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The impact of the Covid-19 pandemic on green space use in Turkey: Is closing green spaces for use a solution?

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ABSTRACT

With the advent of effects of the Covid-19 pandemic spreading far and wide throughout many countries in the world, both similar and differing measures are being taken in an effort to manage and curtail them. In addition to weekend lockdowns and closures of café's and public meeting places throughout Turkey in the early stages of the pandemic, public coasts and urban green spaces (UGS's) were also closed in order to maintain social distancing. The aim of the current study is to reveal the opinions of UGS users regarding the measures taken in general against the pandemic, and the measure of closing the coasts and UGS's for use. For this purpose, the distribution of a questionnaire to 239 UGS users was coordinated. The results indicate that people do not support both pandemic measures in general, and the measure of closing the coasts and UGS's for use. According to the findings based on the opinions of the survey participants, the Covid-19 pandemic has caused more psychological problems than physical problems. UGS's are very important in aiding the elimination of some of the negative effects the pandemic has helped create, as well as the effects of the measures taken in general against it. Covid-19 restrictions have given rise to the need to redesign UGS's, and the lessons learned from the pandemic and usage habits must be taken into account in new designs.

1. Introduction

The Covid 19 pandemic has necessitated important changes in many areas. One of these changes is related with human mobility patterns and working environs (Venter et al., 2020). The pandemic has not only created a global public health emergency, it has also had widespread and deep consequences in social relations throughout the World (Buğra et al., 2020). The pandemic has also caused unprecedented changes to economic activity and the associated environmental footprint (Muhammad et al., 2020; Venter et al., 2020). For example, during the COVID-19 pandemic, different decisions were made about urban green space (UGS) management around the world.

Another important point of consideration on the subject is whether the social restrictions applied during this period changed the behavior and perceptions of city residents regarding UGS's (Ugolini et al., 2020). UGS's help local authorities address local issues that they face, including improving health and well-being, managing health and social care costs, reducing health inequalities, improving social cohesion and taking positive action to address climate change (Sanesi et al., 2006; Van den Bosch and Sang, 2017; O'Brien et al., 2017; PHE, 2020). Access to UGS's

is a human need that reduces stress and improves physical, psychological, and mental health (Lafortezza et al., 2009; Rojas-Rueda et al., 2019; Wolf et al., 2020; Pouso et al., 2021; Du et al., 2021). Spending time in a natural area away from the everyday urban environment could facilitate therapeutic processes. UGS's and forest environments assist recovery from stress and provide short-term cognitive benefits (Gidlow et al., 2016; Liu et al., 2021). Some studies have provided evidence of multiple benefits from UGS's, through various mechanisms, and with potentially differential impacts in various populations in the last decade (WHO Regional Office for Europe, 2016). Additionally, forest visits increase positive emotions and decrease subjective stress and negative emotions such as depression, fatigue, general anxiety, uncertainty and tension (Martens and Bauer, 2013; Tyrväinen et al., 2014; FAO, 2020). For those reasons, the Collaborative Partnership on Forest (CPF) published a statement and emphasized that "Recovery strategies must recognize that ecosystem integrity plays a key role in keeping societies healthy and on a path towards sustainability" (CPF, 2020).

During an emergency that affects public health, such as the Covid-19 pandemic, it is thought that the use of UGS's by a large number of people may increase the risk of the pandemic spreading to others due to the

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crowds formed. For this reason some countries imposed restrictions on the use of UGS's. For example, precautionary closures and limits on activities and access were imposed in outdoor spaces in Canada (Freeman and Eykelbosh, 2020). In Italy, sports activities and walking outdoors were allowed initially, even though public gatherings were prohibited there. However, the rapid increase in positive cases of the virus, led the Ministry of Health to ban any kind of physical exercise or walking further than 200 m from home. Also, going outdoors was permitted only for essential reasons. Similar restrictions were enforced in Israel on March 22, which allowed movement of only 100 m away from home. On March 14, the highest level of limitations – according to which going outside was allowed only for essential activities, and thus the frequentation of UGS was banned in Spain (Ugolini et al., 2020). Several cities, including Zurich and Switzerland, went a step further and closed city parks to the public (Kleinschroth and Kowarik, 2020). Countries such as Chile, Venezuela, Iran, and Hungary have also applied quarantine and measures banning the use of public spaces (Honey-Rosés et al., 2020).

In the spring of 2020, all Turkish coasts, forests and UGS's were closed to any kind of usage during the three months when the pandemic was at its peak. This also occurred in other countries. Thus, these areas were effectively removed or closed inside of the public spaces where social life was allowed continue. As UGS's connect cities and nature (Vargas-Hernandez et al., 2017) which provide many benefits to society (Jansson, 2014), coasts and forests around cities are some of the important elements of UGS's. In large cities such as Istanbul, UGS's, coasts, and green areas such as urban forests and nature parks are especially popular with the residents as recreation areas. The main reason for closing UGS's, forests and coastal spots, was the assessment that social distancing could not be maintained in such areas. Although, this measure essentially ignored the positive effects of UGS's on human health. As a result, although they were not permitted to leave their homes for three months, individuals over the age of 65 and under the age of 20 were eventually permitted to go out for five hours per week, as complaints about their health increased. But even during those five hours, they were prohibited from using UGS's, forests and coasts. Instead, they resorted to visiting the bazaars, marketplaces and shopping malls, which could be much riskier. As the pandemic eased, reopening of UGS's was among the final actions taken in the normalization process. These examples are some of the concrete indicators of the fact that many of the positive functions that the UGS's could perform were ignored by the decision makers during the pandemic.

In contrast to countries such as Turkey, Israel, Italy and Spain, several other countries did not impose any restrictions on the use of UGS's. For example, even though curfews were declared in some countries such as Germany, France, England, Austria, USA and the Philippines, no decision has been rendered to prohibit the use of UGS in particular (DW Turkish, 2020). In Germany's capital Berlin, all cafes and restaurants were closed, except markets and pharmacies, and take-away food sellers. The use of childrens' playgrounds was prohibited, but hiking, walking animals, running, cycling, and even sitting in the parks was allowed on the condition that no more than two people were allowed, and the social distance conditions were observed (İnal Çekiç, 2020). For example, in Tempelhofer Feld in Berlin, more than enough space was provided for adequate social distancing during the COVID-19 crisis (Kleinschroth and Kowarik, 2020). In Slovenia, Croatia and Lithuania, outdoor activities were allowed throughout the period but with strong warnings to maintain their distance from other people (other than family or close relatives) and to avoid gatherings even between a few people (Ugolini et al., 2020). Despite the quarantine decision effected on December 24, 2020 in the Netherlands, a maximum of two people were allowed to engage in sports outdoors by being at least 1.5 m away from one another. Persons under the age of 18 were also allowed in open air sports venues as long as they were 1.5 m apart (Nu.nl, 2020). In short, numerous municipalities across the continent restricted, with varying degrees of stringency, access to and use of public UGS's to help



Fig. 1. Announcement by Bartın Governorship regarding the closure of greenspaces.

(Photo by Erdoğan Atmiş).

encourage physical distancing (Barton et al., 2020), but the services provided by UGS's to society continued during the pandemic.

Instead of prohibiting their use, the management approach should have made it a priority to determine which measures could have been taken to enable the use of UGS's during the pandemic' restrictive conditions. An important part of the epidemic measures has been aimed at reducing social mobility. Mobility patterns are revealed to be strongly correlated with decreased COVID-19 case growth rates for the most affected counties in USA (Badr et al., 2020). Conversely another research conducted about 299 local authorities in England showed that the park use was associated with decreased residual case rates, especially when green space was low and contiguous (Jhonson et al., 2001). Similarly, a study conducted in Oslo found that pandemic measures increased recreational use of UGS's and that increase was positively associated with trail remoteness, suggesting that green spaces facilitated social distancing and indirectly mitigated the spread of COVID-19 (Venter et al., 2020). Pan et al. (2021) emphasized that only applying a uniform social distancing measure without characterising the infrastructure and social conditions may lead to higher infection transmission.

In this study, it is aimed to determine how the Covid-19 pandemic measures and, especially the closure of the coasts and UGS's, are evaluated by UGS users and how these measures affect the use of UGS's. Firstly, the measures taken at national and local levels during the pandemic in Turkey are examined. Then, the thoughts of UGS users regarding both the general measures taken against the pandemic and the closure of the coasts and UGS's were analyzed. Finally, based on both the findings obtained from the research and the experiences in different countries, suggestions were made on how to benefit from UGS's during and after such epidemics.

