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# How house's condition and facilities can reduce mental health problem, learn from COVID-19 pandemic: A systematic review

Andi Prasetiyo Wibowo[1*], Ainul Mardiah[2]
[1]Department of Architecture, Universitas Atma Jaya Yogyakarta, Sleman – D.I. Yogyakarta, Indonesia; andi.prasetiyo@uajy.ac.id (A.P.W.).
[2]Faculty of Psychology, Universitas Mercu Buana, Jakarta, Indonesia.

**Abstract:** This study examines the mental health implications of the COVID-19 pandemic and the impact of lockdown measures on domestic amenities, daily routines, and overall well-being. It further explores how the home environment can mitigate these adverse effects. A systematic review was conducted using the SCOPUS database, analyzing relevant publications up to February 2022. The findings were synthesized using a narrative review methodology to assess the relationship between lockdown measures, mental health, and the role of the home environment. The analysis indicates that lockdown measures significantly influence mental health, exacerbating stress, anxiety, and disruptions to daily life. However, a well-designed home environment can serve as a protective factor, mitigating these negative effects. Access to green spaces, areas for physical activity, and adaptable living spaces contribute positively to mental well-being. Furthermore, the role of technology in maintaining communication and providing entertainment proved essential in reducing feelings of isolation. The findings highlight the critical role of residential environments in supporting mental health during prolonged lockdowns. Homes that accommodate essential activities and provide access to restorative spaces can alleviate the psychological burden of restrictive measures. These insights underscore the importance of designing living spaces that enhance psychological resilience. Urban planners, architects, and policymakers should prioritize residential designs that incorporate green areas, flexible spaces, and digital connectivity to support mental well-being during future crises.

***Keywords:*** *COVID-19, Home, House, Lockdown, Mental Health.*

## 1. Introduction

The pandemic caused by the spread of the COVID-19 virus has had many effects on the lives of human beings. From research that has been done by Atalan [1] the policy to impose a lockdown is indicated to be able to reduce the spread of COVID-19 [1] however it affects the level of boredom for its residents [2]. Lockdown limited people's access to and from homes, schools, offices and other public places. Lockdown will have impacts on the mental health, such as anxiety and depression [3] and health such as dietary practice [4], unhealthy physical habits such as developing a sedentary lifestyle and spending more time with their gadgets [5].

Beside other effects of COVID 19 and it's restriction, report showed an increase of energy consumption [6-8]. The rise in energy consumption within residential settings can be primarily attributed to various factors such as cooking, entertainment, heating/cooling, and lighting [9]. This rise in consumption can be attributed to the growing number of activities conducted within households. In addition, while one of the most significant factors in the spread of the COVID virus is through the air [10] which will become more restricted as the number of household activities increases. Therefore, good management of air circulation in buildings and increasing the intensity of exchange with air from


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* Correspondence: andi.prasetiyo@uajy.ac.id

outside the building are believed to be able to minimise virus transmission [11]. A systematic review conducted by the WHO showed that overcrowding of houses has an impact on mental health including stress, and sleep disorders [12].

The objective of this study is to provide an overview of extant literature regarding residential living circumstances and facilities during periods of lockdown, and their capacity to mitigate psychological distress. The results of this study will provide valuable insights into the ways in which residential settings can be enhanced to foster psychological wellness. This information can be used to guide the decisions of policymakers, urban planners, and mental health practitioners in the development of supportive living spaces in the event of future lockdowns or comparable crises.

## 2. Material and Methods

*2.1. Sources Collection*

The literature review study utilised the SCOPUS database to search relevant articles comprehensively. Scopus is a scholarly journal database consist of peer-reviewed articles. The article search process involves four keywords using the key string: covid AND "mental health" AND lockdown AND (house OR home). Inclusion criteria are published between 2021-2022, articles discuss about house and the impact on mental health during COVID 19, and articles written in English. The search is limited and chooses English-language articles only. Data was collected on 25 February 2022. Figure 1 shows the stages of the data extraction process.

