

Urban Redesign of Public Spaces in Residential Neighborhoods to Raise the Efficiency of Coexistence in the Event of Dealing with Epidemics Case Study - City of Aqaba (Jordan)



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ABSTRACT

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The epidemic following the spread of the coronavirus has led us to feel so distressed, as we have been forced to isolate ourselves - and in an instant we have lost the social relations between people. As the architect has the role of finding design solutions to ensure that in the event of an epidemic like the current coronavirus, people's lives don't have to undergo as many changes. This research has to study a block in an existing neighborhood in the city of Aqaba, Jordan, where it is shown for the lack of meeting spaces and entertainment spaces, people during the lockdown have suffered greatly. To prevent this from happening in the future, we have studied design solutions regarding free spaces in condominiums, to improve the social life of the inhabitants in the event of an epidemic. Naturally respecting the social distancing provided for by the laws of European countries and taking into account the recommendations of the World Health Organization (WHO). Interviews were made with the inhabitants of the neighborhood, a statistical and graphical analysis was carried out to find out the degree of acceptance of our design solutions. The result of the interview showed that 72.9% of the respondents strongly agree; 9.8% agree and 5.3% are neutral, while only 8.7% disagree and 3.3% disagree.

1. INTRODUCTION

Why does this condition of isolation make us feel so distressed? The probable origin of the malaise we feel when social relationships are closed to us must be sought in our evolutionary history. For humans, in fact, similarly to what happens in other non-human primates, the ability to establish complex social dynamics has played a key role in the survival of the species, but also in its evolution [1].

Close schools and public spaces, switch to smart working, ask citizens to avoid unnecessary travel and gatherings, invite everyone to remain as isolated as possible, locked in the house. These are the so-called "social distancing" measures adopted in Italy and in many other countries to slow the spread of the new pandemic coronavirus [2].

The measures of social distancing, necessary given the emergency, can however have negative psychological consequences on people [2]. "The spread of the coronavirus all over the world forces us to repress our need for relationships, a deeply human impulse rooted in evolution: to see friends, to aggregate in groups, to be close to each other", comments Nicholas in Science. Christakis, a physician and sociologist at Yale University, engaged in biosocial science and research on social networks [2].

The epidemic resulting from the spread of the coronavirus has led the world to discover itself global, highlighting the need for greater international collaboration. The current one is not just a health emergency, but also a social, economic and psychological one [3].

More than 2500 years ago, philosophers and doctors such as Plato and Hippocrates had noticed the association between physical activity and health and between lack of physical activity and disease [4]. It has also been shown that physical activity contributes to improving mental health, quality of life and well-being, while links between physical activity and biomarkers of brain functioning have been found [5, 6].

Paying attention, even in this situation (coronavirus), to maintaining a healthy lifestyle is very important to avoid that, once we come out of the emergency, we find ourselves having to deal, individually and as a population, with an increase in all those diseases (diabetes, cardiovascular diseases, cancers and chronic respiratory diseases) that are favored or aggravated by incorrect behavior. To live well and in good health it is necessary to adopt some simple but healthy habits: follow a correct diet; practice regular physical activity; pay attention to alcohol; no smoke; be consciously healthy [7].

The Tuscany Region (Italy) presented on 05/27/2020 the guidelines to be applied to permanent amusement parks, theme parks, water parks, adventure parks, and to any other entertainment contexts in which an interactive role of the user with equipment and spaces, where it is specified that "During physical activity (with particular attention to the intense one) it is necessary to maintain an interpersonal distance of at least 2 meters, while people belonging to the same family are not obliged to maintain interpersonal distance between themselves and to use a mask" [8].

In recent days there have been numerous attempts to rethink to convert the busiest roads into roads with cycling and

pedestrian traffic.

Innovative proposals have been applied from one city to another, among the best known is the "100 miles of open streets" plan of the mayor of New York, which has decided to close most of the city streets to motorized vehicles to make room to light mobility [9].

The Italian government, through the Ministry of the Environment and Land and Sea Protection, has also added the mobility bonus to encourage the purchase and use of bicycles in the 14 metropolitan areas of the country.

In many Italian cities, work has begun to convert portions of roads dedicated to motor vehicles into cycle paths.

