Open space preference and adaption in creating safe environment in Banda Aceh, Indonesia

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Abstract. Open space has a vast benefit on human well-being and, at the same time serving environmental function. However, COVID 19 pandemics have shifted the pattern of open spaces visitation. This study aims to study visitation patterns to open spaces, evaluate facilities and management of open spaces to ensure visitors' safety, and explore the COVID adaptive open space models in Banda Aceh during pandemics. This study is mixed-methods research that integrates both quantitative and qualitative data collection and analysis. The participants of this study are the doctors and nurses that worked in the COVID-19 ward in a general hospital in Banda Aceh. These participants were selected because they have sufficient knowledge of COVID-19 and have adapted their lifestyle after working at these special wards. The result shows shifting perceptions and preferences of respondents towards open spaces and the challenge of open space management adaptation during the COVID 19 situations. This paper also explores the safe open space model derived from the research result.

1. Introduction
Since the COVID-19 pandemics hit globally, governments in most countries have imposed restrictions on activity outside the house for their citizens. This pandemic has caused humans to reduce their interaction by cutting down their activities outside the house, such as offices, schools, and malls. The restriction also impacts the cut of open space visitation. In Banda Aceh, the government closed some public open spaces since the early pandemics [1]. However, there are still several open spaces that do their business as usual and receive many visitations.

Open space can be defined as the area outside the building, either natural or man-made. In Indonesian law, open spaces are defined as corridors and/or clustered areas, used more openly, where plants grow naturally or are intentionally planted [2]. The function of open space is for recreation, social interaction, and nature conservation [3], creating the area's character, supporting the citizen economy, acting as a cultural appreciation space. If having an abundance of greeneries can function in climate amelioration [4]. The quality of open space is also correlated to its citizen's quality of life [5]. Furthermore, open space also plays an essential role in sustaining human physical and mental health and well-being [6]-[7].

During the pandemics, there are changes in the pattern of open space visitation around the globe [7]-[8]-[9]-[10]-[11]. The changes include frequency, preference, and strategies of the visitors in accessing open space. On the other hand, many changes also happen in open spaces management, including adaptation on activities, amenities, and maintenance [12]-[13]-[14]. The changes are made to lower the risk of COVID-19 during open space visitation.

This paper aims to study the preferences and patterns toward open space visitation, evaluate the management of open space to face the challenge of the COVID-19 situation, and explore the COVID adaptive open spaces model in Banda Aceh to ensure visitor safety.
2. Methodology
This study is mixed-methods research that integrates both quantitative and qualitative data collection and analysis. The participants of this study are the doctors and nurses that worked in the COVID-19 wards in a general hospital in Banda Aceh. These participants were selected because they have sufficient knowledge of COVID-19 and have adapted their lifestyle after working at these special wards.

The first phase is quantitative research by designing an online questionnaire-based survey using google forms shared with respondents. There are 20 questions consist of open and closed-ended questions. From the first phase, 65 respondents have filled the questionnaire in a week. The results of this phase are statistical in tables and graphs.

The qualitative method of this research is semi-structured phone-based interviews collected from 11 random respondents that have filled the google form. This second phase explores their preferences and adaptation strategies in accessing the open space during the COVID-19 pandemic, including their observation of open spaces' facilities and management. The interviews protocol was prepared for each respondent based on their answer from the first phase. The data from interview transcripts are analyzed, synthesized, and interpreted with the help of MAXQDA-11 software. The codings that applied in these analyses were prepared to identify the themes and patterns from this phase.

The final method that was applied in this research is observation. The observation was carried out at the open space that appears during the first and second phases. The observation included visiting the open space to check the facilities and management of these open spaces.

3. Results and discussion
3.1. Frequency of visitation
The frequency of visitation is the number of visitations during pandemics compared to before pandemics. From the survey, it is known that 89% of respondents kept visiting open spaces during the pandemic. However, over half of respondents (57%) decreased their visitation frequencies. Some reasons why respondents keep visiting open spaces are because they feel bored staying at home for a long time and feel the need for recreation to reduce pressure from work and the COVID situation. They also want to entertain their children who suffer home lockdown and have quality time with their families. Some respondents mentioned that going outside can also bring happiness that can boost self-immunity. The others are still visiting open spaces, especially sports grounds, to keep fit and healthy.