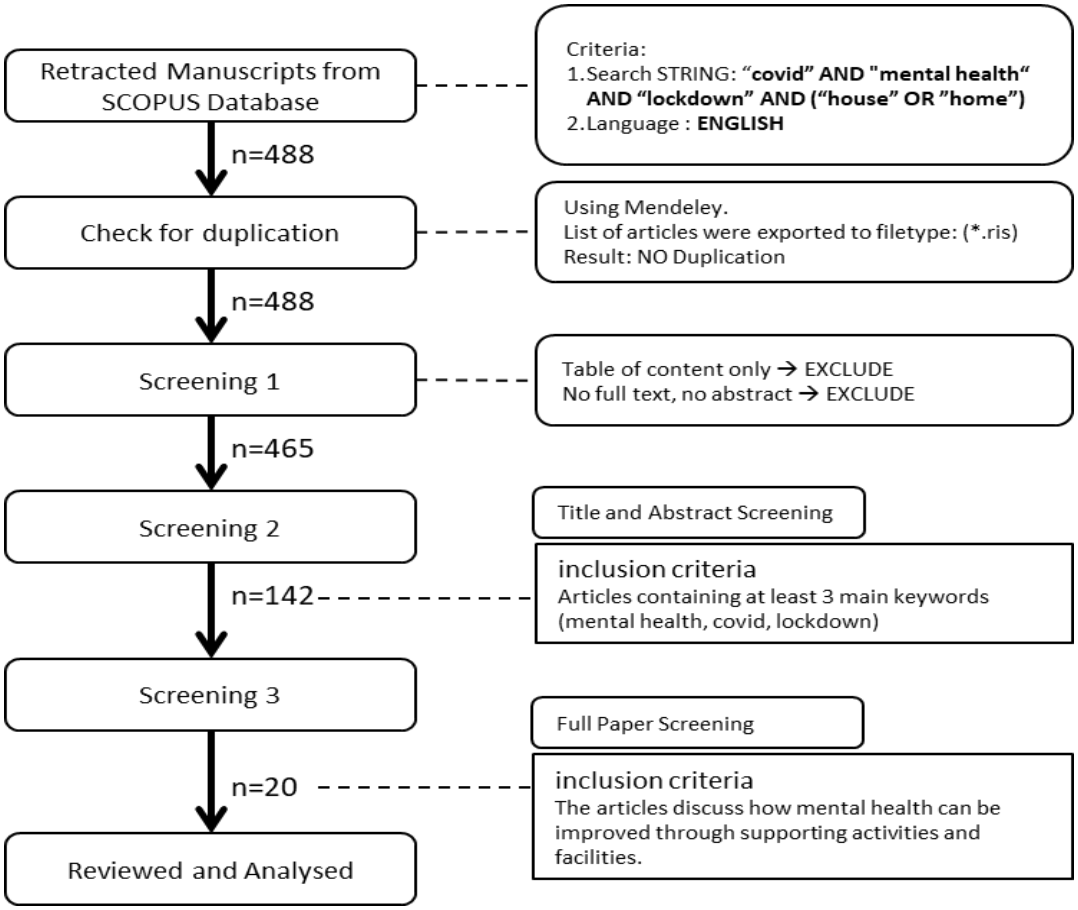


**Figure 1.**
The steps taken to locate relevant sources and select those that used in the research.

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## 3. Results and Discussions

The present study involved a comprehensive review of 21 articles to provide a comprehensive understanding of the impact of COVID-induced lockdown measures on the mental health of individuals residing in their homes, and the facilities that aim to mitigate the adverse effects on mental health. The following discussion will initially explain the effects of lockdown during COVID-19 on mental health. Then, the architectural perspective will categorise the various housing amenities that facilitate the psychological well-being during the confinement.

