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Original Article

Assessing the Role of Urban Green Areas for Students' Quality of Life during the COVID-19 Pandemic

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Abstract

Background: The COVID-19 pandemic and social distancing measures have limited outdoor activities for many people, including university students who live inside the campus and far from their families. We investigated if and how the fear of COVID-19 had impacted visiting green areas and consequently the quality of life.

Methods: The assessments were taken through a questionnaire-based survey of the university students living inside the campus in two universities (Konkuk and Sejong universities) in Seoul, South Korea in 2021 (n=255). Measuring three variables, the participants were asked to self-estimate their fear of COVID-19 and quality of life during the pandemic, and the time and frequency of the park visit. Structural equation modeling (SEM) and confirmatory factor analysis (CFA) were conducted to explore the potential relationship between the three main observed variables.

Results: In the case of the campus students, visiting the green area cannot play a mediating impact on the effect of the COVID-19 fear and quality of life. Likewise, the data did not support the effect of COVID-19 fear on the quality of life for this group of students, however, significant correlations were found between the COVID-19fear and visiting green spaces ($P<0.05$) (positive effect on visiting, and negative effect on the time of visit).

Conclusion: Students perceived not a considerable improvement in their quality of life after visiting green areas. It might be due to the fear of staying outdoor for a long time (frequency) during the pandemic, and students' lifestyles. However, the quality of life for the students is likely to be influenced by other factors, rather than the fear of COVID-19.

Keywords: COVID-19; Green area; Quality of life; Pandemic fear; University student; Korea

Introduction

Human beings have suffered from various diseases and pandemics, and lately, the Covid-19 pandemic has influenced all aspects of human life (1, 2). Pandemics have become a new form of the global crisis that has led to several difficulties for societies, both physical and psychological (1). Several policies have been taken into account to reduce personal and public contact, mainly social distancing and lockdown all around the world. The WHO declared that these restrictive policies

resulted in significant changes in the way people communicate with each other, and on visiting public spaces (2). Moreover, from the mental health perspective, the social distancing and lockdown measurements have led to several psychological problems such as anxiety, depression, fear, and mental health disorders, like uncertainty and negative emotions(3-5). Such limitations have directly affected the individual's quality of life (QOL) (6,7).

The green area visit could heal several health-related issues (8,9), and plays a significant role in the perceived 'well-being' and QOL (10-15). Spending time in green areas influence people's perception of their general health and QOL (8, 16). During the pandemic, parks and green spaces have played a vital role in individual daily lifestyles, mainly considered safe places for healthy outdoor recreation and social interaction at the same time (1,14). Residents with more green areas in their neighborhood would have more interaction with nature which leads to physical and mental health benefits (1), though the other main function of the green area has been providing a place for 'social interaction' during the pandemic (17).

QOL has been an essential criterion for evaluating the physical and mental health during the latest pandemic and the associated lockdowns (13). The WHO suggested assessing the QOL in four main domains, physical health, psychological, social relationships, and environment. QoL refers to people's perception of their position in life in the context of the value systems in which they live and it is about their goals, expectations, standards, and concerns (18,19).

Since the pandemic started, most governments implemented pandemic policies such as lockdowns, restrictions on public events, social gatherings, and public transport (14). In many metropolitan areas, like Seoul, the local government has limited restaurant hours, theatres, shopping centers, gyms, and indoor activities. The lockdown restrictions have made it more difficult for those students living on the university campus, far from their hometowns and families. This group of students uses the shared facilities and entertainment inside and outside the universities, especially in the neighborhood of their university. Therefore, it seems that the latest lockdown and social distancing measures have made some barriers to the normal lifestyle of students. In regard to the latest pandemic and the associated social distancing, several studies discussed and proved the positive role of urban parks on citizens' health and QOL(1,11,14-16). However, none of the studies, so far, investigated the impact of the Covid-19 pandemic on students' QOL. Hence, this study focused on those groups of university students who live on campus and are far from their families. Hence, the main question is to find whether the park visit have affected the QOL of students during the pandemic.