In the Romanian capital in Bucharest, numerous planned cycle paths could become permanent if the measures were favorable to the end of the emergency period [10].

It is terrible to imagine empty theaters and cinemas, places of culture emptied of their essence, the presence of the public, or rather the memory of the experience. This is why the architect has an extraordinary role in this process because, almost in a paradox, he will have to deal with redesigning the spaces to be together, building new ones, regenerating existing ones, intervening in a process of social collaboration starting from the transformation of common areas of condominiums, such as courtyards and atriums, projecting its action to the entire territory. The balconies today have been transformed into small stages and the roofs into gardens or squares for play, expanding the natural landscape of the cities. What better example to imagine these spaces as a common good like streets and squares [11]?

Jordan is a country like many countries in the world that has been hit by the epidemic, and to cope with this problem, the state has put people in lockdown for a long time, and not having neighborhoods that respond to the indispensable minimum of space for detention, the population has suffered a lot.

As the architect has the role of finding design solutions to do so in the event of an epidemic as the coronavirus is right now, people should not totally give up those needs and leisure activities that can be done together but without putting the people and society at risk of contamination.

We will study a block in an existing neighborhood of the city of Aqaba, where people during the lockdown suffered a lot from the lack of spaces for meeting and exercising, and we will present design solutions that allow in the event of an epidemic and not for the inhabitants to live better their condominiums and neighborhoods, obviously respecting the social distances mentioned above in the Tuscany Region (Italy).

These solutions serve as an example to be able to apply to other areas in Jordan and in the world, moreover they serve to give only a stimulus to the employees and people who are involved in the field of urban planning and urban design, to find ideas to make life better of people during epidemics cases.

Obviously, these design solutions must take into consideration the feasibility of implementation and the cost that must be adequate to the economic situation of the country, given the technological process that is in progress that allows adequate solutions to many problems with limited costs.

2. THE CONCEPT DESIGN

The idea of this project is to transform every free space in the condominium or in the neighboring condominiums, into

social spaces, in order to allow the inhabitants of these condominiums the opportunity to interact with each other while respecting the social distances between people who are not of the same family.

So, we have to redesign the spaces indicated above with solutions that allow the socialization of neighbors in condominiums without having close contact with each other if they are not of the same family. The design proposals guarantee the maintenance of social distances, and the low flow of people with whom to come into contact.

In order to maintain social distances, the creation of common outdoor spaces is therefore encouraged, avoiding passages or closed environments with poor ventilation and light.

The idea is to create a happy neighborhood and social cohesion by enhancing the importance of planning a more resettled local level to then get to have a happy city.

Therefore, we should converge our efforts to find ways to focus on social aspects and design spaces for activities that are always essential to people's health and well-being, such as environments in close contact with nature where it is possible to take walks in green areas. o practice gardening, as well as meeting places with play areas for children and meeting spaces for families and the elderly.

It is proposed in the search to divide the common spaces into different areas through design solutions, or through the furniture that forms the spaces according to the need dictated by the pandemic curve; in the event that the pandemic curve is growing in a very evident way, it is possible to connect the common spaces in the outdoor condominium with activities that involve the inhabitants of the condominiums at a distance without the physical approach in an absolute way, but you can have visual communication and of dialogue, create public spaces directly connected to homes that can continue to function with maximum safety for a small number of residents in the course of a pandemic with a flat but constant curve, and then if the pandemic curve is flat and decreasing, it is possible to caution allow the use of public spaces that do not connect directly with homes.

According to the sociologist Walther Orsi in which he promoted the existence of an active condominium: "the houses represent not only places of residence, but also resources to be exploited, shared and made available to the community. This perspective highlights the possibility, for a condominium or a network of condominiums, to directly manage, or to manage, common spaces and resources" [7].

According to the sociologist, poorly used common areas such as roofs, condominium courtyards, others and passageways had to be enhanced. According to Orsi, these places could be transformed into places for activities and services. Among these were indicated the preparation and consumption of meals in common, recreational-cultural activities, socialization activities, the management of condominium gardens, the preparation and use of solar panels, the laundry, the guesthouse and the restaurant domicile.

