

Effects of the COVID -19 Pandemic on the Use and Attitudes Towards Urban Public Spaces

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The benefits of interaction with urban public space, particularly green spaces are numerous for citizens, especially those who live in metropolitan areas. The outbreak of the pandemic, as well as the restrictive measures put in place to prevent the virus's spread, caused enormous changes in people's daily lives and activities. Using a structured questionnaire, the current study intends to capture the shift in attitudes and perceptions of residents of the Attica region during the 2nd wave of restriction measures (7/11/20 – 3/7/21). During the pandemic, visitation in urban public spaces increased, according to the data. The great majority of participants preferred to visit mostly urban public areas within walking distance of their residence (up to 15 minutes), especially in the afternoon and relatively frequently, with 45 percent claiming to visit them "daily" or "3-4 times a week," and only 3% claiming "never". The analysis showed an increase in the visits during the pandemic from participants who reported better-perceived quality of the spaces, better accessibility, safety during the day, and a feeling of relaxation in the free public spaces of their area. Additionally, those reported living in areas with many available spaces were more likely to increase the frequency of visits during the pandemic.

Keywords: Covid -19, green spaces, public spaces, urban mobility.

The urban public space consisted of streets, parks, squares, and playgrounds that are designed for public use by the community's residents. The morphology of cities is changing as a result of ever-intensifying and rising urbanization, often leading to quick degradation of urban public space and a reduction in vegetation in cities (Jayasinghe, Hemakumara, and Hewage 2021). The COVID-19 pandemic was not only a global public health emergency but also had a significant impact on global social cohesiveness and urban sustainability (Addas and Maghrabi 2022).

Numerous studies have shown that the presence of sufficient quality and quantity of urban green space, as a primary element of the city system, is critical in defining a high standard of life in large urban centers. Green spaces and parks in cities are important for preserving the microclimate, improving soil fertility, and increasing the overall urban resilience (Lee and Kim 2015). Also, urban public space engagement has been found to have a significant positive impact on citizens' health as well as their social growth and interaction (Burnett et al. 2021). This has resulted in a renewed emphasis on public space and the significance of long-term management (Glavan et al. 2022).

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Abstract

Introduction



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In order to reduce the spread of the pandemic, the Greek government imposed a series of emergency regulations aimed at restricting mobility and preventing crowding. Social distance measurements have restricted a variety of social, economic, and educational activities, as well as residents' mobility. Repeated lockdowns also had an impact on working conditions. Measurements such as the implementation of teleworking, shift work, and the gradual arrival of employees were encouraged and implemented to relieve traffic on public transportation (Campisi et al. 2020; Noszczyk, Gorzelany, and Kukulska-kozie 2022). Also, global trends in access and usage of urban public spaces are continually shifting (Honey-rosés, Anguelovski, Bohigas et al. 2020). The Greek government has discouraged access to and usage of public spaces, especially urban parks, and squares, throughout numerous phases of the pandemic due to repeated lockdowns enforced to control the virus's spread. There were periods when only the most urgent of reasons could justify leaving home (work, helping a familiar person, a short walk for physical activity on the borders of the municipality, etc) (Politis et al. 2021). The discouragement of citizens from visiting and staying in open public spaces, particularly parks, has posed challenges to urban environments and citizen activity. To prevent health hazards, the number of park visitors decreased substantially in many cities during the strict lockdowns. Several studies have found that free public spaces and especially urban parks are important for pandemic mitigation because they allow people to engage in outdoor activities while reducing the risk of virus infection (Ugolini et al. 2020; Addas and Maghrabi 2022). As a result of the literature research, it was discovered that the new reality of the pandemic had a substantial impact on individuals' attitudes about public space, particularly urban green areas, squares, and playgrounds (Nikolaidou 2019; Venter et al. 2021). In Greece, only a few studies have been conducted to investigate the impact of the pandemic on residents' attitudes toward free public spaces (Kehagia et al. 2020; Vatavali et al. 2020).

