Journal of Architectural Sciences and Applications
JASA 2023, 8 (1), 315-325.
Research article
e-ISSN: 2548-0170
https://dergipark.org.tr/en/pub/mbud

Rethinking the Built Environment in the Context of Covid-19 Pandemic: A Critical Review

Kağan GÜNÇE [1*], Damla MISIRLISOY [2]

ORCID 1: 0000-0003-1557-2987
ORCID 2: 0000-0003-0866-0401
[1] *Eastern Mediterranean University, Faculty of Architecture, 99628, Famagusta, North Cyprus.*
[2] *European University of Lefke, Faculty of Architecture, 99010, Lefke, North Cyprus.*
**** e-mail**: kagan.gunce@emu.edu.tr*

Abstract

The built environment should be re-evaluated in the context of Covid-19 pandemic for preventing the spread of the virus. The study aims to reveal the issues that arise in the context of the Covid-19 pandemic at different scales of the built environment, from urban to interior scale and also to emphasize the importance of designing a sustainable environment by considering the lessons learned. The study highlights the significance of designing a sustainable environment by incorporating lessons learned from the pandemic experience. By investigating and highlighting these issues, the research aims to provide recommendations that can guide future efforts towards creating resilient and adaptive built environments. The method of the study is based on the critical review of the published studies on the issue between April 2020-April 2022 and observations on user experiences. The findings of the study highlight the necessity of further questioning the built environment in light of possible pandemics.

Keywords: *Covid-19, pandemic, built environment, design strategies, urban-architecture-interior scale.*

Covid-19 Salgını Bağlamında Yapılı Çevreyi Yeniden Düşünmek: Eleştirel Bir İnceleme

Öz

Yapılı çevre, kullanıcıların potansiyel olarak enfekte olma durumları göz önünde bulundurularak Covid-19 pandemisi bağlamında yeniden değerlendirilmelidir. Pandemi veya bulaşıcı hastalıkların her an tekrar etmesi olasılığı öngörülerek yapılı çevrelerin yeniden düşünülmesi kaçınılmazdır. Bu çalışma, Covid-19 pandemisi bağlamında yapılı çevrelerdeki sorunları ortaya koymayı ve çıkarılan dersleri dikkate alarak sağlıklı ve sürdürülebilir bir çevre tasarlamanın önemini vurgulamayı, aynı zamanda pandemi sonrası dönem için ortaya konan konulara gelecek için öneriler geliştirmeyi amaçlamaktadır. Çalışma, pandemi deneyiminden öğrenilen dersleri ışığında sürdürülebilir bir çevre tasarlamanın önemini vurgularken, dayanıklı ve uyarlanabilir yapılı çevreler oluşturmaya yönelik gelecekteki çabalara rehberlik edebilecek öneriler sunmayı amaçlamaktadır. Çalışmanın yöntemi, Nisan 2020 ile Nisan 2022 tarihleri arasında bahsi edilen konuyla ilgili yayınlanmış çalışmaların eleştirel incelemesine dayandırılmıştır. Çalışmanın bulguları, mevcut ve olası pandemilere karşı yapılı çevre tasarımlarının, belirtilen farklı boyutlarla, daha fazla sorgulanması gerekliliği vurgulamaktadır. Ayrıca çalışmada, Covid-19 pandemisinden dersler çıkararak olası ihtiyaçlara göre tasarım stratejileri ile ilgili öneriler sunulmaktadır.

Anahtar kelimeler: *Covid-19, salgın, yapılı çevre, tasarım stratejileri, kentsel-mimari-iç mimari ölçek.*

Citation: Günçe, K. & Mısırlısoy, D. (2023). Rethinking the built environment in the context of Covid-19 Pandemic: A critical review. *Journal of Architectural Sciences and Applications*, 8 (1), 315-325.
DOI: https://doi.org/10.30785/mbud.1295082

Received: *10/05/2023* – ***Accepted:*** *21/06/2023*

1. Introduction

Mankind had to fight different pandemics for centuries and has always managed to learn lessons from them. In the light of recent archaeological and genetic research, it has been revealed that plague caused large-scale pandemics in the Eurasian continent since 3000 BC (Varlık, 2020). It is known that more than 13 flu pandemics have occurred since the 1500s (Ateş & Aksoy, 2020). In the 19th century, the spread of many pandemics increased with technological developments in transportation. It is known that the 'Spanish flu' pandemic, which took place between 1918 and 1920, spread very quickly and caused great losses all over the world, resulting in the death of at least 50 million people.

