is highly shifted towards people living in a house who make up more than half of the city's population, far ahead of people living in flats with free space, which make up a third of the inhabitants. One in three people visits parks at least once a week for recreation. The inhabitants of Debrecen visit green spaces more frequently to rest, read or just sit there than those of Szeged. In case of park visitation to meet friends or to spend time together with the family, the Szeged respondents show higher ratio for higher frequency categories, while the Debrecen respondents had higher ratio for the lower frequency categories. Based on this it can be stated that people in Szeged select green spaces to nurture family and friend relationships more often than people in Debrecen. In terms of the frequency of green space visitation purpose, the motivation behind park visitations were aligned, the responses were simplified, and the alternatives showing any non-zero visitation frequency were contracted. In this way, a dichotomous variable was determined, which shows whether people visit parks for a given purpose or they do not visit parks, however, it does not analyze the frequency of visitation of the green space. The individual relaxation is the most popular purpose of visitation, followed by the spending of time with friends, family, children and grandchildren. The ratio of satisfaction with the number of green spaces was 36.4% in Szeged and 23.4% in Debrecen. One third of the Szeged inhabitants and one fourth of the Debrecen ones were fully satisfied with the area of green spaces in their cities. People living in a house with own yard are more satisfied with the cleanliness of green spaces than the inhabitants of flats. Distribution of the accessibility of the visited green space on foot in the whole sample: 61.3% within 10 minutes or less, 15.4% within 15 minutes and 23.3% over 15 minutes. Distribution of the means of travel to the green space in the full sample: 78.6% on foot, 25.9% by bike, 15.5% by public transport and 21% by car. As regards the time spent in green spaces, the ratio of respondents spending less than an hour (44.8%) or 1-2 hours (44%) is practically identical. The visitation time for people over 65 is typically lower, while people under 20 typically spend more time in green spaces. The primary purpose of using several green spaces is the demand for variability; this was mentioned by almost three-fourth of the respondents. The reasons 'different functions' or 'similarly accessible multiple parks' were mentioned similar times, by every fourth respondent. The reason 'same function but different equipment' was mentioned only by the eighth of the respondents. As regards the low distance from home, there is a significant difference between the inhabitants of the two cities. For Debrecen respondents, the lower distance from the green space

is more important than for the Szeged respondents. Based on the Public Administration Name Book of the Central Statistical Office of Hungary (2019), the area of Debrecen was 46166 ha and that of Szeged was 28099 ha. Based on the 2021 database of the Central Statistical Office of Hungary, the area of green spaces owned by the local government of Debrecen is 177 ha, out of which 162 ha is public park; in Szeged, the area of green spaces owned by the local government is 338 ha, out of which 312 ha is public park (KSH, 2021). This means that the area of green spaces compared to the whole area of the city is 0.4% in Debrecen and 1.2% in Szeged. The green space for a single inhabitant is 9 m2 in Debrecen and 21 m2 in Szeged. The health status of the population can be inferred from the fact that the average life expectancy at birth is higher in Szeged than in Debrecen, both for men and women (KSH, 2022).

5 Discussion and Conclusion

In our research, the effect of the vicinity of UGS on human health and well-being in two Hungarian cities, Debrecen and Szeged was analyzed. The results of the first phase of the survey were in accordance with expectations, with Szeged's characteristics being clearly more favorable. In the current phase of the research, no causality can be confirmed. One of the purposes of the SDG 11 is to provide universal access to safe, inclusive and accessible green and public spaces, especially for women, children, the elderly and the disabled. The different satisfaction of the inhabitants of the two cities can be explained by that the area of green spaces in Szeged is double in absolute terms, two and a half times in terms of population, and three times in terms of area compared to Debrecen. This result is in line with the results of an earlier survey, according to which the population of Szeged is satisfied with the state of the natural environment, while the people of Debrecen are among the most dissatisfied (Berki & Halász, 2015). Based on the findings it can be stated that the quantification of the effect of green spaces on physical and mental health must receive higher and higher attention in the various interdisciplinary research activities. The question of sustainability may be incorporated into city design practice by the characteristics and the indicators of the urban green spaces serving public purposes.

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