### *3.1. Mental health during lockdown*

Lockdown during COVID 19 affected different populations. An experiment study conducted in 12 Singaporean showed that decline in cognitive ability related to reduced physical activity and increased screen time that could affect mood and cognitive dysfunction [13]. Another study conducted revealed that individuals reported experiencing distressing circumstances, such as social isolation, financial strain, anxiety, and fear of transmitting the infection to others [14]. A preliminary investigation conducted in Spain involving a sample of 93 individuals diagnosed with dementia revealed that those residing alone reported higher levels of negative affect and experienced more difficulties with sleep in comparison to their counterparts who lived with family members [15]. A study conducted in Spain examined a sample of 310 respondents and found that moderate levels of well-being were associated with various protective factors, including social support and self-efficacy [16].

Lockdown also affected workers. A research done by Torresin, et al. [17] indicated that increasing number of hostility in employee because of difficulty maintaining a healthy work-life balance (conflicts between caring for family members and work schedules), work-related issues (such as the lack of workplace technology support), and boredom due to the repetitive routine of daily living. This not mentioning the teachers who experienced workload distress during covid-19 [18] and students at the university whose work performance deteriorated at home were four times more likely to reported being depressed [19]. However, a cross sectional study done in 385 caregivers of children in UK and Portugal revealed that participants experience post-traumatic growth [20]. A survey in 432 working parents in Italy showed that three factors have an impact on mental health, parental efficacy and job satisfaction during lockdown which are living conditions (e.g., designated workspace), housework responsibilities (e.g., children needs different based on age), and balancing work and parental identities [21].

Lockdown also affected mental health in women and children. A survey on 8177 in Italy showed that women are more likely than men to experience depressive symptoms, anxiety, insomnia, and impulsivity during lockdown [22]. Similarly, mothers with young children experienced disconnection from their surroundings, including boredom, loneliness, poor health, and a lack of social support [23]. Another study found that younger children exhibit lower levels of behavioural and emotional functioning, such as arguing with parents and being easily agitated, as well as experiencing more school-related difficulties, such as being easily distracted and expressing concerns about their academic performance, compared to adolescents in the context of lockdown measures [24].

Research has indicated that various factors contribute to enhancing an individual's mental well-being amidst the COVID-19 pandemic, including the availability of urban spaces and engagement in gardening as a recreational pursuit. Research from Maury in 2022 revealed that people in Spain who newly access UGS (Urban Green Spaces) less anxiety and consume less tobacco products compared to people who continued to access Urban Green Spaces (UGS) before and during lockdown and people that stopped accessing UGS consecutively [25]. However, other aspects has increased such as headache, restlessness, lack of motivation, eating and sleep problems, anger, depression, social withdrawal [25]. Other study in Spain and Portugal showed that access either to public natural space and private indoor green space could decrease stress and other related mental health problems [26]. Similarly, residents in La Palma (Canary Islands) and Zaragoza (Peninsular Spain) who have areas with Green Infrastructure (GI) reported lower levels of stress, anger, medication, and alcohol use during covid19 [27]. Likewise, nature therapy was found to be more effective in treating stress, anxiety, and depression after a case-by-

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case analysis of the treatment of these conditions was conducted [28]. Besides access to green spaces, gardening has been found to reduce levels of psychopathological distress, which can be attributed to decreased distress related to the Covid-19 pandemic.

The practice of home gardening has been found to have beneficial impacts on the well-being of individuals within the age range of 18 to 70 years old, such as experiencing relief from stress, anxiety, and boredom, feeling motivated, experiencing a sense of hope and purpose, and a sense of accomplishment [29]. Similarly, senior citizens residing in Scotland who allocated more time to gardening during the COVID-19 lockdown exhibited notably enhanced physical health, emotional and mental wellbeing, and sleep quality in comparison to their pre-lockdown state [30]. The findings indicate that the impact of garden-related activities on individuals' wellbeing during the pandemic may be more closely linked to the duration of time spent in the garden, rather than the specific nature of the activity (i.e. gardening versus relaxation) [30]. Those findings being supported by other study that mentioned individuals who either maintained or increased their levels of leisure engagement during the COVID-19 pandemic exhibited higher levels of well-being [31].