Concerns over the virus transmission in open spaces remain the main reason for the visitation cut. Most respondents acknowledge the risk of being exposed to other people, even in open spaces. Even the COVID rules have been applied outdoors, such as wearing the mask, they realized that the risk remains. The respondents also cut outdoor visitation because they worried that several visitors do not comply with the COVID rules. Moreover, some have personal considerations; having children and high-risk family members at home, such elderly who has comorbid.
Most children are likely to refuse to wear masks, making them vulnerable when spent time in outdoor public spaces. The respondents also realize their work as health workers are risky, and they do not want to be the ones who spread the virus when spending time in open spaces. The worries shared by the respondent in visiting open spaces have similarities with the study conducting in New York [8]. 42% of respondents maintain their frequency of open space visitation. They mentioned that spending time in open space is their routine, so they continue the habit even in the pandemic. The easy and close access to open space from home is also a reason for keeping the routine.

3.2. Choices of open space
Choice of open space depicted the preference of open space type and location respondent visit during the pandemic. Figure 2 shows the top open spaces choices during pandemics: beaches, sports grounds, and parks. The beach mentioned were Uleheu, Syiah Kuala, Gampong Jawa, Alue Naga, Lhoknga, Lampuuk, Lhokseudu, Pasir Putih, and Lhok Mata Ie, while Blang Padang was mostly chosen sports ground after USK campus sportsground. The park mentioned are Taman Safiatuddin, Taman Sari/Bustanussalatin, and Taman Ulelhue. Other mentioned mountainous areas such as Geurutee and Bukit Suharto.

![Figure 2. Preferred open spaces by the respondent during pandemics.](image)

During the pandemic, respondents prefer open spaces that are not crowded and relatively empty. Spaciousness is an essential parameter to ensure a safe distance can be kept. Respondents tend to choose open spaces with the natural setting because it provides fresh air, good air circulation, green quality, and good views. The open space that managed to comply with the strict COVID rules is more favorable. The completeness of open space facilities, such as seating facilities, also becomes considerations of choice. The open space that offers a variety of activities for children is also preferred.

From the interview, the distance to reach the open spaces is not the primary consideration. Some respondents choose the short-distance open space while others choose a distant location, such as beaches at the outskirts of Banda Aceh. This finding is similar to European people's willingness to travel far away to get quality open space during pandemics [10]. The choices are more depends on the respondent's perspective of safer open space. Some assumed further open space would have fewer visitors.

Beaches are the most preferred natural open space among respondents. Some of the reasons are that the beaches offer better air circulation, better views, and soothing effects. Several researchers found that some aquatic environments quality can promote mental health for people [15], which is needed during a stressful situation, like a pandemic. There are also beliefs among respondents that warm air on the beach could lower the spread of the virus, and bathing in seawater can heal COVID-19. However, scientifically, the effect of weather on virus spreading is still debatable and needs extended researches[16]-[17]-[18], while there is no scientific proof on the effect of seawater for COVID recovery. Respondent also chose beaches because of their geographical background. Most Acehnese, who live near the coastal area, have an emotional attachment to the beaches. This reason may relate to
many respondents who live near coastal Aceh like Banda Aceh and Aceh Besar, where access to the beach is straightforward.

Sportground is the second-highest choice of open spaces. Respondents choose sportgrounds for health and fitness motives. In this research, most respondents mentioned Blang Padang as the reference. Some respondents continue to visit sports grounds as the continuation of their habits before pandemics.

Urban park/community park is the third top choice. However, since early pandemics, the local government of Banda Aceh closed all tourism spots and public parks they managed [1]. Gated public parks such as Hutan Kota Tibang, Putroe Phang, and Hutan Kota Peulanggahan shut the entrance. Nevertheless, there is no clear entering prohibition sign for another public park with no fences and gates. Most public parks that respondents visited are designed with open layouts so people can still enter the park.

3.3. Going with whom and when
The decision on going with whom and the time to visit the urban space is the strategy visitors consider during pandemics. From figure 3, it can be seen that most of the respondents usually visit open spaces with their nuclear family or close relatives. The respondents feel confident going with their family because they know their family member’s health conditions. In stressful situations, spending quality time with family is also a good relief for most respondents. On the other hand, they confessed that during the pandemic, they rarely went out with friends. The open space visitation during pandemics decreased the social function aspects [7].

![Figures 3. Charts on open space visitation during pandemics.](image)

From the interview, it is known that respondents have their strategies to avoid crowded open spaces. Some mentioned that they do not go to open spaces in usual times, such as on weekends. They changed their visitation time on weekdays or in the early morning when there were still limited people in that open space. Respondent also mentions that Friday is an excellent time to avoid many people because the Acehnese rarely arrange leisure activities on Friday due to the obligation of men doing Friday prayer in the afternoon. This strategy is also encouraged by open space agencies in some countries by adjusting the open hours for visitation[14].