Accordingly, we investigated the effects of fear of going out because of the Covid-19 pandemic on QOL and the mediating effect of visiting green areas. To be more specific, we aimed to investigate the impact of green areas as a mediator between fear of the Covid-19 pandemic and the QOL among university students.

Methods

Study design

A cross-sectional study was performed among the students who live in the campus dormitory in Seoul, South Korea. The study was conducted from the 5th of November 2021 to the 15th of November 2021. The inclusion criteria for participating in this questionnaire were as follows: active university students who live inside a university campus (dormitories).

After receiving permission from dormitories managers, the questionnaires were distributed to the student who lived in the dormitories. In the first part of the questionnaire mentioned that their information would be kept confidential, and they were informed that there were no right or wrong answers in the questionnaire.

They were asked to fill in a questionnaire, which comprised three sections with 31 questions. In section one, the survey included questions about participants' social demographic, health back-

ground, and the visited green areas (tested through two variables 'visiting a park' (VP) and 'staying in the park' (SP). Based on the suggestions by previous studies (1,20-22), the 'duration' and 'frequency' of park visits are considered as the mediator of the empirical model of this study.
In section two QOL (QOL) was measured by adopting the WHO (QOL)-BREF scale (23). The last section dealt with the fear of Covid-19 that was designed based on the "Pandemic (Covid-19) Anxiety Travel Scale (PATS)", Zenker et al (24).
For finding the potential participants for this research, we contacted the authorities of the university dormitories and asked them to distribute the questionnaires. Totally 623 questionnaires were distributed, and 277 students sent back the questionnaire. The final sample size was 255, excluding the incomplete survey responses.

Analyses

Data from the questionnaire responses were analyzed with R software version 4.0.1 (R Core Team). R: A language and environment for statistical computing) and the "lavaan" package have been used. The first set of analyses involved a basic descriptive analysis of the demographic variables and the health measurements.
In the second part of the analysis, several tests were conducted to address the research questions. Direct and indirect effects of fear of Covid-19 on QOL and the mediating effect of the green area were estimated using structural equation modeling (SEM) and confirmatory factor analysis (CFA).
The third and final part of the analysis dealt with testing the correlation; Pearson correlations were used based on the distributions of variables. The *P*-value less than 0.05 was set as a significance level.

Results

Descriptive statistics

This study involved 255 participants, comprising 52.9% males, and 47.1% females (Table 1). The nationality of most of the participants was Korean (58.4%), followed by 41.6% of the foreigners. The mean age was 26.63 years (SD = 3.32).
Two-thirds of the participants were graduated-students (69.4%). The majority of participants had not experienced any treatment related to depression. Most of the participants reported smoking and drinking alcohol. Around 3.9% of the participants had infected Covid-19infection, and 1.6% of them lost their immediate family because of Covid-19. Table 1 indicates that participants visited parks mostly during weekends and holidays, and it was followed by visiting parks twice a week. More than fifty percent of the participants stayed in the parks for less than one hour.

Testing the variables

Confirmatory factor analysis (CFA) was performed to estimate a network of relationships between observed variables and latent variables. First, the latent variable named 'fear of Covid-19, was significantly and positively inferred from five observed variables, consisting of 'afraid, think, worry, feel safe, and watching news'. Likewise, the items of 'QOL' were all approved, comprising 'social, environmental, physical, and psychological (Table 2).
Testing the relationship between all variables showed that the fear of Covid-19 significantly reduced the time spent in the park (SP) (beta = -0.09, 95%, *P*-value = 0.012) and increased the number of visiting park (VP) (beta = 0.58, 95%, *P*-value <0.001). In other words, with the increase of one unit of Covid-19 variable, the SP decreased by 2.7 minutes (30min * 0.09), and VP increased by 0.58 times.
Surprisingly, the result indicated that increasing the frequently of 'visiting park' will significantly lead to a decrease in QOL (beta = -1.66, 95%, *P*-value <0.001); however, there is no significant relationship between 'spending time in a park' and QOL (beta = 1.08, 95%, *P*-value = 0.331).