Taking into account this research gap, the goal of this study was to examine the impact of the COVID-19 pandemic on the use and visitation of open urban areas in Attica, Greece's most populated region, from a variety of perspectives. The current study is part of a larger examination of data from multidisciplinary research on public space and the impact of the pandemic on citizens' physical and mental health. Because of the vast amount of data and the nature of the research, it was decided that the current study would only look into (a) how mobility and visitation in free urban public spaces changed during the pandemic, (b) why residents chose to visit free public spaces during the pandemic, and (c) the possible relationship between urban characteristics of free public spaces and visitation. The current study can help with spatial, urban, and comparative analyses of public space strategically.

Furthermore, establishing conclusions regarding residents' attitudes about the city's public infrastructure might aid decision-makers in better understanding the importance and universality of urban public spaces in meeting human needs. As a result, in a post-pandemic future, a sustainable redesign of their public space may become more viable.

Methods

This cross-sectional survey took place in Athens, Greece from 27 April to 27 June 2021, during the second wave of restriction measures (i.e., curfew, social distancing measures, etc). The sample consisted of 745 residents of Attica, Greece, aged over 18 years old whose participation was voluntary and consensual, and answers were self-reported after the provision of detailed information about the nature and the scope of the research by the researchers. For the needs of the present study, convenient and snowball sampling techniques were used. The sample was recruited through invitation via personal e-mails and social media posts on Facebook and Instagram. Questionnaires were distributed to each participant separately, while some participants forwarded the questionnaire to their friends and family.

Tool and measures

For this survey, a questionnaire was created consisting of questions that were frequently requested in this scientific field during the pandemic time, such as Vatavali et al. 2020, and Xie et al, 2020. Sociodemographic measures were collected, including gender, ethnicity, age, place of residence, marital status, having children, house size (square footage), educational status, occupation, and annual income. Characteristics of public spaces referred to quantity (i.e., "There are many free public spaces (squares, parks, playgrounds, groves, etc.) in your area"), quality (i.e., "The quality of free public spaces in your area is very good"), safety during day and night (i.e., "Free public spaces in your area provide a sense of security during the day/night"), maintenance (i.e., "Free public spaces in your area are well maintained"), mobility information (i.e., "Your visits in public spaces in your area have decreased due to the pandemic"), etc. Answers were collected either through a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree) or from close-ended questions of multiple choices.

Statistical analysis

SPSS, PASW Statistics 18, was used for the statistical analysis. For quantitative variables, relative and absolute frequencies were used. Multivariable logistic regression analysis was used to examine associations between the frequency of visits to free public spaces and their availability, quality, accessibility, maintenance, safety during the day, safety during the night, and feeling of relaxation, as well as age, gender, education level, employment status and having children. Multiple linear regression was used to estimate the relationship between the decrease in the frequency of visits to free public spaces during the period of the COVID-19 pandemic and their availability, quality, accessibility, maintenance, safety during the day, safety during the night, and feeling of relaxation, as well as age, gender, working hours and having children. The independent variables of both linear and regression models were established using a stepwise method. Initially, all variables were included in each model, and then progressively removed until reaching the best predictive adequacy of the model. Statistical significance was set at $p < 0.05$.

Survey responders

In total, 745 people from the Attica region participated in the questionnaire survey. Over 72.3% identified as female, 26.6% as male, and 1.1% as "other". Over 98.9% identified as Greek and 1.1% chose another ethnicity. Nearly half of the responders (49.5%) belonged to the age group 18 – 30, 23.6% were 31-40 years old, 14.6% were 41-50 years old and 3% were above 60 years old. The lower household income classes represented in the data were <10,000 Euros annually (42%) and the highest >30,000 Euros annually (4.8%). Almost 58.4% had completed a bachelor degree and 30.3% had completed a master degree or Ph.D. Only 21.1% of the people who participated had children. Almost 35.3% came from the Central Sector of Athens, 17.2% from the Southern Sector of Athens, 14.5% from the Northern Sector of Athens, 12.3% from the Western Sector of Athens, 8.6% from Piraeus Regional Unit, 6.3% from East Attica Regional Unit and 5.8% from West Attica Regional Unit.

The pattern of Urban Public Spaces Visitation

The patterns that follow citizens' visits to urban public spaces during the pandemic were divided into four sections: frequency of urban public space visits during the week (Fig. 1), the time spent going to the urban public destination (square, park, grove, playground) from their home (Fig. 2), the preferred period during the day for this visit (Fig. 3), and finally the type of activities for which they chose to visit the urban public spaces during the pandemic (Fig. 4). The findings revealed that the vast majority of participants use the urban public places in their area, with 13% responding they visit them "every day," 32% responding "3-4 times a week," 32% stating "twice a week," 16% stating "once a week," and 3% claiming "none."