*3.2. Mental Health and Housing*

Housing is a basic need that can have a significant impact on an individual's mental health and well-being. There is a strong relationship between housing and mental health, especially during COVID-19 lockdown. The presence of clinical symptoms is increased when one resides in a dwelling that is on the smaller side [24]. Boosting the immune system is crucial during such periods for confined people and especially for confined athletes [32]. Moreover, housing conditions can be one of the contextual factors for parents who are working from home during the strict lockdown [21]. Adequate housing can provide a sense of security, privacy, and safety, which can contribute to good mental health [33].

On the other hand, poor-quality housing or a lack of stable housing can lead to stress, anxiety, and other mental health issues. Inadequate or unstable housing can also have negative impacts on physical health. For example, living in a damp or poorly-ventilated home can increase the risk of respiratory issues, which can have a negative impact on mental health. In addition, a higher PHQ-9 score for depression was seen in those with a living space of less than 30 square metres [34]. Additionally, homelessness or the threat of homelessness like the migrant workers while staying in the shelter home during lockdown, can be a major source of stress and can have a profound impact on an individual's mental health [35]. It can be difficult to maintain good mental health when one is constantly worried about where they will sleep at night or how they will meet their basic needs. In the other hand, bigger house (>100m2) can provide better and higher level of well-being [16].

Overall, in order to maintain good mental health, individuals must have access to stable, safe, and adequate housing. Living conditions may become more restricted than usual during the lockdown. This can have an impact on a person's mental health because they may feel isolated or deprived of access to activities they are accustomed to doing outside of the home. They may also be stressed because they must manage work and family in the same household. Among males compared with females, a poor housing quality showed a stronger positive association with depressive symptoms and impulsivity [22]. Unhealthy or unpleasant living conditions can also have an impact on mental health. If the home does not provide adequate privacy, or if there are issues with amenities such as water or electricity, this can increase stress and impair mental well-being. Furthermore, if a person feels as if they have no space to breathe or plan activities at home, this can have an impact on mental health. They may feel pressured or constrained by an overly restrictive home. It is critical that people try to manage stress and create activity plans that allow them to feel connected to the world outside their home in order to maintain mental health during lockdown. They must also ensure that their living arrangements meet their basic needs and provide adequate privacy.

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**Table 1.**
The summary of analysis and review from selected works of literature.

| Author and Year | Number of respondents and country of origin | Research Method | Main Findings |
|---|---|---|---|
| Amerio, et al. [19] | 8177 students in Italy | web-based survey | Mental health: students at the university whose work performance deteriorated at home were four times more likely to report being depressed.<br>House, amenities and mental health: Visiting parks and green spaces is essential for physical and mental health |
| Amerio, et al. [22] | 8177 students in Italy | web-based survey | Mental health: depressive and anxiety symptoms<br><br>House, amenities and mental health: a poor housing quality showed a stronger positive association with depressive symptoms and impulsivity. |
| Aperribai, et al. [18] | 345 teachers in Spain | online survey | Mental health: teachers experienced workload distress during covid-19<br>House, amenities and mental health: home physical activity should be encouraged |
| Armstrong and Ross [23] | 10 parents in United Kingdom | interview | Mental health: mothers with young children experienced disconnection from their surroundings, including boredom, loneliness, poor health, and a lack of social support<br>House, amenities and mental health: facilitating creative activities together among family members |
| Corley, et al. [30] | 171 individuals Lothian Birth Cohort 1936 in UK | online survey | Mental health: allocated more time to gardening during the COVID-19 lockdown exhibited notably enhanced physical health, emotional and mental wellbeing, and sleep quality<br>House, amenities and mental health: House shoul facilitating garden-related activities |
| Goodman-Casanova, et al. [15] | 93 participants in Spain | A telephone-based survey | Mental health: those with mild dementia who lived alone reported more distress and more trouble sleeping<br>House, amenities and mental health: ensuring social connectivity through the use of technology |
| Jato-Espino, et al. [27] | Unreported participants of study in La Palma and Zaragoza, Spain | Case studies | Mental health: residents in areas with green infrastructure reported lower levels of stress, anger, medication, and alcohol use during covid19<br>House, amenities and mental health: house has access to green infrastructure |
| Lupton and Lewis [14] | 5 participants in Australia | Case study | Mental health: participants described distressing and incapacitating bodily sensations, including being watched, depression, vulnerability, isolation, stress, anxiety, fear, boredom, difficulty relaxing and sleeping, and difficulty concentrating<br>House, amenities and mental health: the space of the home (especially therapeutic room); contact with a small number of intimate others; online therapeutic care; practising self-care skills learnt from<br>previous difficult times; helping and supporting others; engaging in leisure activities; and the companionship of<br>pets. |
| Manzi, et al. [21] | 432 parents in Italy | Survey | Mental health: the integration of one's status as a |