2. Measures taken in the first wave of the pandemic

The first wave of the COVID-19 pandemic started in March 2020, and the second wave in November 2020 in Turkey. The first COVID-19 case was revealed on March 10, 2020, and the first death from COVID-19 occurred on March 17, 2020. Right from the beginning of the pandemic period, on March 21, 2020, people over the age of 65 as well as individuals with chronic diseases were restricted and prohibited from wandering in open spaces, parks, traveling by public transport vehicles and going out on the streets (Ankara Valiliği, 2020). This is also the date when the first ban on UGS's was imposed. On this day, when the World Forestry Day is celebrated, the decision of the Ministry of Agriculture and Forestry on forbidding barbecues in parks and recreation areas was announced (Sputniknews, 2020). Just one week after the ban on barbecues in UGS's, on March 27, 2020, the decision regarding banning the use of coasts and UGS's on weekends was announced (TCIB, 2020). This decision was based on the justification that activities such as having a picnic, fishing and doing sports at the coasts and UGS's would prevent the social distance rule from being obeyed against the pandemic. In some provinces such as Bartın, the practice of closing UGS's for use on weekends throughout the country was also imposed during the

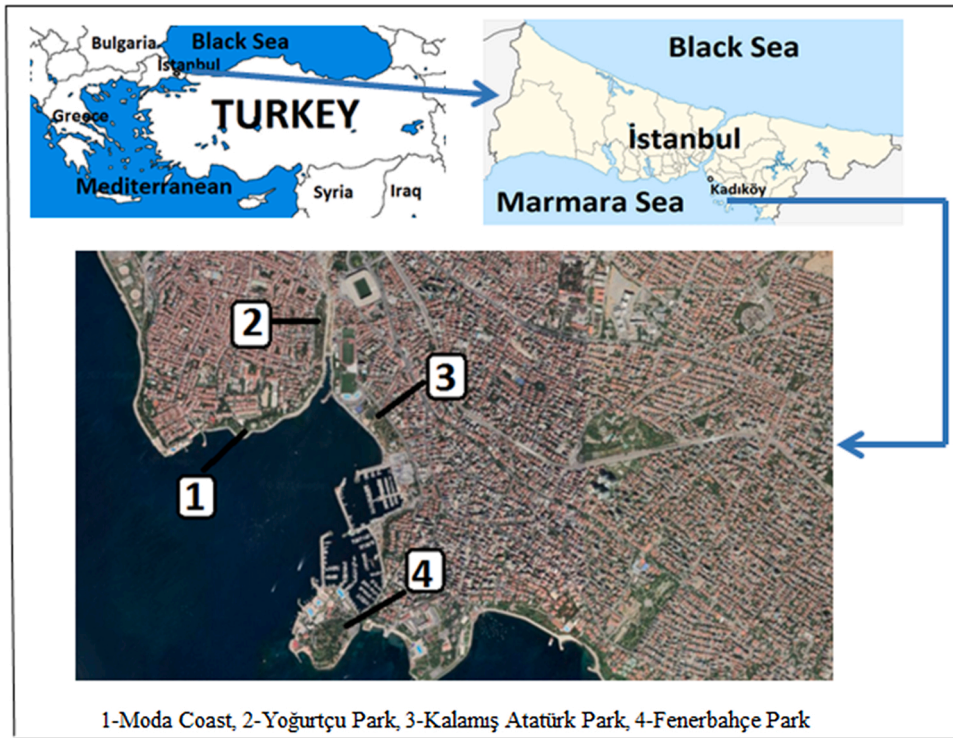


Fig. 2. Greenspaces where questionnaires were conducted.

weekdays as of March 21, 2020. At this time, announcements stating that the decision were made to prevent the spread of the COVID-19 virus, and those who did not comply with this decision would be punished, were posted in UGS's (Fig. 1).

On April 3, 2020, entries and exits with private cars were prohibited in Zonguldak along with with 30 other metropolitan cities, with some

exceptions, by the Ministry of Internal Affairs. There are 81 provinces in Turkey, among these, 30 provinces with high populations are governed in the metropolitan status. The reason Zonguldak, one of the other provinces, was included in this scope, is that COVID-19 cases were reported there much more frequently than other provinces due to the hard coal mining and the thermal power plants in this province. With the

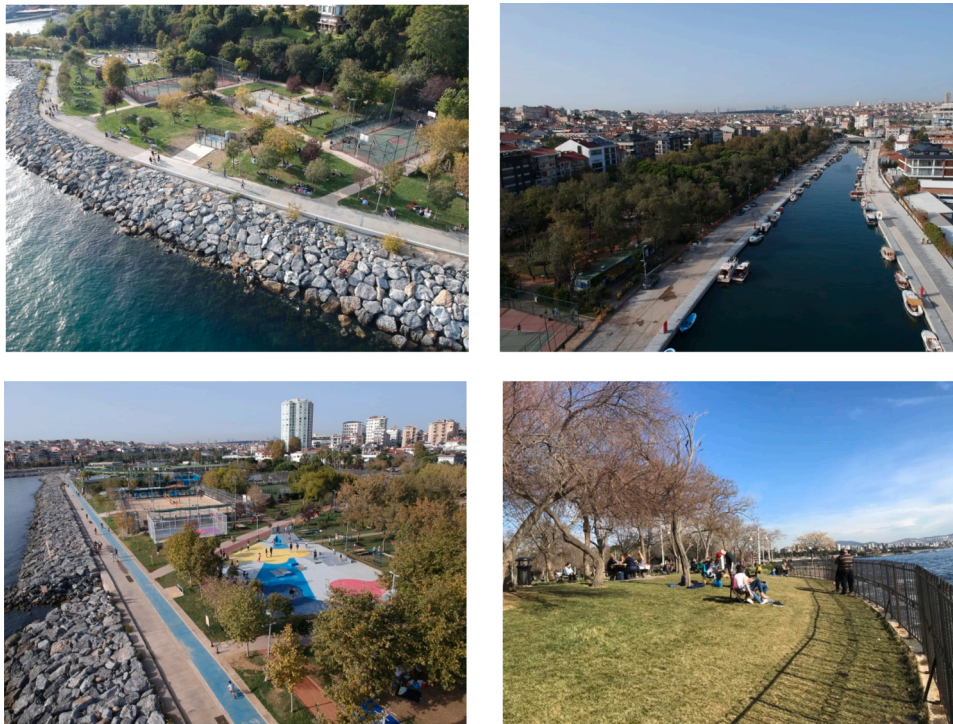


Fig. 3. Views from greespaces where questionnaires were conducted. (Photos by Dağhan Erdönmez).

Table 1
Socio-cultural characteristics of the respondents by UGS's.

		Moda Coast (%) NQ = 49*	Yoğurtçu Park (%) NQ = 71*	Kalamış Atatürk Park (%) NQ = 68*	Fenerbahçe Park (%) NQ = 51*
AGE	18–25	31	14	31	8
	26–35	31	32	8	20
	36–45	14	18	8	27
	46–55	6	13	9	10
	56–65	12	10	12	8
	65+	6	13	19	27
EDUCATION	Middle school or lower	6	13	21	8
	High school	8	23	21	27
	Associate degree-				
	Undergraduate	55	46	44	41
	Postgraduate	21	56	6	22
GENDER	Doctorate	10	13	9	20
	Female	55	50	30	43
	Male	45	50	70	57
HOUSEHOLD INCOME (TL)	4000 or lower	27	16	13	0
	4000–6000	22	20	30	14
	6000–10000	33	39	39	29
	10000–15000	9	17	9	39
	15,000 or higher	9	8	9	18

* NQ: Number of questionnaires.

decision effected on April 3, 2020, a curfew was declared in 81 provinces for individuals under the age of 20 (those born after 01.01.2000). On the same day, an obligation to wear a mask to enter markets, shops and workplaces where collective work is done was imposed (Sözcü, 2020).

On May 6, 2020, the curfew implemented for those above 65 and below 20 years of age was modified a slightly, and those above 65 were allowed to go out on Sundays every two weeks, and those under 20 were allowed to go out on Fridays every two weeks between 11:00–15:00. However, it was observed that the elderly and young people had to walk on the streets and roads in crowds during their leave since the coastal walkways and UGS's were closed, and returned to their homes before the end of the leave as cafes and restaurants were closed. On May 11, 2020, it was decided to reopen the previously closed shopping centers. This was considered to be a very risky decision by the experts (Haberler, 2020).

The government declared that the 'normalization' period would begin on June 1, 2020, and many of the measures taken against COVID-19 were abandoned. In this scope, general quarantine rules were relaxed, coasts and UGS's were opened for use, intercity travel restrictions were removed. Within these "normalization" steps, the curfew continued for the citizens above 65 years of age, and the curfew restriction for those below 20 was adjusted to those under 18. Those older than 65 who had a business or were working were exempted from the curfew. On June 10, 2020, the curfew for those under 18 ended while the curfew for those over 65 continued. The curfew, or 'normalization' for those over the age of 65, continued in the summer, which banned going out before 10:00 and after 20:00 After the start of the second wave in November 2020, individuals below the age of 18 were also banned from going out again, just like those above the age of 65. Furthermore, the daily leave given to these two groups for going out was reduced to three hours. Intercity travels of these age groups were also subject to permission, and the ban on public transportation in the province was also continued (TCIB, 2020).