Table 1: Sociodemographic characteristics of participants

Variable		*Count*	*Column N %*	*Variable*		*Count*	*Column N %*
Gender	Female	135	52.9	Drinking Alcohol	Never	51	20.0
	Male	120	47.1		Monthly or lees	93	36.5
Nationality	Foreigner	106	41.6		Two or fewer times a week	77	30.2
	Korean	149	58.4		Three or more times a week	34	13.3
Study level	Undergraduate	78	30.6	Infected Covid-19	Yes	10	3.9
	Graduate student	177	69.4		No	245	96.1
Medical Condition	Yes	29	11.4	Immediate family Infected Covid-19	Yes	22	8.6
	No	226	88.6		No	233	91.4
Medication-related to depression	Yes	2	0.8	Immediate family died because of Covid-19	Yes	4	1.6
	No	253	99.2		No	251	98.4
Smoke	Yes	61	23.9	Staying Park	≤30 min	169	66.3
	No	117	45.9		1 hour	58	22.7
	Sometime	77	30.2				
	Daily	46	18.0		2 hour	23	9.0
	Once a week	33	12.9		≥3hour	5	2.0
	Twice a week	61	23.9				
Visiting Park	More than 3 times in the week	44	17.3				
	Weekend and holidays	71	27.8				

Table 2: Evaluating the multivariate causal relationships between the Covid-19 and Green area on QOL based on structural equation modeling (SEM)

Path from	*To*	*Coefficient (95% CI)*	*Standardized Coefficient*	*P-value*
QOL	PHYS	1.00 (1.00, 1.00)	0.747	-
QOL	SOCIAL	0.86 (0.68, 1.04)	0.631	<0.001
QOL	PSYCH	0.79 (0.65, 0.94)	0.725	<0.001
QOL	ENVIR	0.99 (0.82, 1.15)	0.835	<0.001
Covid-19	Worry	1.00 (1.00, 1.00)	0.639	-
Covid-19	Think	1.20 (0.96, 1.43)	0.752	<0.001
Covid-19	Afraid	1.24 (1.02, 1.46)	0.869	<0.001
Covid-19	Watching News	1.17 (0.93, 1.40)	0.722	<0.001
Covid-19	Feel Safe	1.03 (0.83, 1.23)	0.778	<0.001
Covid-19	SP	-0.09 (-0.16, -0.02)	-0.168	0.012
Covid-19	VP	0.58 (0.38, 0.78)	0.402	<0.001
VP	QOL	-1.66 (-2.56, -0.75)	-0.261	<0.001
SP	QOL	1.08 (-1.09, 3.26)	0.064	0.331
Covid-19	QOL	-1.21 (-2.62, 0.19)	-0.132	0.092

Finally, the empirical model was tested to answer the main question of the research. The results are presented visually in Fig. 1. The positive effect of Covid-19 on VP and a negative effect on SP were significantly approved. While, VP can significantly decrease the QOL (-1.66), the effect of SP on QOL was insignificant.

It is clear that even though, the direct effect of Covid-19 on QOL was insignificant, the indirect effect of Covid-19 on QOL was significant through two variables of VP and SP (beta = -1.07, 95% CI: [-1.73, -0.41], *P*-value = 0.002). Hence, the overall effect of Covid-19 on QOL is significant (beta = -2.28, 95% CI: [-3.64, -0.93], *P*-value = 0.001).