Each pandemic had affected urban planning and architectural design in different approaches and forced them to change and transform. In the historical process, it is known quarantine, isolation, and imprisonment measures have been taken against pandemics and they have affected architectural space organizations. For example, it is known that healthcare buildings were renovated to fight tuberculosis, leprosy, and plague, or special structures were designed for the mentioned disease. In the fight against tuberculosis, since the 1830s, the existing architectural principles related to sunlight and ventilation should be rethought in healthcare buildings. In the 1920s, the concepts of hygiene and health formed the basis of modern architecture and urbanism (Fezi, 2020).

In the early 21st century, pandemics such as the Swine flu, SARS, MERS, and Ebola virus had also a high trajectory of impacts; however, they were limited to the countries it started. On the other hand, COVID-19 quickly spread across the globe. As a result, a state of “new normal” is introduced to societies lifestyles across the globe, which is predominantly characterized by “stay home”, “self-isolation” and “physical distancing” (Nahiduzzaman & Lai, 2020).

Since 2019, when the covid-19 pandemic started to spread, it is experienced that the built environment needs change and transformation with the fear of being infected. It is obvious that built environment dynamics are also affected by this pandemic. However, it will take time to develop a healthy and sustainable built environment to stop the spread of the virus and take measures to avoid being infected.

This study aims to reveal the problems that arise in the context of the Covid-19 pandemic in the built environment, and also to emphasize the importance of designing a healthy and sustainable environment by considering the lessons learned. Within the scope of the study, the impact of the Covid-19 pandemic on the built environment will be examined in three categories: ‘Urban Scale’, ‘Architectural Scale’, and ‘Interior Scale’.

The primary objective of this study is to put forward the issues that have emerged within the built environment during the Covid-19 pandemic. Additionally, the study highlights the significance of designing a sustainable environment by incorporating valuable lessons learned from the pandemic experience. By investigating and highlighting these issues, the research aims to provide actionable insights and recommendations that can guide future efforts toward creating resilient and adaptive built environments capable of effectively addressing public health crises.

2. Material and Method

Starting in 2020, there has been an immediate increase in academic studies on the COVID-19 pandemic. The pandemic gave a new perspective to academic studies. As the method of the study, a meta-synthesis literature survey is completed on the published studies mentioning the effect of Covid-19 on the built environment. The study employed a methodological approach that involved two key components: a critical review of published studies on the subject and the observations from user experiences during the pandemic. The articles published in the journals that are indexed in the 'Web of Science' has been reviewed. ‘Covid-19’ and ‘built environment’ are used as keywords during the selection of the literature survey. 60 articles were reviewed that are published between April 2020 and April 2022, then 22 selected articles are used as the main source. Then, the future recommendations for the issues revealed for the post-pandemic period have been developed in light of the discussions.

For the critical review of published studies, the researchers systematically analyzed relevant literature to gather information regarding the issues. Relevant studies have been assessed to ensure inclusion in the analysis. In addition to the literature review, user experiences are also considered. It is observed how the individuals interact with the built environment during the pandemic. Site visits, interviews, and surveys have been conducted to collect information regarding challenges and experiences faced by users.

Then, a critical review of the published studies and observations are combined to obtain a comprehensive understanding of the issues related to the built environment. Findings derived from the method formed the basis for the aim of the study to emphasize the significance and designing a sustainable environment and provide future recommendations.

According to the findings, the built environment is classified under 3 scales urban, architecture, and interior space. A literature survey was conducted on the published articles related to the effects of the Covid-19 pandemic on urbanism, architecture, and interior scale and represented in Table 1.