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| | | | worker and parent has the potential to enhance parental effectiveness, job satisfaction, and reduce the likelihood of experiencing stress.<br>House, amenities and mental health: the environment in which they reside can impact an individual's mental health |
| Matalí-Costa and Camprodon-Rosanas [24] | 850 parents of young people (4 - 18 years old) in Spain | online survey | Mental health: younger children exhibit lower levels of behavioural and emotional functioning, such as arguing with parents and being easily agitated<br>House, amenities and mental health: having clinical symptoms is more likely if you live in a small home. |
| Maury-Mora, et al. [25] | 132 respondents in Spain | online survey | Mental health: anxiety of people who newly accessed UGS (Urban Green Spaces) during lockdown was reduced, when compared to people who stopped accessing or people who continued to access UGS before and during lockdown.<br>House, amenities and mental health: the house should feature as much greenery as possible. |
| Morse, et al. [31] | 3,827 participants from 74 countries | online survey | Mental health: individuals who either maintained or increased their levels of leisure engagement during the COVID-19 pandemic exhibited higher levels of well-being.<br>House, amenities and mental health: the home should have area for leisure activities |
| Olszewska-Guizzo, et al. [13] | 12 participants in Singapore | Non-randomised study | Mental health: the decline in cognitive abilities observed during the lockdown period can be linked to significant alterations in daily routines resulting from extended stay-at-home directives<br>House, amenities and mental health: green scenes in cities also can help counteract the negative effects on the brain and mind |
| Ribeiro, et al. [26] | 3157 participants (1638 from Portugal, 1519 from Spain) | online survey | Mental health: individuals who maintained or increased their utilisation of public natural spaces during the lockdown experienced lower levels of stress<br>House, amenities and mental health: gardening activities at home |
| Sánchez-Teruel*, et al. [16] | 310 respondents in Spain | online survey | Mental health: well-being and improving the factors that go along with it (resilience, social support, and self-efficacy) may protect the mental health of carers during the COVID-19 pandemic.<br>House, amenities and mental health: living in a bigger house (>100 m2) would best explain a higher level of well-being. Moreover, better places to live improve the health of family carers, which will give them more chances to rest and more space to do so. |
| Stallard, et al. [20] | 385 caregivers (Portuguese, n = 185; UK, n = 200) | online survey | Mental health: caregivers of children aged 6-16 years' experience post-traumatic growth<br>House, amenities and mental health: lower rates of posttraumatic development were observed among those who maintained or increased their use of public natural spaces during the lockdown |
| Rajoo, et al. [28] | 30 participants in Malaysia | Randomised study | Mental health: upon conducting a case-by-case analysis of the treatment of symptoms of stress, anxiety, and depression, nature therapy exhibited greater efficacy in addressing mental health concerns.<br>House, amenities and mental health: house that |

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| | | | support nature therapy |
| Sunga and Advincula [29] | 104 participants in Philippine | Online qualitative survey | Mental health: the practice of home gardening has been found to have beneficial impacts on the well-being of individuals within the age range of 18 to 70 years old. They were experiencing relief from stress, anxiety, and boredom, feeling motivated, experiencing a sense of hope and purpose, and a sense of accomplishment.<br>House, amenities and mental health: home gardening activity |
| Theodorou, et al. [36] | 303 participants in Italy | online survey | Mental health: the practice of gardening has been found to reduce levels of psychopathological distress<br>House, amenities and mental health: gardening at home |
| Torresin, et al. [17] | 21 employees in Hungary | Case study | Mental health: restriction on social interaction leads to boredom<br>House, amenities and mental health: comfortable indoor soundscapes relate to better mental health |