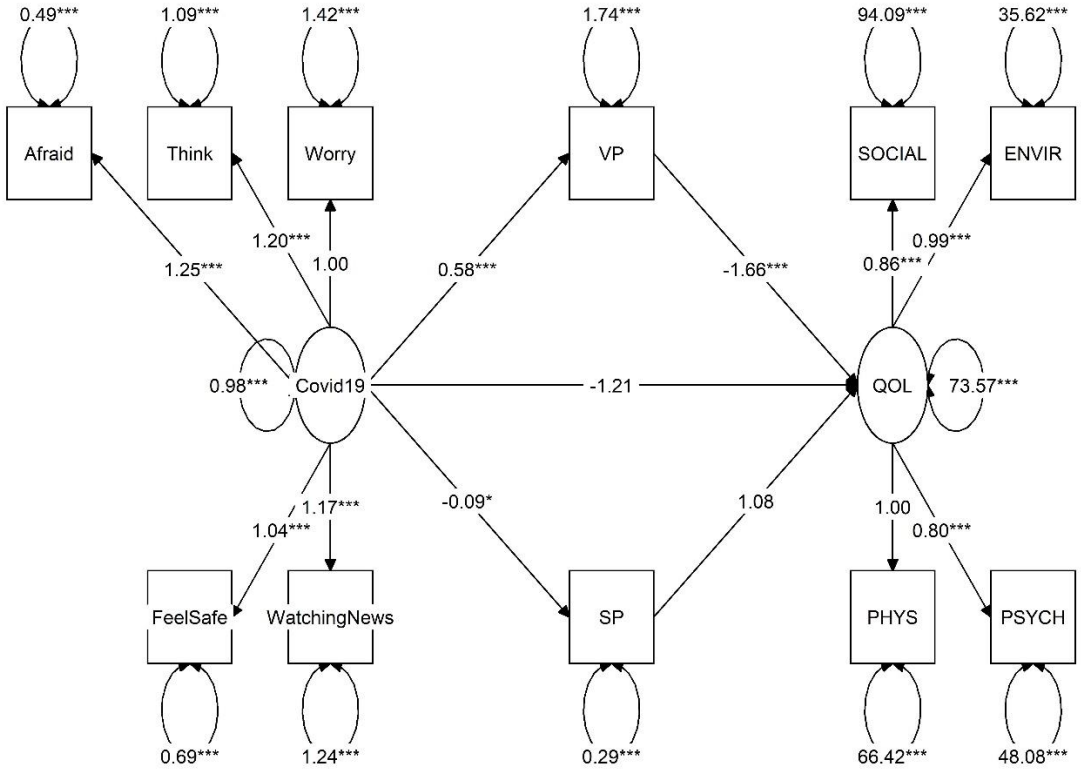

Fig. 1: Direct and indirect effects of Covid-19 on QOL and mediator effect of the green area

Discussion

We investigated the effect of fear of Covid-19 on QOL, and how/if visiting the green area can potentially change the procedure, specifically for the university students who live in dormitories. The result revealed that the QOL of this group of students might be inferred from other factors, rather than the fear of Covid-19. Unlike similar studies on the positive impact of urban green space on human health (25, 26), it was shown that 'spending a long time' in the local parks is not associated with QOL, specifically for the university students during the pandemic. However, this research confirms the previous findings that 'visiting parks' during the pandemic will lead to better mental health (1,2,11,12,18).

According to the result, the PATS scale (24), designed for travel anxiety during the pandemic, can be applied for testing the fear of Covid-19, as well since all the observed variables (afraid, think,

worry, feel safe, and watching the news) significantly correlated with the latent variable.

Having self-reported measurements of Covid-19, QOL, and park visits, we found several interesting patterns in the data. Even though Covid-19 has impacted the QOL among the majority of the population and different social groups, it seems that for students such procedure is different, and it might be due to the different lifestyles of students. In fact, long-term sedentary behavior due to students' lifestyles during the pandemic can lead to a different perception of their own health levels and social interaction needs in comparison to other residents (1, 27). Moreover, the perceived fear of Covid-19 can lead to an increase in visiting parks, which might be due to the fact that the green areas as significant resources in cities have provided a safe place for social connection and outdoor exercises (28,29), while most of the other activities were prohibited during the pandemic.