Table 1. Relevant research studies on the impact of the Covid-19 pandemic on the built environment

DIFFERENT SCALES OF BUILT ENVIRONMENT	RELEVANT RESEARCH STUDY
Urban Space	(Sharifi & Khavarian-Garmsir, 2020), (Guida & Carpentieri, 2021), (Nahiduzzaman & Lai, 2020), (Broo, Lamb, Ehwi, Parn, Koronaki, Makri & Zomer, 2021), (Eltarabily & Elgheznawy, 2020), (Maturana, Salama & McInneny, 2021), (Fezi, 2020) (Edgars, 2020), (Kelly & Mouritz, 2020), (Honey-Rosés, Anguelovski, Chireh, Daher, Konijnendijk van den Bosch, Litt, Mawani, McCall, Orellana, Oscilowicz & Sánchez, 2020)
Architectural Space	(Megahed & Ghoneim, 2020), (Haas, Faber & Hamersma, 2020), (Frumkin, 2021), (Alraouf, 2021), (Maturana, Salama & McInneny, 2021), (Fezi, 2020), (Edgars, 2020), (Corbera, Anguelovski, Honey-Rosés & Ruiz-Mallén, 2020), (Taheri & Rider, 2022), (Navaratnam, Nguyen, Selvaranjan, Zhang, Mendis & Aye, 2022)
Interior Space	(Tokazhanov, Tleuken, Guney, Turkyilmaz & Karaca, 2022), (Spennemen, 2021), (Cheshmehzangi, 2021), (Signorelli, Capolongo, Alessandro & Fara 2020), (Porter, 2021), (Taheri & Rider, 2022), (Navaratnam at al., 2022)

The effects of Covid-19 on the built environment can be evaluated on three different scales as mentioned above. These:

- Urban Scale
- Building Scale
- Interior Scale

2.1. Built Environment on the “Urban Scale” in the Context of the Covid-19 Pandemic

During the Covid-19 pandemic, it has been suggested and recommended by different authorities and administrations to stay at home. In almost every country in the world restrictions on the "use of public spaces" has been witnessed. Especially in touristic cities, the squares, which were full in all seasons of the year before the pandemic, were empty. In this process, restrictions on the use of public space and physical distancing were the key measures in order to protect public health.

With the limited movement recommendations of the World Health Organization (WHO, 2021), people closed their homes in order not to be infected and did not leave the house unless it was necessary. In this process, many people tried to run their business from home via the Internet. Thus, it has been observed that urban spaces such as streets, parks, plazas, squares, and beaches are emptied in a way that has never been seen before. Cities, especially known for their active street lives, have taken on the appearance of 'ghost cities' as their users stay at home for the collective public good and restrict their out-of-home lives.

All the studies completed so far show it is not clear what will happen after the pandemic. There is uncertainty about how the social relations experienced in public spaces may change in the future. It is unclear whether the effects of Covid-19 on the public sphere will be as profound as in other aspects of our lives (Corbera et al., 2020). It will take years to come to definitive conclusions about how the global pandemic has changed the built environment (Honey-Rosés et al., 2020).

The Covid-19 pandemic is not the first pandemic that humanity has experienced. At the same time, this is not the first time that planning, and design will focus on improving public health (Sennett, 2018). In order to overcome the Covid-19 pandemic and protect against new pandemics, new solutions, and methods can be developed by considering health dimensions of planning and design.

According to Frumkin (2021), features of the built environment that increase disease risk are: crowding, poverty, poor air circulation, and air pollution. A critical reassessment of urban spaces has occurred Covid-19 pandemic and it caused a period of change and uncertainty (Berg, 2020). The pandemic should be perceived as an opportunity to rethink and assess urban planning priorities (Varlık, 2020).

In today's-built environment, it is impossible to ensure total isolation and physical distancing due to high-density development (Nahiduzzaman & Lai, 2020). This pandemic will force city planners and related designers to integrate the concepts that will directly affect public health in the fields of 'social density', 'social distance', 'private zone', and 'privacy and its degrees', in addition to environmental psychology. The current pandemic has given a new perspective to think about urban design and all design dimensions related to public space. This situation will lead to the production of new ideas and new concepts by analyzing the existing ones. Covid-19 can be an opportunity to rethink planning and design issues to create more sustainable cities.

Key questions in the field of urban design relate to 'how long will these effects last' and 'to what extent will they be transformative'. After the restrictions are lifted, the question of what will be the long-term effects of the Covid-19 pandemic on urban design and public space is a question that planners and designers should pay attention to. Will stakeholders working in this field define planning and design issues as 'before the Covid-19 pandemic' and 'after the Covid-19 pandemic'?

Studies carried out since the beginning of the Covid 19 epidemic in 2019, show that the epidemic will change and transform urban design and public space design in various ways and dimensions, especially in terms of perceptual, social, and administrative aspects, with a user-oriented perspective. However, the depth and extent of the transformation are currently unclear as it relates to the future use and perceptions of urban design (Honey-Rosés et al., 2020).