3. Materials and methods

Since the beginning of the pandemic in Turkey, especially restrictive closure of the coasts and UGS's were followed from the official statement of the public authorities and the news media. These measures were evaluated by comparing the measures in other countries and taking into account the statements of the Turkish Medical Association, the most important professional organization in the field of health in the country (TMA, 2020).

Questionnaire-filling sessions were conducted in four different UGS's in Kadıköy district, which is on the Anatolian side of Istanbul, and is the largest metropolitan city in Turkey. Kadıköy is one of the most attractive districts of the city in terms of socio-cultural aspects. People from many parts of the city come to Kadıköy in their spare time. They participate in different socio-cultural activities in the district and also use UGS's frequently. For this reason, the four most popular UGS's in Kadıköy, containing facilities such as bicycle paths, walking and running tracks, and sports fields, close to the district center and near the sea, were chosen for the implementation of the questionnaire (Figs. 2 and 3). The main reason for selecting four different UGS's is to receive more surveys. In the selection of these UGS's it has been noted that they are close to each other and that their users have similar socio-cultural characteristics. Thus, the data from four different UGS's could be analyzed collectively. Some characteristics of respondents with the number of questionnaires in each UGS are shown in Table 1.

The questionnaire consisted of three main question groups and 17 questions. The questions in the first group were aimed at understanding how UGS users have been affected by the pandemic and their views on the measures taken against the pandemic. In order to learn the opinions of UGS users on the curfew restrictions, four different answer options were presented to the related questions. These are; "completely right", "right, but it was applied more than required", "right, but it was applied less than required", and "completely wrong." Additionally, five answer options were presented to the question asked in order to learn the opinions about the closure of the beach and green areas. They are; "appropriate and necessary", "wrong and unnecessary, they should not have been closed off", "they should not have been closed off, but rotational use should be allowed in a way to maintain social distance", "they should have been kept open only for people over 65 years old", and "they should have been kept open only for the use of those with health problems". The aim of the second group of questions was to reveal the UGS usage characteristics such as UGS visit frequency and UGS usage purpose. The questions in the last group aimed to obtain particular demographic characteristics of the UGS users such as gender, age, education level, and household income.

The questionnaire sessions were conducted during October and November 2020, on different days and hours of the week. The surveys were conducted by a young, female forest engineer together with one of the authors. The other person conducting the survey was trained by the author and the points to be considered were explained. Each person surveyed was given a full questionnaire form and a pen. Although there is a comprehensive explanation at the beginning of each questionnaire, a

Table 2
Distribution of the respondents by demographic characteristics.

Gender	Frequency	%
Female	105	44,1
Male	133	55,9
Total	238	100,0
Age group	Frequency	%
18 – 25	53	22,3
26 – 35	54	22,7
36 – 45	40	16,7
46–55	24	10,0
56–65	26	10,9
65+	41	17,2
Total	238	100,0
Education	Frequency	%
Middle school or lower	30	12,6
High school	48	20,1
Associate degree-undergraduate	111	46,4
Postgraduate	34	14,2
Doctorate	16	6,7
Total	239	100,0
Household income (TL)*	Frequency	%
4000 or lower	29	12,1
4001–6000	46	19,2
6001–10000	76	31,8
10001–15000	40	16,7
15,000 or higher	23	9,6
Total	214	100,0
Occupation	Frequency	%
Student	49	20,5
Teacher	12	5,0
Academician-researcher	11	4,6
Architect-engineer	29	12,1
Retired	42	17,6
Private sector employee	22	9,2
Others (worker, artisan, officer, unemployed, self-employment etc.)	60	25,1
Total	239	100,0

* Some respondents declined to report their income.

brief explanation was made about the scope and purpose of the questionnaire, and participants were asked to respond to the questions asked while considering the measures taken in the first wave of the pandemic. Due to the uneasiness caused by the pandemic, many UGS users avoided participating in the survey. Therefore, the number of surveys conducted was lower than planned. The respondents were randomly selected from among the UGS's visitors, and only one of the visitors in the same group was surveyed to prevent the respondents from being affected by each other. At the end of the process, a total of 239 face-to-face questionnaire sessions were conducted and evaluated. The distribution of the respondents according to their demographic characteristics is shown in Table 2. Due to the attractiveness of Kadıköy district in terms of socio-cultural activities, the distribution of respondents by age and education level is markedly different from the general structure of the local population.

Table 3
UGS users' thought on pandemic restrictions.

Question	Completely right	Right, but it was applied more than required	Right, but it was applied less than required	Completely wrong	Number of respondents
How do you evaluate the general curfew applied in the early stages of the pandemic?	28,5	12,1	47,3	12,1	239
How do you evaluate the curfew for people above the age of 65 applied in the early stages of the pandemic?	38,5	28,5	19,7	16,3	239
How do you evaluate the curfew for people below the age of 18–20 applied in the early stages of the pandemic?	33,9	24,7	19,7	16,3	239
Average	33,9	24,7	23,4	18,0	239

A normality test was applied to the data set and it was determined that the data distribution was normal. Frequency distributions and cross tables were used to analyze the results. One-way analysis of variance (ANOVA) was used to search for relationships between different variables. ANOVA is statistical test which works by comparing group means to determine independent variables that have an effect on a dependent variable (Sawyer, 2009). In this study, the factors affecting opinions of the UGS users on general measures taken against the pandemic and closure of coasts and UGS's were investigated.

4. Results

The findings have been analyzed under two headings. Under the first heading, the way the UGS users have been affected by the pandemic and their opinions about the general measures taken against the pandemic are evaluated. Under the second heading, UGS's utilization characteristics of UGS users, changes regarding the use of UGS's after the first wave of the pandemic and their opinions about the measures taken for the UGS's and coasts within the scope of the pandemic are investigated.

4.1. UGS users' thoughts on general pandemic measures

According to the survey results, 2.1 % of the UGS users got sick due to the COVID-19 virus. The rate of the UGS users among whom at least one person got sick from his/her social circle, such as family, friends and colleagues, is 23 %. The only answers given by the group that got sick or at least one person from their social circle got sick about the curfew restrictions applied for the age 18–20 differ from other groups ($F = 3.809$; $Sig = 0.024$). While those who find these restrictions "completely right" are 25 % of the group mentioned above they are 34 % of the others. On the other hand, those who find these restrictions "less than necessary" are 38 % of the first group and they are 21 % of the others. Curfews form a significant part of the measures taken against the pandemic. The distribution of the responses received for three different types of curfew restrictions are demonstrated in Table 3. The most remarkable point here is the high rate of those who believed that the general curfew restriction was applied less than required compared to the curfew restrictions applied for those aged above 65 and below 18–20. This is because of the warnings of the Turkish Medical Association and other health organizations, suggesting that the pandemic can be prevented if there is a continuous lockdown for two weeks, not only on weekends and public holidays. However, the government disregarded these warnings for socio-economic reasons and imposed a curfew on all the sections of society only on weekends and public holidays while curfews were continuously applied to those above 65 and below 20. Therefore, the rate of those who find the general curfew restriction completely right and completely wrong is lower than other curfew restrictions. The rate of those who find the curfew restrictions completely wrong is below 20 % for all three restrictions. This result points at a consensus on the necessity of the curfew, but it is not possible to talk about a consensus on the type and duration of the restriction.

A significant number of the participants in the survey evaluated the measures taken against the Covid-19 pandemic unsuccessful in the general sense. According to 15.9 % of the participants, these measures

Table 4

One-way analysis of variance results regarding the variables affecting the opinions on measures taken against pandemic.

Factor	Sum of squares	df	Mean square	F	Sig
Education level	24.545	4	6.136	7.774	0.000
Professions	17.428	6	2.905	3.334	0.004
Age	30.294	5	6.059	7.883	0.000
Household income	12.107	4	3.027	3.439	0.010
Thoughts on general curfew	56.682	3	18.894	29.506	0.000
Increase in physical disorders due to restrictions	13.478	2	6.739	8.099	0.000
Increase in psychological disorders due to restrictions	18.457	2	9.228	11.398	0.000
Frequency of UGS usage	14.679	4	3.670	4.399	0.002

are very unsuccessful, and for 35.6 %, they are unsuccessful. Accordingly, the rate of those who find the measures taken unsuccessful is over 50 % in total. On the other hand, the rate of finding them successful remained below 10 % in total. A significant portion of respondents, 34.3 %, found the measures neither successful nor unsuccessful; they evaluated them as normal. It has been determined that some demographic characteristics of UGS users, the way they are affected by the pandemic period and the frequency of UGS usage influences the measures taken against the pandemic with respect to finding them successful or unsuccessful. In Table 4, the results of one-way analysis of variance for these variables are given.