However, the park visits had no significant effect on QOL, which seems to be the result of spending a very short time in the park. In fact, the fear of Covid-19 reduced the time spent in the park, which accordingly affected the final outcome, QOL. The frequency of green area visits has been tested by previous studies and lately, it is been suggested to stay in parks longer than 20 min, or 30 min to reach the aimed quality and positive mental outcome (27,30). In addition, the number of visitors in the park would be another significant determinant since it can make people nervous and reduce the health benefit of park visitation during the pandemic (1).

Hence, for those students who live in campus dormitories, the fear of Covid-19 had no effect on their QOL, and accordingly, visiting local parks (as a green area) might play a role as a mediator if the time of visiting parks is increased. It is likely that there are several other determinant factors since the results are not consistent with the previous empirical research about the positive impact of visiting green areas on QOL (2,8,16,25,31). Therefore, it is required to organize other activities that can potentially fit the students' lifestyles.

Conclusion

Visiting green areas has not been associated with the QOL for university students during the pandemic. However, fear of Covid-19 can contribute to visiting parks; though the effects on the intention to visit, and the time spent in parks are different. The results add to a growing body of knowledge on the impact of fear of Covid-19 on quality of life, and the role of the green spaces exposure.

Journal Ethics considerations

The authors have entirely observed ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.).

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Conflicts of interest

The authors declare that there is no conflict of interest.

References

1. Xie J, Luo S, Furuya K, Sun D (2020). Urban parks as green buffers during the COVID-19 pandemic. *Sustainability*, 12(17):6751.
2. Pipitone JM, Jović S (2021). Urban green equity and COVID-19: Effects on park use and sense of belonging in New York City. *Urban For Urban Green*, 1;65:127338.
3. Anser MK, Sharif M, Khan MA, Nassani AA, Zaman K, Abro MM, Kabbani A (2021). Demographic, psychological, and environmental factors affecting student's health during the COVID-19 pandemic: on the rocks. *Environ Sci Pollut Res Int,* 28(24):31596-31606.
4. Aebli A, Volgger M, Taplin R (2021). A two-dimensional approach to travel motivation in the context of the COVID-19 pandemic. *Current Issues in Tourism*, 29:1-6.