3.4. Activities in open spaces
During the pandemics, activities in open spaces are not very different from before. Most respondents are doing leisure activities, such as sightseeing, eating, relaxing, and enjoying the spaces’ quality. On the beaches, visitors do a picnic, sea bathing, and playing with family. On the other natural open space, such as mountain areas, they go camping, biking, and enjoying views. On the sports ground, they are jogging, exercise, and do various sports.

Most activities during pandemics are recreational and sports. The finding also shows the similar activities preferred by European in open space during pandemics [10]. It is reasonable because both
activities are suitable done by an individual or small group of people. Furthermore, during the pandemic's peak, respondents noticed that some usual activities were restricted in specific open spaces, for example, in Blang Padang, where the food court, Sunday market, and playground are closed, limiting activities' choices.

3.5. Judgement of safety
Judgment of safety discusses the respondents' perception of open space safety. Figure 4 shows that about half of the respondents consider visiting open spaces in a pandemic situation safe, while the other half feel unsafe. However, most of the respondents perceived that open spaces are safer than indoor spaces.

![Figure 4. Perception of open space safety during pandemics.](image)

Respondent assesses the safety differently, even for the same location. In the case of Blang Padang, some think Blang Padang is a safe open space because it has a screening post at its entrance gate. On the other hand, some consider it unsafe because some runners or joggers take off their masks while jogging or running. Some respondents perceived that the beaches are safe due to their spacious quality. However, some still feel insecure about their beach experience because there is no screening at the entrance, and they cannot maintain a safe distance while bathing. It seems that the respondent's judgment of safety measures of open space is varied and relative. It depends on their knowledge, habit, and experiences, personal condition, and preferences.

Some have conflicted feelings about visiting open spaces. However, a study on psychology reveals that people's decision to keep going for outdoor recreation during a pandemic is because they rate the health and psychological benefits of going outdoor as more important than the perception of those activities' risk [19]. Besides hoping for better facilities and management of open spaces, the respondent prefers to take individual action to ensure their safety during open space visitation. They conduct some strategies regarding choosing the open space, strategizing visitation time, keeping their health and safety compliance during visitation, and preparing themselves all special needs on COVID prevention equipment.

3.6. Facilities needed
During the pandemic, open space must follow local regulations on health and safety protocols regulated by the government [20]. The management of open space has to provide some facilities to support the implementation of COVID-19 rules.
Figures 5. Facilities needed during COVID pandemic.

Figure 5. show additional facilities in open spaces considered necessary by the respondent during the COVID pandemic. These facilities, respectively, are handwashing facilities with soap, screening post/checkpoint, signage on COVID health and safety protocols, social distancing markers, and temperature check facilities.

Respondent reveals that public park has provided handwashing facilities, while these facilities' availability at beaches is varied. However, handwashing facilities in public parks are lack in maintenance. Sometimes the soap does not refill, the water is not running, or there is no routine cleaning for the washtub that upsets the visitors. In some open spaces, these handwashing activities rely on existing toilets or ablution (wudhu) facilities.

The number and placement of this washtub are also concerned. Some respondents evaluate that only a limited number of washtubs are installed. It is placed in certain spots and hard to reach from activities ground. From observation, many handwashing facilities are mostly placed near the entrance (e.g., Blang Padang) but hardly found in other activities areas. According to the Health Minister Guidelines on handwashing protocols, the handwashing facility should be easily accessed and maintained well [21]. Because these facilities are an additional element of the park, it is not planned integrally with the park clean water infrastructure, causing no continuous and stable clean water supply. Typical portable handwashing water tanks used in the open space in Banda Aceh required to be manually refilled, make it is harder to maintain the water supply.

Screening post or checkpoint is the second most considered necessary by the respondent. Open space management should check visitors' temperature and all COVID health and safety measures at this checkpoint that help visitors feel safer in the open space. According to the respondent, only a few open spaces have checkpoints, such as Blang Padang, while beaches rarely have these facilities. As in observation, parks or sports grounds with a clear entrance are mostly able to do screening procedures, while the open space that is relatively open on all sides or not gated is hard to do so.