Results

Table 1

Socio-demographic characteristics of survey responders

Variable	Categories	N (Total=745)	%	Variable	Categories	N (Total=745)	%
Gender	Male	198	26.6	Marital status	Widowed	5	0.7
	Female	539	72.3		NA/Other	10	1.3
	Other	8	1.1	Having children	Yes	157	21.1
Ethnicity	Greek	737	98.9		No	583	78.3
	Other	8	1.1		NA/Other	5	0.7
Age	18-30	369	49.5	Age of children	<18	102	65
	31-40	176	23.6		Education status	Primary/Secondary school	5
	41-50	109	14.6	High school		79	10.6
	51-60	69	9.3	University/College		435	58.4
	>60	22	3	MSc/PhD	226	30.3	
Residency	Northern Sector of Athens	108	14.5	Occupation	State employee	87	11.7
	Western Sector of Athens	92	12.3		Private employee	335	45
	Central Sector of Athens	263	35.3		Freelance	127	17
	Southern Sector of Athens	128	17.2	Occupation	Unemployed	147	19.7
	East Attica Regional Unit	47	6.3		Retired	22	3
	West Attica Regional Unit	43	5.8		NA/Other	27	3.6
	Piraeus Regional Unit	64	8.6	Income (yearly)	<10,000	313	42
	Marital status	Not married	323		43.4	10,000-20,000	235
Married		150	20.1		20,000-30,000	64	8.6
In a relationship		232	31.1		>30,000	36	4.8
Divorced		25	3.4	NA/Other	97	13	

It's also clear that well over half of the residents preferred to be within walking distance of their homes, with 18% saying it takes less than 5 minutes, 48 % saying it takes 5 to 15 minutes, 21 % saying it takes 15 to 25 minutes, 7 percent saying it takes 25-35 minutes, and only 4% saying it takes more than 35 minutes. These findings are in complete agreement with government recommendations to avoid long-distance travel between municipalities to limit the possibility of congestion in inter-municipal centers of interest as well as the transmission of viral load from heavy regions to lighter ones.

When questioned what period during the day they prefer to visit the urban public places, 66 % answered "after 18.00," 25 % answered "14.00-18.00," 13 % answered "12.00-14.00," 19 % answered "9.00 -12.00," and 3 % answered, "before 09.00."