5. Rokni L (2021). The psychological consequences of COVID-19 pandemic in tourism sector: a systematic review. *Iran J Public Health*, 50(9):1743- 1756.
6. Kamara S, Walder A, Duncan J, Kabbedijk A, Hughes P, Muana A (2017). Mental health care during the Ebola virus disease outbreak in Sierra Leone. *Bull World Health Organ,* 1;95(12):842.
7. Ren SY, Gao RD, Chen YL (2020). Fear can be more harmful than the severe acute respiratory syndrome coronavirus 2 in controlling the corona virus disease 2019 epidemic. *World J Clin Cases,* 26;8(4):652-57.
8. Heidarzadeh E, Rezaei M, Haghi MR, Shabanian H, Lee Y (2021). Assessing the impact of outdoor activities on mental wellbeing; focusing on the walking path in urban area. *Iran J Public Health*, 4;50(10):2132-8.
9. Buckley R, Westaway D (2020). Mental health rescue effects of women's outdoor tourism: A role in COVID-19 recovery. *Ann Tour Res*, 85:103041.
10. Huerta CM, Utomo A (2021). Evaluating the association between urban green spaces and subjective well-being in Mexico city during the COVID-19 pandemic. *Health Place*. 1;70:102606.
11. Chen X, Xu Q, Lin H, Zhu J, Chen Y, Zhao Q, Fu C, Wang N (2021). Quality of life during the epidemic of COVID-19 and its associated factors among enterprise workers in East China. *BMC Public Health*, 21(1):1-8.
12. Camargo DM, Ramírez PC, Fermino RC (2017). Individual and environmental correlates to quality of life in park users in Colombia. *Int J Environ Res Public Health*, 14(10):1250.
13. Wong FY, Yang L, Yuen JW, Chang KK, Wong FK (2018). Assessing quality of life using WHOQOL-BREF: A cross-sectional study on the association between quality of life and neighborhood environmental satisfaction, and the mediating effect of health-related behaviors. *BMC Public Health*,18(1):1-4.
14. Geng DC, Innes J, Wu W, Wang G (2021). Impacts of COVID-19 pandemic on urban park visitation: a global analysis. *J For Res,* 32(2):553-67.
15. Bertram C, Rehdanz K (2015). The role of urban green space for human well-being. *Ecol Econ,* 1;120:139-52.
16. Rezaei M, Kim D, Alizadeh A, Rokni L (2021). Evaluating the mental-health positive impacts of agritourism; A case study from South Korea. *Sustainability*,13(16):8712.
17. Zhu W (2020). Should, and how can, exercise be done during a coronavirus outbreak? An interview with Dr. Jeffrey A. Woods. *J Sport Health Sci*, 9(2):105-107.
18. Algahtani FD, Hassan SU, Alsaif B, Zrieq R (2021). Assessment of the quality of life during COVID-19 pandemic: a cross-sectional survey from the Kingdom of Saudi Arabia. *Int J Environ Res Public Health,* 18(3):847.
19. Tiyarattanachai R, Hollmann NM (2016). Green Campus initiative and its impacts on quality of life of stakeholders in Green and Non-Green Campus universities. *SpringerPlus*, 5(1):1-7.
20. Yang M, Dijst M, Faber J, Helbich M (2020). Using structural equation modeling to examine pathways between perceived residential green space and mental health among internal migrants in China. *Environ Res*, 1;183:109121.
21. Musterd S, Galster G, Andersson R (2012). Temporal dimensions and measurement of neighbourhood effects. *Environ Plan A,* 44(3):605-27.
22. Volenec ZM, Abraham JO, Becker AD, Dobson AP (2021). Public parks and the pandemic: How park usage has been affected by COVID-19 policies. *PLoS One.* 19;16(5):e0251799.
23. World Health Organization (1998). *Programme on mental health: WHOQOL user manual.* World Health Organization.
24. Zenker S, Braun E, Gyimothy S (2021). Too afraid to travel? Development of a pandemic (COVID-19) anxiety travel scale (PATS). *Tour Manag*, 1;84:104286.
25. Kondo MC, Fluehr JM, McKeon T, Branas CC (2018). Urban green space and its impact on human health. *Int J Environ Res,*15(3):445.
26. Gascon M, Triguero-Mas M, Martínez D, Dadvand P, Forns J, Plasència A, Nieuwenhuijsen MJ (2015). Mental health benefits of long-term exposure to residential green and blue spaces: a systematic review. *Int J Environ Res*, 12(4):4354-79.
27. Shanahan DF, Bush R, Gaston KJ, Lin BB, Dean J, Barber E, Fuller RA (2016). Health benefits from nature experiences depend on dose. *Sci Rep*, 23;6(1):1-0.

28. Europe WHO (2017). Urban green spaces: a brief for action. World Health Organization. Abgerufen von. Available from https://apps.who.int/iris/handle/10665/344116
29. Kemperman A, Timmermans H (2014). Green spaces in the direct living environment and social contacts of the aging population. *Landsc Urban Plan ,* 1;129:44-54.
30. Yuen HK, Jenkins GR (2020). Factors associated with changes in subjective well-being immediately after urban park visit. *Int J Environ Health Res*, 3;30(2):134-45.
31. Holt EW, Lombard QK, Best N, Smiley-Smith S, Quinn JE (2019). Active and passive use of green space, health, and well-being amongst university students. *Int J Environ Res,* 16(3):424.