As the level of education increases, the rate of finding the measures successful decreases. While the rate of finding the measures successful among those studying for doctoral and master’s degrees is 0 %, this rate is 4 % for undergraduate and associate degree graduates, 12 % for high school graduates, and 11 % for secondary school graduates and lower level graduates. On the other hand, the rate of finding the measures unsuccessful is 69 % for doctoral students, 64 % for master’s students, 62 % for undergraduate and associate degree graduates whereas for high school graduates it is 38 %, and 36 % for secondary school graduates and lower education students.

The rate of three different professions, architects-engineers, teachers and academicians to find the measures taken against the pandemic successful is 0 %. While academicians find the measures 100 % unsuccessful, 67 % of architects-engineers and 45 % of teachers find them unsuccessful. Architects-engineers who consider the measures as neither successful nor unsuccessful are 33 % and teachers are 55 %. The occupational group with the highest rate of finding the measures successful is the retirees with 16 %. However, a significant part of the retirees (64 %) also considered the measures unsuccessful.

It is observed that middle-age groups find the measures taken more successful than the low- and older-age groups. While this rate is 30 % in the 46–55 age group, 16 % in the 56–65 age group, it is 4 % in the 18–25 age group and 0 % in the 25–35 age group. Besides, the rate of finding the measures unsuccessful was 76 % in the age group above 65, 72 % in the 26–35 age group, 50 % in the 18–25 age group, 38 % in the 36–45 age group, 69 % in the 56–65 age group and 46 % in the 46–55 age group.

It is revealed that those in the highest and lowest income groups find the measures unsuccessful at much higher rates. The rate of those who find the measures taken unsuccessful is 81 % for those whose monthly household income is higher than 15 thousand Turkish Lira,¹ 67 % for those with less than four thousand Turkish Lira, while this rate is 34 % in the four thousand-six thousand Turkish Lira group and 36 % in the six thousand-10 thousand Turkish Lira group.

Measures taken to prevent the spread of the Covid-19 virus during

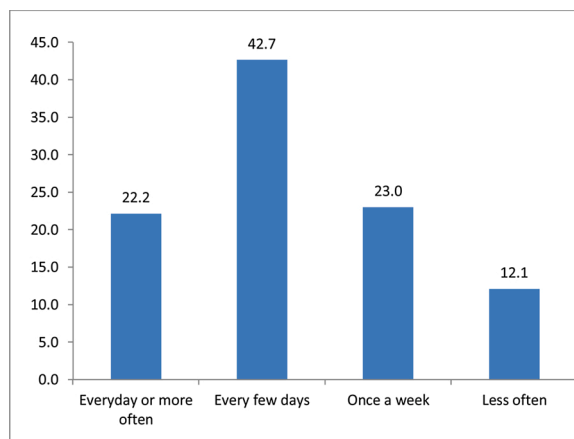


Fig. 4. Visit frequency before the first wave of the pandemic.

the pandemic process may lead to other health problems. Especially, curfews and closures of UGS’s can cause physical and psychological health problems. The answers to the questions asked to find out whether the applied Covid-19 measures cause any health problems confirm this relationship. Restrictive measures taken against the pandemic have led to an increase in physical problems such as diabetes, blood pressure, joint pain and heart palpitations for 20.9 % of UGS users. For the same reason, the rate of individuals who have an increase in psychological problems such as insomnia, crying crises, anxiety and restlessness is 46 %. The fact that the measures taken cause other types of health problems is a factor that directly affects the opinions about these measures. The rate of UGS users who have an increase in their physical and psychological problems to find the measures taken against the pandemic unsuccessful is significantly higher than other UGS users. The rate of those who find the measures taken unsuccessful is 81 % for those who have an increase in physical problems, and is 73 % for those who have psychological problems. This rate is 48 % for those who do not have any physical problems and 41 % for those who do not have any psychological problems.

No relationship was observed between the UGS usage purposes and the opinions of the UGS users about the measures. On the other hand, it has been observed that the frequency of using UGS’s has an effect on the opinions about the measures. Those who visit UGS’s more frequently found the measures taken more unsuccessful than others. While the rate of finding the measures unsuccessful for those who visit UGS’s every day is 77 %, it is 45 % for those who visit them every few days and 47 % for those who visit them once a week. The rate of finding measures successful is 20 % for those who visit the UGS’s once a week, 6% for those who visit them every few days, and 0 % for those who visit them every day.

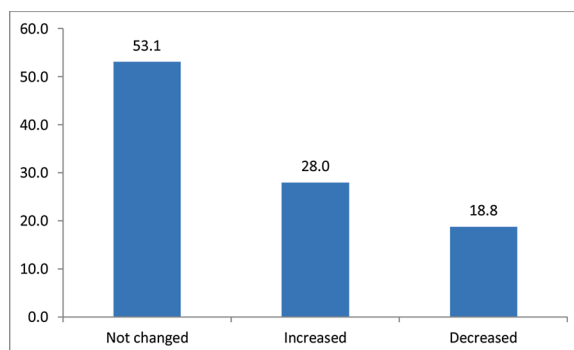


Fig. 5. Change of visit frequency after the first wave of the pandemic.

¹ 1 US Dollar equals 7.58 Turkish Lira, and 1 Euro equals 8.99 Turkish Lira on November 20, 2020.

Table 5
Change of visit frequency after the first wave of the pandemic according to UGS usage purpose.

UGS usage purpose	Visit frequency after the first wave of the pandemic			Number of respondents
	Not changed (%)	Increased (%)	Decreased (%)	
Getting fresh air	47,5	32,8	19,8	177
Being alone	46,8	27,8	25,3	79
Having a picnic	69,4	21,0	9,7	62
Doing physical exercise	58,4	36,6	5,0	101
Taking my kids or grandchildren around in the park	37,2	55,8	7,0	43
Being with friends and family members	40,7	36,1	23,1	108
Walking the dog	50,0	36,8	13,2	38
Breaking away from everyday life	50,0	31,4	18,6	70
Enjoying nature	54,5	33,6	11,9	143
Getting to know nature	50,0	33,3	16,7	30
Lack of better leisure time options	7,1	28,6	64,3	14

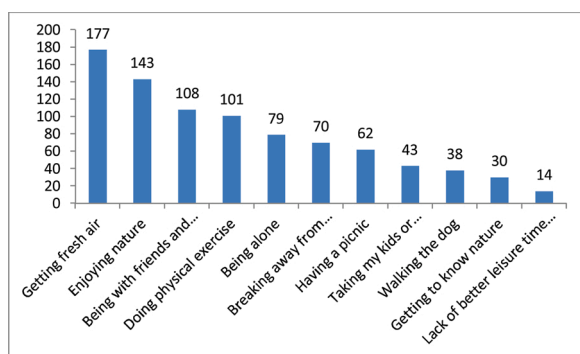


Fig. 6. Number of respondents' preferences for UGS usage purposes.

4.2. Use of UGS's and UGS users' thoughts on coast and UGS restrictions

It has been determined that the pandemic has made changes to the frequency of UGS usage frequency. The frequency of using UGS before the first wave of the pandemic is illustrated in Fig. 4

Almost half, 42.7 % of surveyed UGS users visited the UGS's every few days. The rate of those who visit the UGS's every day or more than once a day is 22.2 %, and the rate of those who visit them once a week is 23 %. Hence, those who visit them at least once a week reach 85.8 %. Notably, 53.1 % of the visitors did not change the frequency of their UGS visits after the first wave of the pandemic compared to before. However, 28 % increased their visit frequency and 18.8 % decreased their visit frequency (Fig. 5).

While better understanding of the value of UGS's is shown as the reason for the increase in the visit frequencies, the concerns about being in society owing to the social distance rule come into prominence in the reduction of visit frequencies. There are some differences in the change in the visit frequencies after the pandemic according to the purpose of the UGS visits (Table 5).

Regarding the change in UGS visit frequency after the pandemic, there are many purposes for UGS visits. It is quite natural that those who visit UGS due to lack of options reduce their visit frequencies after the pandemic. It is also eye-opening that those who used the UGS's to take their children or grandchildren around is the group that increases the

Table 6
Relationship between UGS usage purposes and usage frequency.

UGS usage purpose	UGS usage frequency				Total *
	Everyday or more frequently	Every few days	Once a week	Once a month	
Getting fresh air	44	77	37	19	177
Being alone	30	27	15	7	79
Having a picnic	9	23	26	4	62
Doing physical exercise	36	47	11	7	101
Taking my kids or grandchildren around in the park	13	25	5	0	43
Being with friends and family members	25	55	17	11	108
Walking the dog	20	18	0	0	38
Breaking away from everyday life	15	25	20	10	70
Enjoying and getting to know nature	42	77	38	16	173
Lack of better leisure time options	3	5	1	5	14
Total*	237	379	170	79	865

* The respondents were able to choose more than one UGS usage purpose.