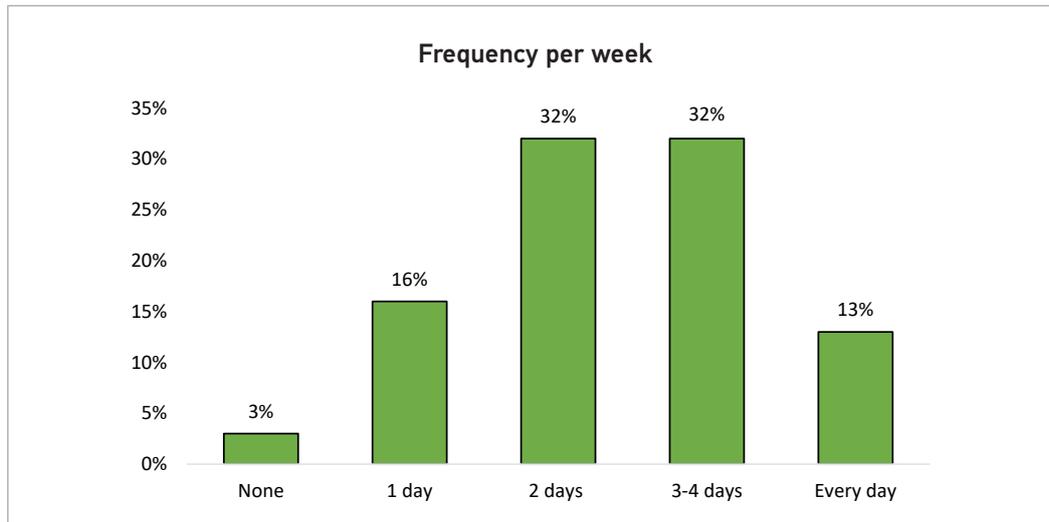


Fig. 1

Frequency of urban public space visits during the week

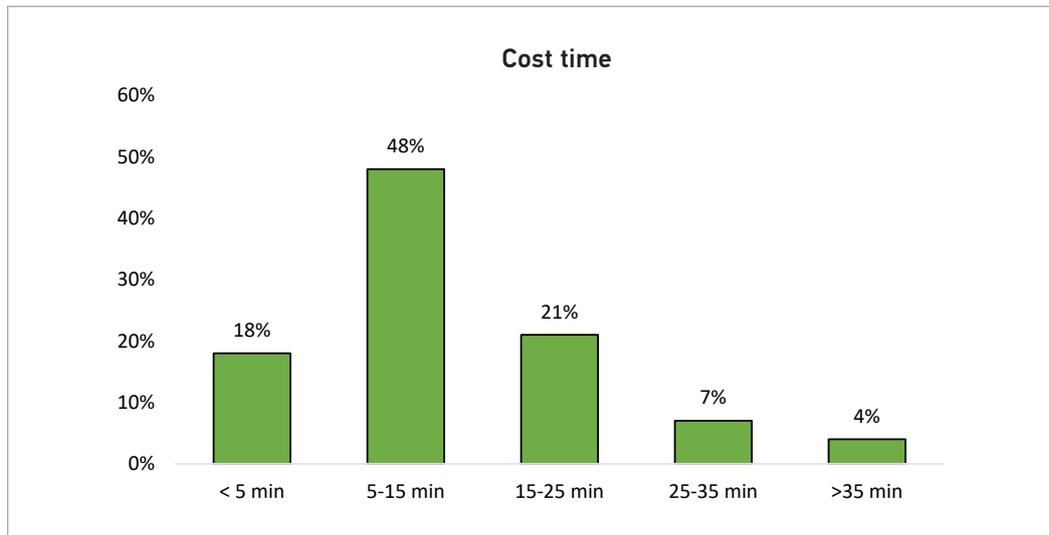


Fig. 2

Time spent going to the urban public destination (square, park, grove, and playground)

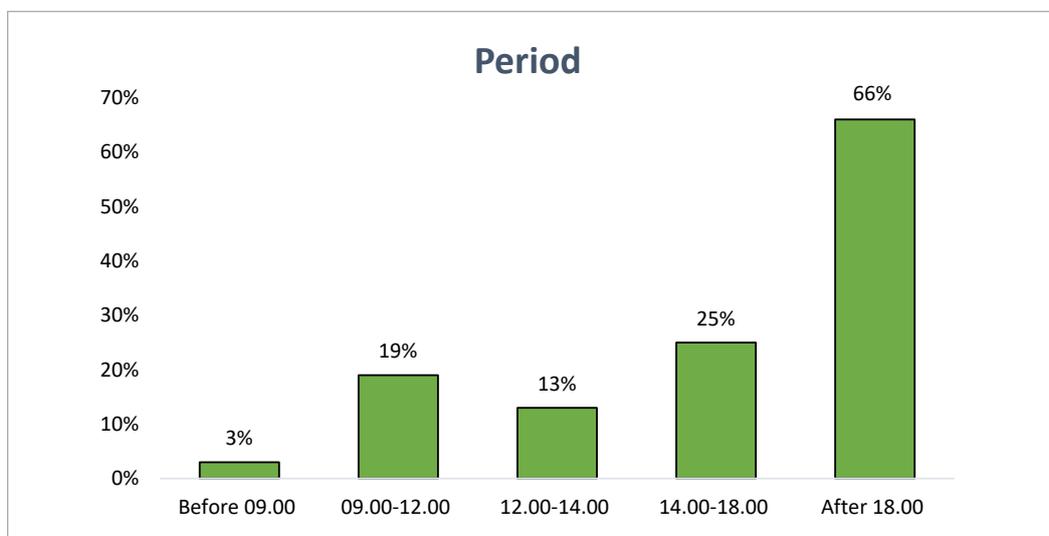
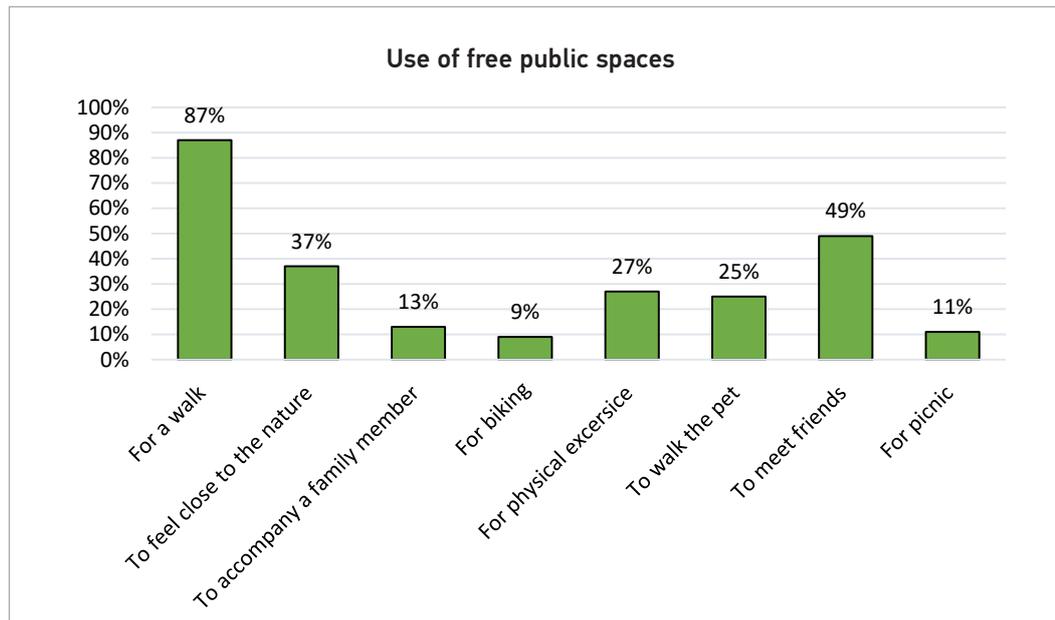