*3.3. Create Pleasurable Places at Home*

A lockdown is an emergency response protocol that can be activated in schools, businesses and other public places. Therefore, during a lockdown, all occupants must remain in their designated area and refrain from leaving the premises until the emergency is over. While having a living space of less than 30 square metres has been linked to an increase in depressive symptoms (PHQ-9 score) [34]. In this case, people favoured places with couches, beds, and opportunities for socialisation among their fellow residents as places to relax and unwind. In addition, the improvements in parent and child happiness have been linked to their participation in fun, creative activities together [23] making it important to have a home that facilitates these kinds of interactions.

As well as scenery, sound has a psychological impact on people. Comfortable indoor soundscapes relate to better mental health [17]. Similarly, self-rated health can be improved during times of social distancing through the use of positive indoor soundscape and restorative quality [37]. Birdsong, wind, and water are all examples of natural sounds that can be incorporated into an indoor soundscape to create a positive environment. They may also consist of things like soundproofing, sound masking, and acoustic treatments to lessen the impact of ambient noise. Creating a pleasant space at home during lockdown can help enhance productivity and harness creativity. It is necessary to have pleasurable spaces at home during lockdown.

*3.4. Hobby and Activity – Physical Activity*

Physical activity has been found to have a positive impact on mental health, as it reduces stress and improves mood. Physical activity has also been shown to enhance self-esteem and cognitive function. Regular exercise can reduce symptoms of depression and anxiety, as well as serve as a stress-relieving outlet. Energising and productive activities include walking, running, and cycling. In addition, activities such as yoga are actively pursued to reduce anxiety and stress, so that improved sleep may have a positive effect on immunity [38].

To prevent future health issues from pandemics like COVID-19, home physical activity should be encouraged [18]. In addition, there is a positive correlation between regular physical activity and the consumption of fruit, fish, and vegetables, which is beneficial to the health of the body as a whole [39]. Sports activities that are performed at home are an option that can be taken to maintain fitness and at the same time reduce stress levels when there is a ban on gatherings and doing activities outside the home, even for seniors [40]. Of course, exercising at home will present numerous challenges, especially if space and equipment are limited. As a result, it is best to stick to activities that require little preparation or special equipment. When working out at home, accessible and efficient exercise methods

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are more important than expensive home gym equipment [41]. As social isolation is vigorously promoted, it should be equally important to promote and recommend home-based exercise during the lockdown [42]. Having a designated space indoors for physical activity, exercise and home-based sports is a good idea that should be taken into account to foresee potential negative effects on deteriorating mental health during lockdown.

*3.5. Hobby and Activity – Garden (Green Space)*

During the COVID-19 pandemic, domestic gardens could be a potential health resource [30]. This is due to the fact that the presence of GI (Green Infrastructure) will create a sense of relief. This sense of relief is derived from having visual contact with vegetated landscapes [27]. Even for residents who exhibit symptoms of ADHD, the presence of a garden can compensate to lessen the detrimental effects of the lockdown [43].

Engaging in hobbies and enjoyable activities at home is a great way to maintain our mental health. This kind of enjoyable activity is beneficial for maintaining fitness and combating boredom. Additionally, hobbies like gardening, cooking, and crafting can keep us occupied and reduce stress and anxiety. People enjoy gardening because it allows them to connect with nature in their backyards that are associated with lower stress levels [26] . Gardening activities have been identified as a potentially effective tool for mitigating the mental health consequences of forced home confinement because gardening is associated with lower psychopathological distress [36] and other benefits include stress relief and improved mood [29].