2.2. Built Environment in the "Building Scale" in the Context of the Covid-19 Pandemic

Every phenomenon that affects life also directly affects architecture. Undoubtedly, this pandemic process closely concerns and affects architectural space. The current situation has revealed that architectural spaces need to be re-examined and reconsidered. The pandemic caused a change in accessibility, social gathering, lifestyle, and working environment to prevent the spread of the infection (Navaratnam et al., 2022).

In this context, the buildings that need to be re-examined are 'public buildings', 'health buildings', 'educational buildings', and 'residential buildings' at first. While structures such as public, health, and educational buildings should be reconsidered by focusing on the prevention of Covid-19 transmission and in the light of other relevant factors; there is no doubt that residential buildings should be reconsidered in the light of space organization suitable for new life.

Human interaction with nature has been cut off by designing multi-story structures using artificial lighting and ventilation. It has been ignored that these artificial environmental conditions can cause many chronic diseases and allergies. The need to connect with sunlight, natural ventilation, soil, and water on the ground has been ignored as a basic human need (Rassia, 2020). At this point, Covid-19 has created a reason for architects and related designers to question these approaches again.

During the pandemic, the desire of users to escape from city life was triggered by the urge to belong and a sense of security. In this process, it has been observed that many people desire to live close to nature and to move from cities to rural environments. Residential living spaces, which are sufficient under normal conditions, started to be insufficient for people who stayed in the residence for a long time during the pandemic, causing users to question their living spaces again. In this context, the necessity of reconsidering and evaluating housing structures has emerged.

One of the most important issues to consider in the context of the Covid-19 pandemic is how public buildings should be designed in the future. In this process, concepts such as social distance, social density, quarantine, and public health have been the direct interest of the phenomenon of architecture. It is unclear how the social life, which was transferred to the digital screen during the pandemic, will be after the pandemic.

During the pandemic, museums started to reach more people digitally; digital tourist travel has increased; activities in the field of digital cultural heritage gained momentum. In addition to these, formal, non-formal, and informal education, which is indispensable for life, has been tried to be constructed and carried out on the screen. However, if the existing physical structures, especially the understanding of use in social, cultural, and educational structures, do not change against the dangers of pandemics that can be considered the new normal, it does not seem possible to create structures that will prevent social distance and related transmission and reduce the risk of infection. Both the understanding of use and the design approach need to be changed. In this context, such structures should be rethought and redesigned in a way that is more flexible than the new normal and other possible pandemic situations, suitable for possible new conditions, observing social distance rules, and reducing/preventing the spread of the pandemic.

The Covid-19 outbreak has revealed that healthcare buildings (hospitals, polyclinics, clinics, health centers, etc.) are not well-prepared structures to prevent virus spread. In all countries where the pandemic was seen, the healthcare buildings were insufficient, and therefore, health workers and patients had a hard time. One of the biggest problems experienced in this area in many countries has been that other patients and Covid-19 patients were kept in the same building and under similar conditions in healthcare buildings that were not designed according to the possible pandemic situation. This situation has revealed that healthcare buildings are spaces that need to be reconsidered, rethought, and designed as structures that can easily adapt to such crises.

With the pandemic, the necessity of rethinking architectural space has emerged. The rapid spread of the epidemic has triggered light carrier systems and modular construction. With these approaches, architectural structures such as hospitals and health centers were built in a short time. In addition, the pandemic period reminded designers that existing architectural structures could be rapidly transformed and reused. In this process, a significant increase has been observed in the reuse of existing structures in a short time in line with new functions and needs. Due to the long construction period of a new building, choosing the way to re-function and use it has contributed to creating a sustainable environment by using existing resources.

In this context, one of the most important questions to be asked is undoubtedly the question: How can self-contained structures be designed in case of possible pandemics, where users can be physically and psychologically safe and healthy? All stakeholders working in the field of architecture should focus on developing more human-centered designs that can quickly adapt to crisis conditions in the future.

2.3. Built Environment in the “Interior Scale” in the Context of the Covid-19 Pandemic

Due to the increasingly unsuitable transformation of the built environment, population density, pollution, and the environmental stresses faced by the Covid-19 virus, people felt safer in their homes, which can be described as the safest place for people after the womb (This inference was interpreted based on the works titled The Poetics of Space (Bachelard, 2013) and A Room of One's Own (Woolf, 2017). Since people stayed at home during the lockdown, they felt the need to change the spatial organization of the house. It was observed that users tried to fit all activities such as office-related activities, children's play activities, and sports-related activities into the existing spaces and organize

the living spaces again. In other words, living spaces, which were sufficient before the pandemic, were not enough for the people who stayed at home for a long time during the pandemic and it caused the users to reorganize their living spaces again.