Fig. 3

The preferred period during the day for this visit

Fig. 4

Type of activities for which they chose to visit the urban public spaces during the pandemic



In addition, respondents were given the option of responding to a multiple-choice question on the motivations that drive them to be in urban public spaces during the pandemic. The vast majority of the sample (87%) chose “for a walk,” followed by 49% “to meet friends,” 37% “to feel close to nature,” 27% “for physical exercise,” 25% “to walk the pet,” 13% “accompany a family member,” 11% “for a picnic,” and 9% “for biking,” according to the results (Fig. 4).

Relationship between urban characteristics of free public spaces and visitation

The univariate linear regression analysis showed an increase in the visit to urban public spaces during the pandemic among participants who reported better-perceived quality ($B=0.13$, $p=0.02$), accessibility ($B=0.16$, $p=0.01$), safety during the day ($B=0.16$, $p<0.01$) and feeling of relaxation ($B=0.28$, $p<0.01$). Additionally, those reported living in areas with many available free public spaces were more likely to increase the frequency of visits during the pandemic ($B=0.06$, $p<0.01$). An increase in the visit to free public spaces was also found in employed individuals ($B=0.06$, $p=0.01$), as well as in those with a higher education degree ($B=0.06$, $p=0.03$). On the contrary, those having children were less likely to increase the frequency of visits ($B=-0.08$, $p<0.01$). Also, people older than 60 years of age were less likely to increase their visits to Free public spaces during the pandemic compared to those aged 18-30 years ($B=-0.16$, $p<0.01$).

Discussion

The rise of the pandemic has proved the significance of sustainable planning and maintenance of public spaces for residents, particularly in big urban areas. The pandemic has remained a visible and ever-changing threat to people until now, with no evidence of a decisive escalation of the health threat. Its consequences may be seen in the public space in a variety of ways, and it is expected to create new conditions for public space management and planning. The covid-19 pandemic revealed the vulnerabilities of Greek public space, particularly in the region of Attica (Vatavali et al. 2020). The current study investigated 745 individuals in the Attica region, which is host to Greece’s capital and contains the majority of the country’s heavily populated districts. The survey gathered information on the people of Attica’s perceptions of public spaces. The findings revealed that the great majority of individuals prefer a) free public spaces that are within walking distance of their house, i.e. up to 15 minutes, which is in line with government restrictions. During this time, there were suggestions and restrictions for brief mobility in regions adjacent to the residence and inside the municipality’s boundaries. This is also in line with comparable research and polls undertaken in cities across