Green areas, such as parks, have been shown to have a positive effect on mental health, as they provide both direct and indirect access to nature. Visiting parks and green spaces is essential for physical and mental health [44]. Lower rates of posttraumatic development were observed among those who maintained or increased their use of public natural spaces during the lockdown [20]. Green scenes in cities also can help counteract the negative effects on the brain and mind that come with living in a busy city after a pandemic [13]. However, the lockdown could severely limit the ability to participate in such pursuits, especially if there is a plan on going to a public park. Many people find it challenging to stay physically active when they are confined to an indoor environment because parks, trails, and open green spaces are closed. The situation is made worse for those who are more vulnerable to harm because they cannot access green space. Because nature therapy was found to be more effective than exercise therapy in treating mental health issues [28] bringing nature into the home is an important concept to consider. Even though there is no substitute for a variety of outdoor green experiences, people who interacted with green spaces on a daily basis were better able to cope with stress than those who did not [25]. Therefore, the home should feature as much greenery as possible.

*3.6. Technology for Better Life*

Technological developments like high-speed internet, cloud storage, and video conferencing bring changes in the way people work. Especially in the recent global pandemic, in which this condition has profoundly impacted how people work, with many of them having to work from home. The ability to work remotely has enabled many advantages, including cost savings associated with reduced commute times and the elimination of the need for costly office space. However, it also has its drawbacks, such as the inability to strike a healthy work-life balance, feelings of isolation, and a lack of the social interaction that comes with working in an office setting. For this reason, a proactive approach to work-life imbalance, workloads, and teleworking will enable employers to ensure teleworking is as positive as possible for their workforce [45].

The application of technology is a solution to several problems that arise as a result of restrictions on direct social interaction between humans. The feeling of loneliness that arises, especially for students who live alone due to the isolation program, can be anticipated by creating new means of communication. Ensuring social connectivity through the use of technology is recommended way to tackle that problem [15]. To mitigate the negative effects of lockdowns, therapeutic care can now be

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provided online, thanks to the proliferation of high-speed networks and cutting-edge communication tools [14]. The online wellness coaching method also turns out to be able to improve the ability to cope with stress, and improve positivity and well-being [46]. However, with the IA (Internet Addiction) trend, it is necessary to have proper control and supervision from parents to minimise internet use in children, especially internet use which is related and aims for entertainment.

There is no doubt that technology has become an integral part of our lives. In many ways, technology can make our lives easier. It has enabled us to automate routine tasks and quickly and easily access information. It has also made it possible for us to collaborate more effectively and work more flexibly and remotely. Additionally, it has allowed us to communicate and share information more efficiently than ever before. The development of technology in the entertainment sectors when used wisely will also help increase feelings of comfort and relaxation. However, it is critical to remember that technology is not a replacement for human intelligence and judgement, and that technology should be used responsibly and productively.

## 4. Conclusions

A house is crucial for health immunity and wellbeing. The role of the house is becoming more essential in containing the Covid-19 virus during the pandemic. During the lockdown, someone must remain at home for a prolonged period of time. Therefore, the home must offer sufficient amenities for a person's physical and mental well-being. One way to strengthen immunity at home is to keep things clean. To maintain health, a number of amenities are also required at home, including hygienic food storage areas, comfortable bedrooms, and clean bathrooms. In order to prevent contaminated air from entering the house, a good ventilation system is also required. To maintain mental health, the home must offer a cosy and unwinding setting.

From this study, several things can be concluded.

1. Committing in physical activities is a widely implemented and efficacious approach to mitigate adverse outcomes linked to mental health.
2. One strategy for fostering a comfortable living environment is to offer a comfortable sleeping area, a favourable indoor acoustic environment, and the opportunity to observe natural surroundings from within the home.
3. Engaging in pleasurable activities during periods of lockdown may have a beneficial impact on mitigating the negative effects of mental health decline that may arise as a result of prolonged confinement. Gardening activities, which have been subject to scrutiny in prior scholarly literature, are encompassed within this scope.
4. Technological infrastructure, such as internet networks, is indispensable and holds significant value, not only for facilitating communication with external parties, but also for serving as a platform for therapeutic and consultative purposes. Furthermore, individuals are capable of conducting their academic and professional obligations through remote learning and telecommuting. The utilisation of the internet for recreational purposes is feasible; however, it is imperative to restrict its usage due to the potential of screen illumination to elicit stress.

## Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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