When the sudden lockdown was launched, millions of people reorganized their residential spaces in several ways. As a result, residential design and lifestyles were affected by this new challenge. Residential spaces, which were used mainly in the evening, have started to host many other daily functions (Signorelli et al., 2020).

The design of the residential buildings needs to adapt to the new normal since Covid-19 will not be the last pandemic (Spennemen, 2021). Architects and city planners need to find solutions for residential spaces that offer more flexibility for the members of the family to work from home, have online classes, be physically active, and have leisure, in addition to their regular activities at home (Signorelli et al., 2020).

In this process, the biggest problems in indoor areas such as housing were also experienced in quarantine centers. Patients or contacts who had to be confined to a single room for 14 to 21 days tried to spend all their vital needs (physical, social, psychological, etc.) in that room. The above-mentioned needs of the patient or possible patient were tried to be met in interior spaces that were not prepared for this purpose. In this context, it is necessary to design health structures and quarantine centers that offer healthier physical environments and meet all the needs of the users against the risk of continuing or any other possible future epidemic scenarios.

There is no doubt that architectural structures such as 'public buildings', 'health buildings', 'educational buildings', 'office buildings', 'shopping centers', 'stations of vehicles such as airports', 'and supermarkets' are among the places that should be discussed in interior design issues besides housing. Interior organizations should also be designed to adapt to the new situation. Before the epidemic, the way of life in the globalizing world had already begun to change its natural course. The concept of 'home office', which was brought to the agenda for the first time in the context of Environmental Psychology Congresses at LUND in 1991, started to become widespread in almost all regions of the world day by day.

In this period, where people spend their time mostly in residential interiors and try to isolate themselves, it is necessary to consider how the above-mentioned architectural structures can be designed to prevent the spread of viruses (antivirus - indoor built environment) by observing social distance and hygiene rules according to the new normal. Also, the question arises: Is there a need for such a wide variety of specialized architectural structures and specialized interiors? In addition, the question of 'how much will traditional spaces be needed for activities such as office activities and educational activities that can fit into the home?' should also be considered.

3. Findings and Discussions for Post-Pandemic Period

Above, the impact of the Covid-19 pandemic on the built environment has been examined in three categories: 'Urban Scale', ‘Architectural Scale', and 'Interior Scale'. The Covid-19 pandemic has taught that design strategies and related theories need to be reviewed. During the process, the following questions should be asked:

• What are the lessons learned from the crisis experienced with this pandemic in terms of the built environment?

• Is this situation a temporary phenomenon or is it the new normal? In both cases, what should be done in terms of the built environment?

• How the anti-virus-built environment can be developed for stopping the spread of the virus, decrease its effects, and possible new pandemics?

In light of all these discussions, the following suggestions can be made in the context of the built environment in the post-pandemic period:

Frumkin (2021) proposed potential long-term implications of Covid-19 for the built environment as infection-safe buildings, working from home instead of the office, re-envisioned streets, changing models of travel, a new appreciation for green space and nature, a shift from cities to exurbs and rural areas (Frumkin, 2021).

On the other hand, Cheshmehzangi (2021) divides possible development changes into two 'Construction development changes' and "Built environment development changes". The built environment should be transformed into low-density low-rise buildings with strong interaction with nature. The neighborhood culture should be revitalized, ensuring that the users can meet almost all their needs in their region.

Many studies published on the subject so far agreed on the significance of increasing outdoor ventilation and ensuring social distancing without specific consideration of the potential impact of mentioned strategies on the other factors of building and users (Taheri & Rider, 2022). Building designs should focus on the structures that provide air control with natural ventilation to create healthy and hygienic environments. Public buildings should be designed in a way that is more flexible against possible crises, observing social distance rules and reducing/preventing the spread of the pandemic.

Steps should be taken towards considering living spaces according to the new normal, developing theories, and designing them, to be more flexible and multi-purpose than the new normal. These suggestions have been developed under three headings as seen in Table 2 in the light of the discussions.