Table 7
One-way analysis of variance results regarding the variables affecting the opinions on the closure of the coasts and UGS's.

Factor	Sum of squares	df	Mean square	F	Sig
Age	89.204	4	22.301	7.786	0.000
Professions	65.288	6	10.881	8.874	0.000
Frequency of UGS usage	22.704	3	7.568	5.661	0.001
Change of frequency of UGS usage after the pandemic	34.758	2	17.379	13.575	0.000
Increase in physical disorders due to restrictions	8.630	1	8.630	6.231	0.013
Increase in psychological disorders due to restrictions	23.863	1	23.863	18.067	0.000

frequency of their UGS visits at the highest rate. The main reason for this result is that children's playgrounds where children can play safely and healthily are located in such UGS's. This group is followed by those walking dogs, being with family members and friends, and doing physical exercise at similar rates. The purpose of visiting the UGS's, where the rate of those who do not change their visit frequency is the highest, was found as having a picnic.

Numbers showing how many of the 239 respondents prefer each UGS usage purpose are shown in Fig. 6. Among the UGS usage purposes of the UGS visitors, "Getting fresh air" (74.1 %) and "getting to know and enjoying nature" (72.4 %) come to the fore. "Walking with children or grandchildren" (18 %) and walking the dog (15.9 %) are the least preferred purposes of UGS usage.

In Table 6, the distribution of UGS usage purposes according to the UGS usage frequency is presented.

Closing off the coasts and UGS's for use is of significance among the measures taken against the pandemic. However, only 29.3 % of the participants considered this measure "an appropriate and necessary decision". On the other hand, while 30.5 % said "it is a wrong and unnecessary decision, they should not have been closed off", 25.9 % said "they should not have been closed, but alternate use should have been allowed by maintaining social distance", 7.9 % "only those with health problems should have been allowed to use them" and 6.3 % "only those over 65 should have been allowed to use them". Factors affecting thoughts on closure of coasts and UGS's are shown in Table 7.

It has been found that older age groups approach the closure of the coast locations and UGS's for use much more negatively. Among those

above 65 years of age, the rate of those who consider this implementation as "appropriate and necessary" is only 4.9 % whereas the rate of those who consider it as "wrong and unnecessary" is 51.2 %. This group is followed by the 56–65 age group (19.2 % and 46.2 %). The other group closest to these two groups is the 26–35 age group (25.9 % and 38.9 %). The 18–25, 36–45 and 46–55 age groups approach the closure of coasts and UGS's more positively than the previous three groups.

In respect to professions, students (51 %), teachers (50 %) and private sector employees (50 %) were the groups that supported the implementation of the closure of the coasts and UGS's by referring to it as "an appropriate and necessary decision". In this aspect, the lowest rate was observed in the group of architects-engineers (3.4 %). The groups that selected the option "a wrong and unnecessary decision, they should not have been closed off" at the highest rate are the retirees (42.9 %) and other occupational groups (41.7 %), respectively. The reason for the dissatisfaction of the retirees can be matched with the dissatisfaction of the age group above 65. In the category of other occupational groups, there are occupational groups such as workers, public servants and tradesmen, whose numbers are too low to form a group on their own.

The frequency of UGS visits of the participants has an important effect on the opinions on the implementation of closing the coasts and UGS's. The rate of those who found the implementation right and marked the option of "an appropriate and necessary decision" increases inversely with the frequency of UGS visits. While this rate is 17 % for those who visit UGS's every day or more frequently, it is 18.6 % for those who visit them every few days and 50.9 % for those who visit them once a week. On the other hand, the rate of those who are of the opinion that the implementation is a "wrong and unnecessary decision" is 34 % among those who visit UGS's every day or more frequently, whereas it is 16.4 % for those who visit them once a week.

The attitude of those who increased the frequency of their UGS visits after the pandemic towards the closure of UGS's is much clearer than those who did not increase or decrease their visit frequency. Of those who increased their visit frequency, the rate of those who consider the closure of the coasts and UGS's as "an appropriate and right decision" is only 3 % whereas this rate is 37 % among those whose visit frequency did not change, and 47 % among those who reduced their visit frequency. On the other hand, the rate of those who consider the closure of coasts and UGS's as a "wrong and unnecessary decision" is 24.4 % for those who reduced the frequency of their UGS visits, 27.6 % for those who did not change the frequency of their UGS visits and 40.3 % for those who increased the frequency of their UGS visits.

The increase in physical and psychological problems owing to the restrictive measures taken against the pandemic has also affected the opinions on the closure of the coasts and UGS's. While 33.3 % of those who did not experience physical problems due to restrictive measures or who experienced them at the same level or less than before the pandemic consider the closure of the coasts and UGS's as an "appropriate and necessary decision", this rate is 14 % for those who had an increase in physical problems. Moreover, the rate of those who considered the closure of the coasts and UGS's as "a wrong and unnecessary decision" is 40 % in those who had an increase in physical problems, and 28 % in the other group. While 45 % of those who did not experience psychological problems due to restrictions or who experienced them at the same level or less than before the pandemic find the closure of the coasts and UGS's as "an appropriate and necessary decision", the rate of those who refer to it as "a wrong and unnecessary decision" is 21.7 %. On the other hand, the same rates are 10.9 % and 40.9 %, respectively, for those who experienced more psychological problems due to restrictions than before the pandemic.

Furthermore, the increase in physical problems during the pandemic period is seen in both the young and older age groups, but not in middle age groups. The rate of those who had an increase in their physical problems during the pandemic period is 70.7 % in the age group above 65, 34.6 % in the 56–65 age group, 11.3 % in the 18–25 age group and

11.1 % in the 26–35 age group. However, this rate is 0 % for the 36–45 and 46–55 age groups. While the rate of increase in psychological problems is 75.6 % for the age group above 65, and 73.1 % in the 56–65 age group, the highest rate after both of these groups is observed in the 26–35 age group (44.4 %). In the 18–25, 36–45 and 46–55 age groups, similar rates were identified, varying between 28.3 % and 32.5 %.

5. Discussion

According to the findings, the most important reason regarding the thought of failure in pandemic measures as age increased was generally the specific curfew restrictions imposed on those who were over 65 years of age. Indeed, according to the 2020 data of the Turkish Statistical Institute, 7 million 550 thousand 727 people were affected by the curfew restrictions imposed on people who were aged 65 and over because they were in the risk group for COVID-19. This corresponds to 9 percent of the entire population. It was reported by the Turkish Medical Association (TMA), which is the umbrella professional organization of physicians, that long-lasting restrictions, such as leaving the residence with curfew restrictions imposed on these individuals who stayed at home for 71 days between March 22 and June 10, caused bodily harm; the separation from relatives and friends caused psychological harm, and their social well-being was also negatively affected (TMA, 2020). Complaints of similar problems, especially musculoskeletal and circulatory system disorders increased during this period, and those affected were detained from the ability to do their daily work and spend time with their relatives/friends. Although it was concluded in this study that the health problems experienced by young people after pandemic restrictions are not as high as the elderly, it is claimed that many factors such as losses caused by Covid-19, social restrictions and quarantine practices to reduce risk, decreased school and peer interaction, increased sense of isolation and loneliness, decreased outdoor activities, and increased home time cause psychological problems such as depression and anxiety disorders, post-traumatic stress disorder, and eating disorders in the group under the age of 20, or increased the severity of the problems that already existed before the pandemic (Yektaş, 2020). For example; in a survey by the mental health charity YoungMinds, which included 2111 participants up to age 25 years with a mental illness history in the UK, 83 % said the pandemic had made their conditions worse (Lee, 2020; YoungMinds, 2020). However it can be considered that the reason for the rate of finding pandemic measures not successful in the group below 18–20 age, just like those over the age of 65, was not as high as the rate of those over the age of 65, was that this group that consisted of almost all students who were accustomed to spending time at home and on their own, because they had the advantage of having digital communication and entertainment opportunities when their schools switched to distance (online) education in a lower density. Also, this age group said that they did not experience physical disorders like those who were over the age of 65 due to curfew restrictions.

Different income groups reacted differently to the measures regarding Covid-19. For example, on the one hand, several different income groups became poorer as a result of the measures that were taken against the pandemic and closed businesses; and on the other hand, tradesmen and employees, who had to work more in more unsafe conditions against the pandemic, constituted the group that emphasized the inadequacy of the measures. A study conducted specifically with employees showed that the incomes of employees decreased, the way they worked changed, their debts increased, and feelings of occupational safety decreased due to the pandemic (DISK, 2020). According to a study conducted in China (Qian and Fan, 2020), some status indicators such as high level of education, good economic status of the family, Communist Party membership and employment in the state sector reduce the negative effects of the Covid-19 epidemic on income losses. Those who lost their jobs and those who had to go out and earn income every day had greater difficulty protecting themselves. Moreover, healthcare systems and government programs were often unable to

support them adequately (Buğra et al., 2020). Indeed, according to the DISK (2021) data, it is inevitable that business owners and employees find the measures to be inadequate in Turkey, which is one of two countries in the world that provided only 1.1 % of its national income as cash support, and had the lowest cash support for the fight against Covid-19 in the entire world.