The third important facility is COVID health and safety protocols signage to remind visitors to follow the COVID rules. Respondent mentioned that most open spaces had had these reminder facilities, but not all of them. This signage's content usually aims to inform and educate visitors on what is required and prohibited in those open spaces during pandemics. The respondent prefers infographics rather than the written type of signage.

3.7. Open space management

The management of open space should adapt to the pandemic situation to mitigate the risk of COVID infection and spread during visitor visitation. Open space in Banda Aceh managed by the various institution. Beaches, even though public spaces are usually managed by private business or village where it is located. Some sportgrounds like Blang Padang are owned and managed by military institutions, while the local government manages public parks.
Respondents considered the implementation of COVID 19 health and safety protocols as the most important measures in open spaces. The protocols include prohibiting visitors from entering open space if not wearing masks, reminding them to keep their masks on, warning visitors about crowding, and strict implementation of COVID rules. However, respondents found the practice of COVID rules is inconsistent in several open spaces they visited. Sometimes the compliance with the rules depends on the open space authorities. For example, military-managed open spaces like Blang Padang have had stricter COVID rules enforcement than privately managed beaches, typical in Lhoknga and Lampuuk.

Limiting visitor numbers is the second important measure to prevent a crowded situation, especially in the peak season. In the respondent's opinion, most open space managers in Banda Aceh have not implemented these measures. Respondents suggested some methods for managing visitor's numbers, such as limiting visiting hours, informing the visitor if the space is full, and using mobile applications to book and manage visitation. These strategies can be expanded by allocating specific times for each visitor group, such as special time for family and elderly and different times for walkers versus runners using park track [6]-[12]. In managing visitors numbers, the manager should have a calculation on park capacity. It could be aligned with the Indonesian Health Minister standard for various outdoor activities distancing requirements [22]. The open space manager could collect visitor data to analyze trends, patterns, and dynamics of visitation in order to make better management decisions.

The third important measure is managers' commitment to control COVID rules in open space. The respondent does not mind if any open space staff strictly monitors their compliance to COVID rules. However, only a few open spaces have COVID rules guards. On some occasions, the official COVID task force that consists of local government staff, police, and Satpol PP (municipal police) controls and monitors visitors in open spaces. This authority also has the right to close private managed open spaces when the COVID case rises. For example, in May 2021, they closed the Lhoknga and Lampuuk beaches area and patrolled the road asking visitors to return home [23].

3.8. Design adaptation of safe open spaces
In planning and design, space engineering should be adaptive to the pandemic situation [12]. Some changes to ensure the safety of the open space should be embraced and implemented. Based on the respondent evaluation and judgment on the current open space situation, some alteration is proposed.

In the natural open space setting (Figure 7), the change is to add up some facilities required to keep the visitor's safety, such as handwashing facilities, reminder COVID signage, and ensure the seating/shelter is placed at a safe distance.
Moreover, some improvements should be considered in general future planning and design of urban open spaces in Banda Aceh. For example, clean water infrastructure should be installed through the open space, especially within the activities zone, to ensure a stable water supply. The spacing of seating or activities facilities should be maintained to create a safe environment in open space. Quality of the greeneries should also be the priority in open spaces design. The access and layout of the open spaces should be clear; the entrance and exit have to be defined, so it will be easy to manage and control visitation, especially in pandemics. At last, the most essential is creating a flexible and multi-function space rather than all fixed-function spaces. The new green space should be planned and programmed to allow spontaneous and embracing bottom-up and tactical approaches, reducing excess amenities and formal function [8]-[13]. Figure 8 shows the model of safe open space proposed.

Figures 7. Model of safe open spaces in a natural setting.

Figures 8. Model of future general open space.
4. Conclusions

During the COVID pandemics, there are changes in the open space visitation pattern in Banda Aceh. Even though most respondents keep visiting the open space, but the frequency is decreased. The beaches, sportgrounds, and parks are the preferred open space in the time of COVID. In order to reduce the risk of COVID-19 infection, respondent strategized their visitation habits.

Respondents evaluate that the COVID adaptation of open spaces is varied in Banda Aceh. Some open spaces are responsive to pandemics, while others run the business as usual. Some facilities should be added or modified to adapt to pandemic situations, while open space management should be altered to create a safe open space. Both visitor and open space adaptation is needed in order to ensure the safety visitation in open spaces.

Both facility and management measures are essential in creating safe open space during pandemics. The open space manager in Aceh should refer to COVID safe and health protocol that multiple government institutions have enacted in terms of law and guidelines[22]-[20]-[23].

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