In this study, which is handled within the framework of the global pandemic, clues are presented about the criteria for designing, constructing, and managing built environments. As Megahed and Ghoneim (2020) stated, while strategies for the future are determined and the vision is revealed, it should be done by considering the capabilities of the community and/or society, and the environment (Megahed & Ghoneim, 2020).

In this context, the epidemic emphasized that urban planners and architects should develop more ideas and work on new designs to reshape physical spaces and cope with possible future pandemics. The experiences have given designers many ideas about how cities and architectural structures can change for the better or the worse in the long run. However, it is still too early to predict or even judge how Covid-19 attributed to urban and architectural design theories will affect the relevant fields (Megahed & Ghoneim, 2020).

The findings of the study highlight important issues that emerged within the built environment. Through a critical review of the published studies and observations of user experiences, several key findings have been identified:

- Inadequate adaptability: the built environment has revealed a lack of flexibility to address challenges that emerged with the pandemic. Existing infrastructures and urban planning strategies were not designed with the ability to transform quickly.

- Health and safety concerns: the pandemic highlighted the significance of health measures in the built environment. Insufficient ventilation and overcrowded spaces were identified as risk factors for the spread of the virus.

- Social dynamics and well-being: the pandemic has emphasized the significance of social interaction in the built environment. Spaces that promote physical distancing without sacrificing social interaction become important.

Table 2. Issues revealed in the different scales of the built environment by the pandemic and future recommendations for the post-pandemic period

SCALE	ISSUES REVEALED BY THE PANDEMIC	FUTURE RECOMMENDATIONS FOR THE POST-PANDEMIC PERIOD
URBAN SCALE	Lack of public spaces that fulfill social distancing requirements	Rethinking public structures in a way that is more flexible against possible crises, observing social distance rules, and reducing/preventing the spread of the pandemic
	City density and overcrowding	Designing low-density cities that expand horizontally and ensuring decentralization by revitalizing the neighborhood culture, ensuring that the users can meet almost all their needs in their region.
	Social distancing issue in public transport	Encouraging the use of more cycling and walking
	Lack of parks and green areas in some cities	Urban planning should be reconsidered by focusing on green spaces.
	Lack of equity in the opportunities especially for the overcrowded and poor areas	Urban equity should be provided because overcrowded and poor areas are most affected by COVID-19 since there is a lack of services.
BUILDING SCALE	Public buildings are problematic in the context of concepts such as social distance, social density, and public health	Public buildings should be rethought and redesigned in a way that is more flexible in the new normal and other possible pandemic situations, suitable for possible new conditions, observing social distance rules, and reducing/preventing the spread of the pandemic.
	The necessity of rethinking architectural structures, construction, and structure issues has emerged.	Since regular construction needs too much time. The use of modular construction and lightweight structures is increased. It is possible to build structures such as hospitals and health centers in a short time with lightweight structures.
	The desire to be in nature is discovered during the lockdown.	Low-density and low-rise buildings can be designed with strong interaction with nature.
	Human interaction with nature has been cut off by designing multi-story buildings using artificial lighting and ventilation.	During the pandemic, the desire of users to escape from city life was triggered by the urge of belonging and a sense of security.
	The artificial environment can cause many chronic diseases and allergies. The need to connect with sunlight, natural ventilation, soil, and water has been ignored as a basic human need.	Healthy and hygienic built environments with maximum connection to sunlight, natural ventilation, soil, and water should be created.
	The Covid-19 outbreak has revealed that healthcare buildings are not well-prepared structures to prevent virus spread.	The necessary steps should be taken towards rethinking and redesigning healthcare buildings that can easily adapt in case of crisis.
	The long construction period of a new building in a crisis such as pandemic	Existing buildings can be reused for new functions to contribute to creating a sustainable environment by using existing resources.
INTERIOR SPACE SCALE	Issue of fitting all activities into houses during lockdown	Rethinking “home” in the context of pandemics. Suggesting design principles of housing in the new normal.
	Working from home and the issues revealed	Home-office should be considered as a new paradigm and spaces should be designed accordingly.
	Lack of flexibility and ability to transform in all spaces	Rethinking interior spaces in the concept of flexibility and ability to transform and taking quick steps towards considering living spaces of all sizes according to the new normal, developing theories, and designing them.
	Lack of facilities in quarantine spaces	Quarantine centers that offer healthy physical environments and meet all the needs of users should be designed for future pandemics.