	B	Std. Error	p-value
Quality	0.13	0.06	0.02
Accessibility	0.16	0.06	0.01
Maintenance	0.02	0.05	0.62
Safety during Day	0.16	0.06	0.00
Safety during Night	0.07	0.04	0.07
Relaxation	0.28	0.05	0.00
Availability of Free public spaces			
Not many available	(Ref.)	(Ref.)	(Ref.)
Many available	0.06	0.02	0.00
Gender			
Male	(Ref.)	(Ref.)	(Ref.)
Female	0.03	0.02	0.21
Age			
18-30	(Ref.)	(Ref.)	(Ref.)
31-40	-0.04	0.02	0.10
41-50	-0.03	0.03	0.29
51-60	-0.05	0.03	0.106
>60	-0.16	0.05	0.00
Having children			
No	(Ref.)	(Ref.)	(Ref.)
Yes	-0.08	0.02	0.00
Employment status			
Unemployed	(Ref.)	(Ref.)	(Ref.)
Employed	0.06	0.02	0.01

	B	Std. Error	p-value
Education status			
Basic Education	(Ref.)	(Ref.)	(Ref.)
Higher Education	0.06	0.03	0.03
Area of residency			
North	(Ref.)	(Ref.)	(Ref.)
West	0.04	0.03	0.23
Central	0.04	0.03	0.20
South	0.05	0.03	0.13
East	0.04	0.04	0.31
West Attica	-0.03	0.04	0.43
Pireus	-0.05	0.04	0.18
Distance from FPS			
<=15 min	(Ref.)	(Ref.)	(Ref.)
15-25 min	0.00	0.02	0.88
>25 min	-0.06	0.03	0.05
House Sqm			
<30	(Ref.)	(Ref.)	(Ref.)
30-50	0.02	0.06	0.69
50-70	0.03	0.06	0.61
70-100	-0.02	0.05	0.72
>100	-0.01	0.06	0.86
Working hours due to COVID-19			
Same	(Ref.)	(Ref.)	(Ref.)
Less	0.02	0.03	0.60
More	-0.02	0.02	0.36

Table 2

Univariate linear regression analysis between urban characteristics of free public spaces and visitation

Europe during the pandemic, which revealed individuals' preference for urban public spaces near their homes (Xie et al. 2020; Ugolini et al. 2020). We may claim that a sustainable urban design in the post-pandemic period should contain an extended network of public spaces and green spaces, even before we look at the quality concerns, which provide us with even more information about the importance of these places. As a result, it will enable urban dwellers to be within walking distance of such a destination. This is a major premise of the "city of ten minutes", the "green city" theory, and the concept of urban acupuncture (Honey-rosés, Anguelovski, Chireh et al. 2020; van Vliet et al. 2021). The number of visits to the urban public spaces increased throughout the pandemic period, with