According to the survey conducted by IPSOS Research Company in 30 countries, Turkey was determined to be the country where mental health deteriorated the most due to the coronavirus epidemic with a rate of 61 % (IPSOS, 2021). According to another study, within a one-year period between April 2020 and April 2021 in Turkey, the rate of those who said "I became angry more quickly" increased from 38 percent to 46 percent, and those who said "I constantly feel tired and exhausted" increased from 39 percent to 65 percent (Bozkurt, 2021). These findings are consistent with the findings of our study and is indicative that the curfew restrictions caused increases in the physical and psychological disorders of the participants. Those who had increased psychological disorders (46 %) were more than twice those with increased bodily diseases (20.9 %). Those who experienced these disorders were the ones who found the pandemic measures, which were taken by the government, to be unsuccessful at the highest level. The physical disorders in the elderly were prevented by exercises in homes or streets; however, the psychological problems were not as easy to solve in almost half of people who participated in the study as well as those from all age groups. The fact that almost half of those who used UGS's after the pandemic restrictions were over said that their psychological disorders increased during the pandemic period, and they came to UGS's to relieve these disorders show the importance of UGS's in preventing such disorders. However, instead of closing UGS's completely during pandemic restrictions, continuing their use with certain limitations could have been an opportunity to prevent these maladies. Indeed, some studies report that fewer psychological disorders are seen in areas where the use of UGS's was not prohibited, and that it is mandatory to allow the use of UGS's to avoid unintended negative effects on psychological health when designing future measures to control the spread of an infectious disease (Pouso et al., 2021). In fact Freeman and Eykelbosh (2020) also maintain; "The management of outdoor recreational spaces requires a thoughtful analysis to balance the needs of the population against the potential risks of community spread."

On the other hand in this study, people who experienced increased physical and psychological problems during the pandemic were more likely to be those UGS users who were in older age groups (i.e. 56–65 and over 65). However, a study that was conducted in Denmark, France, the Netherlands, and the UK in the period between March and June 2020 reported that pandemic lockdowns caused psychological problems in young people who were under the age of 30 (WEF, 2021). The fact that the results of our study did not overlap with a wide-range study conducted with 200,000 people should not be considered abnormal because the findings of our study covered UGS users in a limited region.

The impact of the pandemic on mental health is expected to be severe (Freeman and Eykelbosh, 2020). Depressive symptoms and a sense of loneliness were found to increase in people in Turkey (Bozkurt, 2021). The basic causes of psychological disorders are the uncertainty and anxiety caused by the pandemic environment with restrictions. Directing people to UGS's instead of locking them down in their homes or mixing with the crowds on streets, which are offered as open spaces, is the best option for solving these diseases. When the government realized this, it banned barbecues or picnics in these areas, allowing other activities instead of banning the use of UGS's entirely in November 2020, when the second pandemic restrictions were imposed. Scientific studies conducted on this subject prove the accuracy of this new application. It is argued that such studies, which increase the importance of visual access to nature to improve the physical and psychological health of individuals, also increase the demand for UGS's (Velarde et al., 2007; Slater et al., 2020). The fact that people living in Istanbul, which is a city where forests and UGS's are rapidly disappearing due to distorted

urbanization (Şahin, 2014; Cengiz et al., 2019; Doğru et al., 2020), better understood the value of UGS's with limited numbers and space after pandemic restrictions indicated this. Also, the lack of desired success in providing services to the public with urban forests and urban forestry throughout the country (Atmiş et al., 2007; Atmiş, 2016) was more clearly understood during this pandemic period.

According to the findings of our study, the closure of coasts and UGS's under the pandemic restrictions was not supported by society. It is the desire of the majority that UGS's either remain fully open or are kept open with some priorities and restrictions. Instead of closing UGS's, the focus is on the importance of directing people to UGS's; and it is speculated that people (especially the elderly) will otherwise have to walk around crowded places, such as streets, alleys, cafes, and restaurants, and thus be more affected by the pandemic. So indeed maintaining safe use of green areas is a challenge in terms of controlling Covid-19 transmission in the outdoor environment (Rojas-Rueda et al., 2019). For this reason, it is recommended that more spaces are provided for individual use in UGS's, plans are made to expand running tracks, consider where to locate parks and green spaces, create built environments for all users, conduct ongoing monitoring and evaluation and measures are taken to relieve users, such as social distancing circles in small neighborhood parks after the Covid-19 pandemic (Eltarabily and Elghezanwy, 2020; Slater et al., 2020).

Green Infrastructure is one of the few resources that has increased its societal value during the pandemic, due to its function in providing locations for physical and social interactivity (Mell and Whitten, 2021). Demand from residents for parks and outdoor UGS's has increased since the outbreak began, and highlights the important role and benefits provided by parks, especially urban and community parks, under the COVID-19 pandemic (Geng et al., 2020). Also it is stated that socio-economic attributes influenced the changes in frequency of visiting green areas (Uchiyama and Kohsaka, 2020). In this study, 53.1 % of the participants said that they did not have any changes in the frequency of UGS visits after pandemic restrictions, 28 % increased the frequency of visits, and 18.8 % decreased. Those who increased the frequency of visits said that they had a better understanding of the value of UGS's due to the restrictions, and those who reduced their visits said that they were concerned about being in society because of the social distancing rule. According to another study conducted in Turkey, the rate of those who increased their recreational activities after the normalization process was 43 % (Güngör and Öner, 2020). Similarly, a study conducted in Oslo showed that outdoor recreational activities increased at a rate of 291 % after the lockdown when compared to the previous three-year average on the same days (Venter et al., 2020) and a study conducted in Beijing indicated that despite the restrictions imposed due to the pandemic situation, people still have great demand for external green space (Zhu and Xu, 2021).

Increases and decreases were detected in urban UGS visits according to different UGS usages. For example, a relative increase was detected in forced visits, such as dog walking, and a decrease was detected in high-risk visits, such as observing nature and meeting other people (Ugolini et al., 2020). It was also found in our study that those who used UGS's to walk with children and grandchildren increased the frequency of UGS visits after the pandemic, which can be associated with regional and sociological differences. On the other hand, the fact that the rate of increasing the frequency of visits by those who used UGS's for dog walking was the second higher rate after walking with children and grandchildren in our study seems in line with the previous study data. These findings explain that the change in the frequency of visits varied according to the purpose of visits. However, it can be speculated that Covid-19 restrictions made short-distance outdoor activities more popular than before the pandemic (Kleinschroth and Kowarik, 2020).

When the first-period pandemic restrictions were terminated, the UGS's reopened on June 1, 2020 in Turkey. To regulate these uses, social distance circles were drawn in UGS's, and users were asked to remain within these circles. However, because of the lack of UGS's and different



Fig. 7. Applicability of social distance in greenspaces after pandemic (Yeniçağ, 2020).

UGS use habits, users did not take these circles into account; and violated social distancing rules, which was the subject of criticism in different ways in the media; and various comparisons were made between dogs who preferred to remain within the circle and people who did not remain within it (Fig. 7).

6. Conclusions

This work has revealed that the effect of UGS's in meeting people's psychological needs is more profound than meeting their physical needs in extraordinary periods such as the Covid-19 pandemic. The differentiation of psychological problems experienced during the period of pandemic restrictions compared to normal times plays a role in this. People can satisfy their physical needs outside of UGS's. However, in order to solve their psychological problems, they need more UGS's. For this reason, more importance should be given to taking into account the cultural ecosystem services in the redesign of UGS's. In this context, it is important to create environments where people can stay alone, read a book, listen to the sounds of birds by watching plants and flowers, or walk or run freely in nature.

There is great uncertainty about how COVID-19 will impact future public space design, use and perceptions. We have begun to search for answers to questions such as how the benefits we obtain from urban nature will change, and whether the pandemic will give us new lessons that we can include in our street designs and urban planning (Honey-Rosés et al., 2020; Uchiyama and Kohsaka, 2020; Mayen Huerta and Cafagna, 2021; Mell and Whitten, 2021). In Turkey, the government has realized that the closure of UGS's during the first wave of the pandemic was wrong and has preferred to keep UGS's open with some restrictions instead of closing in the second wave of the pandemic. Another striking point is the insufficiency of UGS's. With the release of UGS's after the first wave, crowds due to the inadequacy of UGS's indicate the need to increase the number and area of UGS's in and around the cities.