4. Conclusion

The findings of the study highlight the necessity of further questioning the built environment against the current and possible pandemics. No doubt-built environment is important for overcoming this pandemic, as well as for possible pandemics. The most important lesson of this pandemic is the necessity of protecting human existence by designing physical spaces suitable for all possibilities, in line with their needs. While doing this, parallel approaches should be established with 'sustainable design approaches' without affecting natural resources and harming the environment. If this can be achieved, cities and buildings will continue to serve human existence. Without forgetting these experiences, studies on the developing built environment should continue in all dimensions and with relevant stakeholders for possible future scenarios. Important lessons should be learned from the Covid-19 pandemic to keep these events on the agenda and transform life for the better. The future remains uncertain; therefore, there will be a need for stakeholders from different disciplines to work together in the field of urban and architectural design against what may happen in the future.

Designers must have an awareness of possible viruses and possible pandemics on different scales. The designers must define the problems regarding the pandemics and built environment and develop design strategies according to possible needs by learning lessons from the Covid-19 pandemic. For this purpose, in this study, with a holistic perspective, the studies carried out in the field were systematically reviewed. The results of the subject have the potential to shine a light on the future.

The findings have highlighted the significance of creating resilient environments that prevent future pandemics. To achieve this, collaborative efforts of architects, urban planners, and policymakers are required. Future designs should provide flexibility while ensuring functionality. By implementing these recommendations, it is possible to create healthier, safer, and more resilient spaces that can respond to future pandemics and health challenges. Pandemics can be seen as an opportunity to transform the built environment into a more protective and supportive framework for communities.

Acknowledgments and Information Note

The article complies with national and international research and publication ethics. Ethics Committee approval was not required for the study.

Author Contribution and Conflict of Interest Declaration Information

Both authors contributed equally to the article.

References

Alraouf, A. A. (2021). The new normal or the forgotten normal: Contesting COVID-19 impact on contemporary architecture and urbanism, Archnet-IJAR: *International Journal of Architectural Research*, vol. 15, no.1, pp. 167-188.

Ateş, E. & Aksoy, F. (2020). Pandemi ve Tarihçesi, Aile Hekimliği ve COVID-19 Pandemisi, 1. Baskı, Ankara: Türkiye Klinikleri, pp.1-4.

Bachelard, G. (2013). Mekanın Poetikası, İthaki Yayınları, Çevirmen: Alp Tümertekin.

Berg, R. (2020). How will Covid-19 Affect Urban Planning?, Access Address (18.10.2021): https://thecityfix.com/blog/will-covid-19-affect-urban-planning-rogier-van-den-berg

Broo D. G., Lamb K., Ehwi R. J., Parn E., Koronaki A., Makri C. & Zomer, T. (2021). Built environment of Britain in 2040: Scenarios and strategies, *Sustainable Cities and Societies*, vol. 65.

Cheshmehzangi, A. (2021). Revisiting the Built Environment: 10 Potential Development Changes and Paradigm Shifts due to COVID-19", vol. 10, pp. 166-175.

Corbera, E., Anguelovski, I., Honey-Rosés, J. & Ruiz-Mallén, I. (2020). Academia in the time of COVID-19: Developing an ethics of care. *Planning Theory & Practice*, vol. 21, no. 2, pp.191-199, DOI:10.1080/14649357.2020.1757891

Edgars, P. (2020). Smart and sustainable local communities in global Covid-19 pandemic conditions, *Scientific Journal of Latvia University of Life Sciences and Technologies, Landscape Architecture and Art*, vol. 17, no. 17.

Eltarabily, S. & Elgheznawy, D. (2020). Post-pandemic cities – the impact of COVID-19 on cities and urban design, *Architecture Research,* vol. 10 no. 3, pp. 75-84.

Fezi, B. A. (2020). Health engaged architecture in the context of Covid-19", *Journal of Green Building,* vol. 15, no. 2, pp. 185–212.

Frumkin, H. (2021). Covid-19, Built environment and health. *Environmental Health Perspectives*, vol. 129, no. 7.

Guida, C. & Carpentieri, G. (2021). Quality of life in the urban environment and primary health services for the elderly during the Covid-19 pandemic: An application to the city of Milan (Italy), *Cities*, vol. 110.