more than 40% of respondents visiting the free urban areas several times a week, according to the findings as has been found in other relevant studies worldwide (Derks, Giessen, and Winkel 2020; Grima et al. 2020). Of course, the new data and requirements that emerge as a result of pandemics are likely to change the demands for the distribution and organization of public places within the urban fabric (Honey-rosés, Anguelovski, Bohigas, et al. 2020). The increasing visitation in these areas, as evidenced by other surveys, confirms the high need for local green spaces or neighborhood parks that serve as destinations for a variety of activities essential to everyone's health and socializing. The number of inhabitants who chose to walk and exercise in public places is high, which is consistent with worldwide research. The focus on walking is most likely connected to the pandemic's negative impact on residents' physical and mental health, which directly explains people's aim to attend public areas more frequently from this perspective. The frequency of visits by residents is increasing, and the phenomenon of certain inhabitants visiting the locations almost every day is highlighted (Chen et al. 2022). In light of the pandemic, new designs are being considered that will favor uses and practices that will work best in pandemic distancing conditions, such as creating more space for personalized leisure and sports activity instead of team sports and places that encourage crowding, the development of smart applications that will recognize the need for periodic cleaning and sanitizing of urban equipment based on visitation data collection, expanding roads and pathways to make it easier for pedestrians to move and engage in safe sports activities such as jogging and running, etc (Sun 2020; Honey-rosés, Anguelovski, Chireh, et al. 2020; Ugolini et al. 2020). One of the major goals of the study was to determine how residents' participation in urban public places changed when the COVID-19 regulations were implemented. Several surveys have been conducted across European countries with very interesting results, such as the fact that during the first wave of the pandemic, nearly two-thirds of those who had frequently visited urban green spaces, stopped visiting them. This result can be attributed to government restrictions, while 1/3 continued to visit urban green spaces, a fact that condemns the human need for interaction with public space is indisputable even in the most adverse conditions (Ugolini et al. 2020). During the pandemic, participants who reported improved perceived quality, better accessibility, developed a sense of security during the day and a sense of relaxation during their stay in these spaces, increased their visits, according to univariate linear regression analysis. This is in line with study findings, which suggest that good quality public open spaces, as well as a sense of relaxation and satisfaction while visiting them, are a strong motivator for citizens' mobility (Madureira et al. 2018; Ernawati, Surjono, and Sudarmo 2018; Sepe 2021; Wu et al. 2015; Zhang, Cao, and Han 2021). Also, the findings suggest that changes in visitor behavior, particularly the choice of urban space visits for socializing purposes, show the significance of public space to citizens' harmonious social development (McCormack et al. 2010).

Furthermore, individuals who said they lived in a location with a lot of available urban public spaces were more likely to increase their visit frequency during the pandemic (Grima et al. 2020). Those with children, on the other hand, were less inclined to increase the number of visits (Fitzpatrick, Drawve, and Harris 2020; Yamazaki et al. 2021; Derks, Giessen, and Winkel 2020; Uchiyama and Kohsaka 2020). This emphasizes the evident need to encourage individuals with children to use public places in cities more frequently, therefore making them more child-friendly. The same phenomenon happened to persons over 60, who were less likely than those aged 18-30 to increase their visits during the pandemic (Burnett et al. 2021). As a result, public space cannot be built solely to meet the requirements of certain groups, as this contradicts the notion of public space as a space for all (Mela 2022; Venter et al. 2021; 2020; Yi et al. 2021). A more in-depth examination of the issues concerning the unique features of public space, as well as their interaction with individuals' perceptions about them, is considered important. A potential area of research might be how the specific characteristics of the spaces can be factors of attraction for the residents, while at the same time, in times of public health crisis, this attractiveness can be an exacerbating factor in terms of, for example, viral load. It is considered appropriate in the management issues that arise

in relevant circumstances: a) to spread knowledge about the beneficial effects of citizen interaction with the public space, particularly during times of social distancing; b) to strengthen citizens' awareness of the safest ways to use public space; c) to facilitate thoughtful planning and management of existing public spaces, eliminating the gap generated by urban space deterioration by emphasizing the diversity and local characteristics of public space, and significantly improving urban equipment; and d) to demonstrate continuous evaluation and re-checking of the condition of public spaces at the local level by competent agencies in order to constantly adapt to new data and citizens' requirements (Chen et al. 2022).

The findings of this study are intended to aid in a better understanding of citizens' patterns of activity in urban public areas throughout the pandemic time. The present study focused on the investigation of visitation patterns and the analysis of the elements that may have influenced them, which was undertaken on inhabitants of Attica during the second wave of the pandemic and studied the probable benefits of their connection with the urban public space. The data analysis revealed that the number of visitors to open public places rose throughout the pandemic period, with the great majority of the sample visiting them multiple times during the week, particularly in the afternoon. Leisure, exercise, and socializing are all factors in how they choose to spend their time in parks, squares, and playgrounds of their city. In addition, the sample revealed a definite preference for regions that are within walking distance of it (up to 15 minutes away). One of the study's key findings is that people who reside in places with more and better urban public spaces are more inclined to visit them in the future. This emphasizes the need of having many, high-quality, secure, and easily accessible public urban spaces in every community, particularly during times of crisis. A resilient and sustainable society that can rapidly and efficiently overcome crises requires the design of a sustainable public space that is based on the real and ever-changing needs of residents.

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Conclusion

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