Not only the insufficiency of UGS's, but also the habits of those using these areas are important. It will be very difficult for societies such as the Turkish community, which has traditions such as picnics and barbecues in the use of UGS's, to alter their habits after the pandemic. As a matter of fact, although activities such as picnics and barbecue were also prohibited during the second wave of pandemic restrictions, such demands and illegal use continue. For that reason, the solution of such problems will be an important topic in future UGS design. Not only the government, but also the private sector and non-governmental organizations have learned various lessons in this process. For example, cinemas, theaters and concert halls, which were closed during the first restrictions, left a large number of people unemployed, as well as distancing society from artistic activities. Since such activities are not allowed in closed areas during the summer months, a theater group called DOT Theater (DOT, 2021) set up an outdoor stage in the Kemerburgaz Urban Forest in Istanbul and started to exhibit their shows there. The theater group also planted saplings in the same forest for the demandant audience. Designing UGS's in accordance with such artistic

activities should also be considered as a new approach.

In this study, only the results of interviews with UGS users in a certain region were analyzed. Therefore, the results cannot be considered correct for all of society. However, the findings expressed here will be useful in understanding how UGS users are affected by pandemic restrictions and their demands for UGS's. The study will also be guiding in increasing the amount of UGS's and redesigning them in the post-pandemic period.

Author statement

Cihan Erdönmez: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft, Supervision, Writing – review and editing, Resources. Erdoğan Atmş: Conceptualization, Methodology, Investigation, Writing – original draft, Writing – review and editing, Resources.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

- Ankara Valiliği, 2020. Ankara Governorship Board Decisions (in Turkish). <http://www.ankara.gov.tr/kurul-kararlari>.
- Atmş, E., 2016. Development of urban forest governance in Turkey. *Urban For. Urban Green.* 19, 158–166 (2016).
- Atmş, E., Özden, S., Lise, W., 2007. Urbanization pressures on the natural forests in Turkey: an overview. *Urban For. Urban Green.* 6 (2), 83–92.
- Badr, H.S., Du, H., Marshall, M., Dong, E., Squire, M.M., Gardner, L.M., 2020. Association between mobility patterns and COVID-19 transmissions in the USA: a mathematical modelling study. *Lancet Infect. Dis.* 20 (11), 1247–1254.
- Barton, D., Haase, D., Mascarenhas, A., Langemeyer, J., Baro, F., Kennedy, C., Grabowski, Z., McPhearson, T., Krog, N.H., Venter, Z., Gundersen, V., Andersson, E., 2020. Enabling access to greenspace during the covid-19 pandemic – perspectives from five cities. *The Nature of Cities*, 4 May 2020. <https://www.thenatureofcities.com> (Viewed 10 Feb 2021).
- Bozkurt, V., 2021. The Impact of Pandemic on Mental State and Family Relationships (in Turkish). <http://veyselbozkurt.com/2021/05/06/pandeminin-toplumun-ruh-hali-ve-aile-iliskileri-uzerindeki-etkisi/> (Viewed 8 May 2021).
- Buğra, A., Gürkaynak, R., Keyder, Ç., Palat, R.A., Pamuk, Ş., 2020. New Perspectives on Turkey roundtable on the COVID-19 pandemic : prospects for the international