Haas, M., Faber, R. & Hamersma, M. (2020). How Covid-19 and the Dutch 'Intelligent Lockdown' change activities, work and travel behaviour: Evidence from longitudinal data in the Netherlands, *Transportation Research Interdisciplinary Perspectives*, vol. 6.

Honey-Rosés, J., Anguelovski, I., Chireh, V. K., Daher, C., Konijnendijk van den Bosch, C., Litt, J. S., Mawani, V., McCall, M. K., Orellana, A., Oscilowicz, E. & Sánchez, U. (2020). The Impact of COVID-19 on Public Space: An Early Review of the Emerging Questions – Design, Perceptions and Inequities, *Cities & Health*, vol. 5, no. s1, pp. 263-279, DOI: 10.1080/23748834.2020.1780074

Kelly, C. & Mouritz, L. (2020). The accelerated smart (-ification) of cities post-COVID-19, *Landscape Architecture Frontiers*, vol. 8, no. 5, pp. 180-187.

Maturana B., Salama A. M. & McInneny A. (2021). Architecture, urbanism and health in a post-pandemic virtual world, Archnet-IJAR: *International Journal of Architectural Research*, vol. 15, no:1, pp. 1-9.

Megahed, N. A. & Ghoneim, E. M. (2020). Antivirus-built Environment: Lessons Learned from Covid-19 Pandemic, *Sustainable Cities and Society*, vol. 61.

Nahiduzzaman K. M. & Lai, S. K. (2020). What does the global pandemic COVID-19 teach us? Some reflections, *Journal of Urban Management*, vol. 9, no. 3, pp. 262-263.

Navaratnam, S., Nguyen, K., Selvaranjan, K., Zhang, G., Mendis, P. & Aye, L. (2022). Designing post COVID-19 buildings: Approaches for achieving healthy buildings, *Buildings*, vol.12, no.1, Access Address (12.12.2022): https:// doi.org/10.3390/buildings1201007

Porter, P. F. G. (2021). Modern collective housing of modernity in times of Covid-19. contributions of the housing paradigm, *Arquitecturas Del Sur*, vol. 39, no. 59, pp. 28-43, DOI:10.22320/07196466.2021.39.059.02

Rassia, S. T. (2020). How Architecture Fails in Conditions of Crisis: A Discussion on the Value of Interior Design over the COVID-19 Outbreak, SN Operations Research Forum, SN Operations Research Forum, vol. 1, pp. 1-3., Springer International Publishing.

Sennett, R. (2018). Building and Dwelling: Ethics for the City, Farrar, Straus and Giroux.

Sharifi, A. & Khavarian-Garmsir, A. R. (2020). The Covid-19 pandemic: impacts on the cities and major lessons for urban planning, design and management, *Science of the Total Environment*, vol. 749.

Signorelli, C., Capolongo, S., Alessandro, D. & Fara, G. M. (2020). The Homes in the COVID-19 Era. How Their Use and Values are Changing, Acta Bio Medica: *Atenei Parmensis*, vol. 91, no.9, pp. 92-94.

Spennemen, D. H. (2021). Residential architecture in a post-pandemic world: Implications of Covid-19 for new construction and for adapting heritage buildings, *Journal of Green Building*, vol. 16, no. 1, pp. 199–215.

Spennemen, D. H. (2021). Residential architecture in a post-pandemic world: Implications of Covid-19 for new construction and for adapting heritage buildings, *Journal of Green Building*, vol.16, no. 1.

Taheri, H. & Rider, T. R. (2022). A Review on architectural guidelines to safely reopen buildings in light of COVID-19 in the United States: Establishing Future Research Opportunities, *Architectural Science Review*, vol. 65, no.2, pp. 147-161, DOI: 10.1080/00038628.2022.2038538

Tokazhanov, G., Tleuken, A., Guney, M., Türkyılmaz, A. & Karaca, F. (2022). How is COVID-19 experience transforming sustainability requirements of residential buildings? *A Review, Sustainability*, vol. 12, no.20.

Varlık, N. (2020). The plague that never left: Restoring the second pandemic to Ottoman and Turkish history in the time of Covid-19, *New Perspectives on Turkey*, vol. 63, pp. 176-189.

Woolf, V. (2017). Kendine Ait Bir Oda, İndigo Yayınevi, Çevirmen: Ezgi Taboğlu Özkülahçı.

World Health Organization (WHO). (2021). Coronavirus Disease (COVID-19) Pandemic, Access Address (01.02.2021): https://www.who.int/