- political economic order in the post-pandemic World. *New Perspect. Turk.* 63, 138–167 (2020).
- Cengiz, S., Atmiş, E., Görmüş, S., 2019. The impact of economic growth oriented development policies on landscape changes in Istanbul Province in Turkey. *Land Use Policy* 87, 104086.
- CPF, 2020. Towards Sustainability: Forest Solutions in Response to the COVID-19 Pandemic (erişim adresi: <https://www.un.org/esa/forests/collaborative-partnership-on-forests/cpf-statement-on-covid-19/index.html>), (Viewed 05 Feb 2021).
- DISK, 2020. How Did Covid-19 Affect Workers? Effects of the Pandemic on Working Life: Field Research Results for DİSK Members. DİSK Yayınları No. 81. İstanbul. 47 p. (in Turkish).
- DISK, 2021. Resources Allocated to Fighting for Social and Economic Impacts of Covid-19 in the World and Turkey. Devrimci İşçi Sendikaları Konfederasyonu Araştırma Merkezi Raporu, 9P. (in Turkish).
- Doğru, A.Ö., Göksel, C., David, R.M., Tolunay, D., Sözen, S., Orhon, D., 2020. Detrimental environmental impact of large scale land use through deforestation and deterioration of carbon balance in Istanbul Northern Forest Area. *Environ. Earth Sci.* 79, 270 (2020).
- DOT, 2021. DOT Is in the Forest. <https://dotormanda.com/>.
- Du, H., Zhou, F., Cai, Y., Li, C., Xu, Y., 2021. Research on public health and well-being associated to the vegetation configuration of urban green space, a case study of Shanghai, China. *Urban For. Urban Green.* 59, 126990 (2021).
- DW Turkish, 2020. What Measures Have Countries Taken in the Fight Against Coronavirus?, 17.03.2020. <https://www.dw.com/tr/koronavir%C3%BCs-ile-m%C3%BCadelede-%C3%BCkeler-hangi-%C3%B6nlemleri-ald%C4%B1/a-52811940> (Viewed 10 Feb 2021).
- Eltarabily, S., Elghezanwy, D., 2020. Post-pandemic cities - the impact of COVID-19 on cities and urban design. *Archit. Res.* 10 (3), 75–84, 2020.
- FAO, 2020. Forests for Human Health and Well-being – Strengthening the Forest–health–nutrition Nexus. Forestry Working Paper No. 18. Rome. <https://doi.org/10.4060/cb1468en>.
- Freeman, S., Eykelbosh, A., 2020. COVID-19 and Outdoor Safety: Considerations for Use of Outdoor Recreational Spaces. National Collaborating Centre for Environmental Health, Vancouver, BC, 2020 April.
- Geng, D.C., Innes, J., Wu, W., Wang, G., 2020. Impacts of COVID19 pandemic on urban park visitation: a global analysis. *J. For. Res.* 32, 553–567 (2021).
- Gidlow, C.J., Jones, M.V., Hurst, G., Masterson, D., Clark-Carter, D., Tarvainen, M.P., Smith, G., Nieuwenhuijsen, M., 2016. Where to put your best foot forward: psychophysiological responses to walking in natural and urban environments. *J. Environ. Psychol.* 45, 22–29.
- Güngör, S., Öner, B., 2020. The change in recreational activity usage in the normalization process after Covid-19 and individuals' cravings for urban green areas. *Turkish J. Agric. - Food Sci. Technol.* 8 (1), 8–12.
- Haberler, 2020. The Expert Warned about the Shopping Malls to be Opened on May 11: the Most Risky Choice, 05.05. 2020. <https://www.haberler.com/avm-ler-11-mayis-ta-acilacak-ancak-uzman-ism-13188688-haber/> (Viewed 10 Feb 2021) (in Turkish).
- Honey-Rosés, J., Anguelovski, I., Bohigas, J., Chireh, V., Daher, C., Konijnendijk, C., Litt, J., Mawani, V., McCall, M., Orellana, A., Oscilowicz, E., Sánchez, U., Senbel, M., Tan, X., Villagomez, E., Zapata, O., Nieuwenhuijsen, M., 2020. The Impact of COVID-19 on Public Space: a Review of the Emerging Questions. OSF Preprints r7Xa. Center for Open Science.
- İnal Keçiç, T., 2020. Urban Reflection of the Fight against the Pandemic. *Birgun Gazetesi*, 13.04.2020. <https://www.birgun.net/haber/salginla-mucadelenin-kentsel-tezahuru-296162> (In Turkish).
- IPSOS, 2021. One Year of Covid-19. IPSOS Survey for the World Economic Forum. <http://www.ipsos.com/en/expectations-about-when-life-will-return-pre-covid-normal-vary-widely-across-world>.
- Jansson, M., 2014. Green space in compact cities: the benefits and values of urban ecosystem services in planning. *Nordic J. Archit. Res.* 2, 139–160.
- Jhonsen, T.F., Hordley, L.A., Greenwell, M.P., Evans, L.C., 2001. Associations between COVID-19 transmission rate, park use, and landscape structure. *Sci. Total Environ.* <https://doi.org/10.1016/j.scitotenv.2021.148123>.
- Kleinschroth, F., Kowarik, I., 2020. COVID-19 crisis demonstrates the urgent need for urban greenspaces. *Front. Ecol. Environ.* 18 (6), 318–319.
- Lafortezza, L., Carrus, G., Sanesi, G., Davies, C., 2009. Benefits and well-being perceived by people visiting green spaces in periods of heat stress. *Urban For. Urban Green.* 8, 97–108 (2009).
- Lee, J., 2020. Mental health effects of school closures during COVID-19. *Lancet Child Adolesc. Health* 4 (5), 397–404.
- Liu, D., Kwan, M., Kan, Z., 2021. Analysis of urban green space accessibility and distribution inequity in the City of Chicago. *Urban For. Urban Green.* 59, 127029 (2021).
- Martens, D., Bauer, N., 2013. Natural environments – a resource for public health and wellbeing. A literature review. In: Noethammer, E. (Ed.), *Psychology of Wellbeing: Theory, Perspectives and Practice*. Novas Science, New York, USA, pp. 173–217.
- Mayen Huerta, C., Cafagna, G., 2021. Snapshot of the use of urban green spaces in Mexico city during the COVID-19 pandemic: a qualitative study. *Int. J. Environ. Res. Public Health* 18, 4304, 2021.
- Mell, I., Whitten, M., 2021. Access to nature in a post Covid-19 world: opportunities for green infrastructure financing, distribution and equitability in urban planning. *Int. J. Environ. Res. Public Health* 18, 1527, 2021.
- Muhammad, S., Long, X., Salman, M., 2020. COVID-19 pandemic and environmental pollution: a blessing in disguise? *Sci. Total Environ.* 728, 138820.
- Nu.nl, 2020. Lockdown Decision Has Been Made in the Netherlands: Here are All the Measures. <https://www.nu.nl/uitleg-over-het-coronavirus/6096871/hollandada-ka-panna-karar-ald-iste-tum-onlemler.html>.
- O'Brien, L., De Vreese, R., Kern, M., Sievanen, T., Stojanova, B., Atmiş, E., 2017. Socio-cultural ecosystem benefits of urban and peri-urban green infrastructure in different Europe countries. *Urban For. Urban Green.* 24, 236–248 (2017).
- Pan, J., Bardhan, R., Jin, Y., 2021. Spatial distributive effects of public green space and COVID-19 infection in London. *Urban For. Urban Green.* <https://doi.org/10.1016/j.ufug.2021.127182>.
- PHE, 2020. Improving Access to Greenspace a New Review for 2020. Public Health England publications. UN gateway number: GW-1158. 112 P. London.
- Pouso, S., Borja, A., Fleming, L.E., Gómez-Baggethun, E., White, M.P., Uyarra, M.C., 2021. Contact with blue-green spaces during the COVID-19 pandemic lockdown beneficial for mental health. *Sci. Total Environ.* 756, 143984 (2021).
- Qian, Y., Fan, W., 2020. Who loses income during the COVID-19 outbreak? Evidence from China. *Res. Soc. Stratif. Mobil.* 68, 100522 (2020).
- Rojas-Rueda, D., Nieuwenhuijsen, M.J., Gascon, M., Perez-Leon, D., Mudu, P., 2019. Green spaces and mortality: a systematic review and meta-analysis of cohort studies. *Lancet Planet. Health* 3, 469–477, 2019.
- Şahin, A., 2014. 1970'den Günümüze İstanbul İlinde Arazi Kullanımı, Değişimi ve Ormanlar (Land use, change and forests in Istanbul Province since 1970). In: Akkemik, Ünal (Ed.), *İstanbul Ormanlarının Sorunları ve Çözüm Önerileri*. Türkiye Ormancılar Derneği Yayın Marmara Şubesi, pp. 24–55.
- Sanesi, G., Lafortezza, R., Bonnes, M., Carrus, G., 2006. Comparison of two different approaches for assessing the psychological and social dimensions of green spaces. *Urban For. Urban Green.* 5, 121–129 (2006).
- Sawyer, S.F., 2009. Analysis of variance: the fundamental concepts. *J. Manual Manipulative Ther.* 17 (2), 27–38.
- Slater, S.J., Christiana, R.W., Gustat, J., 2020. Recommendations for keeping parks and green space accessible for mental and physical health during COVID-19 and other pandemics. *Prev. Chronic Dis.* 17, 200204, 2020.
- Sözcü, 2020. Corona Measures Additional Circular was Issued. *Sözcü Gazetesi*, 3 April 2020 <https://www.sozcu.com.tr/2020/gundem/corona-tedbirleri-ek-genelgesi-yayinlandi-5724153/> (Viewed 20 Feb 2020) (in Turkish).
- Sputniknews, 2020. The Ministry of Agriculture and Forestry Has Banned Picnics and Barb in Parks and Recreation Areas Within the Scope of Coronavirus Measures. Sputnik Turkish, 21.03.2020. <https://tr.sputniknews.com/turkiye/202003211041652462-tarim-ve-orman-bakanligi-park-ve-mesire-alanlarinda-mangala-yasak-getirdi/> (In Turkish).
- TCİB, 2020. Additional Circular on Parks, Recreation, Picnic Places Within the Scope of Combating the Coronavirus Outbreak Website of the Ministry of Internal Affairs of the Republic of Turkey (June 1, 2020). <https://www.icisleri.gov.tr>.
- TMA, 2020. Age Discrimination Should Be Ended in Pandemic Measures!. dated 22.07.2020 Statement of the Turkish Medical Association. <https://ttb.org.tr/haber-goster.php?Guid=7ad41de6-cc03-11ea-ae98-95a88cc32d95>.
- Tyrväinen, L., Ojala, A., Korpela, K., Tsunetsugu, Y., Kawaga, T., Lanki, T., 2014. The influence of urban green environments on stress relief measures: a field experiment. *J. Environ. Psychol.* 38, 1–9.
- Uchiyama, Y., Kohsaka, R., 2020. Access and use of green areas during the COVID-19 pandemic: green infrastructure management in the “new normal”. *Sustainability* 12, 9842, 2020.
- Ugolini, F., Massetti, I., Calaza-Martínez, P., Carinanos, P., Dobbs, C., Krajter Ostoic, S., Marin, A.M., Pearlmutter, D., Saaroni, H., Saulienė, I., Simoneti, M., Verlic, A., Vuletic, D., Sanesi, G., 2020. Effects of the COVID-19 pandemic on the use and perceptions of urban green space: an international exploratory study. *Urban For. Urban Green.* 56, 126888 (2020).
- Van den Bosch, M., Sang, A.O., 2017. Urban natural environments as nature-based solutions for improved public health – a systematic review of reviews. *Environ. Res.* 158, 373–384 (2017).
- Vargas-Hernandez, J.G., Pallagst, K., Zdunek-Wielgolaska, J., 2017. Urban green spaces as a component of an ecosystem. Functions, services, users, community involvement, initiatives and actions. *Rev. Urban.* (37), 1–26.
- Velarde, M., Fry, G., Tveit, M., 2007. Health effects of viewing landscapes—landscape types in environmental psychology. *Urban For. Urban Green.* 6, 199–212, 2007.
- Venter, Z.S., Barton, D.N., Gundersen, V., Figari, H., Nowell, M., 2020. Urban nature in a time of crisis: recreational use of green space increases during the COVID-19 outbreak in Oslo, Norway. *Environ. Res. Lett.* 15, 104075 (2020).
- WEF, 2021. Younger People are Being Hit Hardest by Pandemic Loneliness. WEF internet sitesi. https://www.weforum.org/agenda/2021/01/pandemic-loneliness-covid19-mental-health?utm_source=twitter&utm_medium=social_scheduler&utm_term=Mental+Health&utm_content=05/02/2021+07:30.
- WHO Regional Office for Europe, 2016. *Urban Green Spaces and Health: a Review of Evidence*. Copenhagen. 80 p.
- Wolf, K.L., Lam, S.T., McKeen, J.K., Richardson, G.R.A., Van den Bosch, M., Bardekjian, A.C., 2020. Urban trees and human health: a scoping review. *Int. J. Environ. Res. Public Health* 17, 4371, 2020.
- Yektaş, Ç., 2020. Mental effects of the pandemics in adolescents (in Turkish). In: Ercan, E. S., Yektaş, Ç., Tufan, A.E., Bilaç, Ö (Eds.), *Covid-19 Pandemisi ve Çocuk ve Ergen Ruh Sağlığı*. Türkiye Klinikleri, Ankara, pp. 13–18.
- Yeniçağ, 2020. These Are the Photos, We Leave the Title to You: We Will Write the Name of the Best Commenter on the News. *Yeniçağ Newspaper*, 14.06.2020 <https://www.yeni-cag.com.tr>

yenicaggazetesi.com.tr/fotograflar-bunlar-basligi-size-birakiyoruz-en-iyi-yorum-yapanin-adin-habere-yazacagiz-284144h.htm (Viewed 20 Dec 2020) (in Turkish).
YoungMinds, 2020. Coronavirus: Impact on Young People with Mental Health Needs. https://youngminds.org.uk/media/3708/coronavirusreport_march2020.pdf.

Zhu, J., Xu, C., 2021. Sina microblog sentiment in Beijing city parks as measure of demand for urban green space during the COVID-19. *Urban For. Urban Green.* 58, 126913 (2021).