Architect Laura Tallarida specifies and says that I am an architect and I like to design avoiding any kind of waste, reusing and recycling materials to adapt them to new uses, also specifies that there are 4 happy ways to better use the condominium space on the roof as: communal vegetable garden, an alternative to the roof garden: the turf, cultivation in raised boxes and finally as a solarium, so the roof terrace can also be used as a solarium, equipping the attic with deck chairs and umbrellas [12].

In the document "Public Space Charter", drawn up by the Biennial of Public Space of the National Urban Planning Institute (Italy), it is specified that public spaces must offer precious opportunities for recreation, exercise and regeneration for all, and must also promote conviviality, the encounter and the freedom of expression [13].

A space is not just a place of passage and rest, but to put it in the effective words of the architect Paola Bellaviti. It is in the public space that needs related to individual and collective wellbeing find (or do not find) satisfaction: sociality, codivision, mobility, leisure, being rooted in places and their signification, self-expression ... " [14].

There is no city without public space, because this is the connector between an agglomeration of buildings and functions with the life that moves in them, besides the spaces public, in fact they are recognized as important for the quality of life and affect the physical, mental and social well-being of the man who lives them every day [15].

"The street is not an area but a volume. It cannot exist in a void; it is inseparable from its environment. In short, it is no better than the company of houses it frequents. The street is the matrix: urban room, fertile ground and breeding place Its vitality depends on the right kind of architecture as much as from the right kind of humanity" [16].

The public space becomes a stable reference in the transformation processes aimed at the regeneration of abandoned, degraded and marginal areas, in the construction of new infrastructures, in the housing project, in environmental redevelopment and landscape enhancement [17].

3. DESCRIPTION OF THE PROPOSED PROJECT

The project is carried out in the eighth zone of the city of Aqaba, this area was chosen despite being built very recently, there is a lack of spaces for leisure and entertainment even when there is no lockdown (Figures 1 and 2).

This neighborhood was built with buildings very close to each other, we took four buildings randomly and they were connected to each other, it was possible to apply the idea of the project without difficulty and excessive costs.

On the basis of the analysis carried out in this study, the design intervention of the spaces that are not occupied by other condominium activities aims to divide the project into two sections; the first one concerns solutions relating to the use of roofing in condominiums, while the second solution proposes the application of spaces that can be used by the inhabitants of the same floor.

For both solutions we have proposed redesign possibilities that reflect the lines of the proposed concept:

Section 1:

The roofs of the 4 condominiums were connected by means of footbridge with a load-bearing structure formed by steel boards of a color similar to the color of the facades, the boards were covered with rubber material; in such a way these walkways can form a long course that crosses the roofs of condominiums, so it becomes a path where you can practice the projection of walking (Figures 1 and 2).

The spaces created by the meeting of the roofs, were formed with outdoor furniture and design of outdoor environments, environments and seats that can be used by the same family or by individuals without creating physical contact. We have done in case of epidemics these environments allow people to

listen and observe each other, so it becomes a way to socialize without physical contact between the subjects, while for the subjects of the same family even in the presence of diseases; they can sit together if everyone family members are not effects (Figure 3).

While when there are no epidemics this space can be used freely by all condominiums without limitations (Figure 4). Clearly joining the roofs of different neighboring condominiums allows you to have ample space, where we can create different environments with different functions.

Section 2:

The buildings have been applied on the facades of the condominiums the catwalks, the buildings having free spaces inside them and being part of the same property.

Each building has its own property in its own right and limited through a masonry reception. The space from the inspection has been ascertained the possibility of being able to apply on the facades of the catwalks within the limits of the property. But this space in most of the condominiums was limited and you could only add the catwalks.

We have designed the catwalks in such a way that it does not alter the design of the facades, with the supporting structure in light steel with colors compatible with the facades.

This "shared walkways" space allows people to see each other, talk to each other and practice some activities that do not require much space, and allows people to get close. obviously people can approach in the absence of diseases, or people of the same family can approach even if the epidemic is underway (Figure 5).

This solution is necessary, because the spaces suitable for the courtyards and the open spaces at ground level are limited (Figure 6).



Figure 1. Satellite image of the city of Aqaba

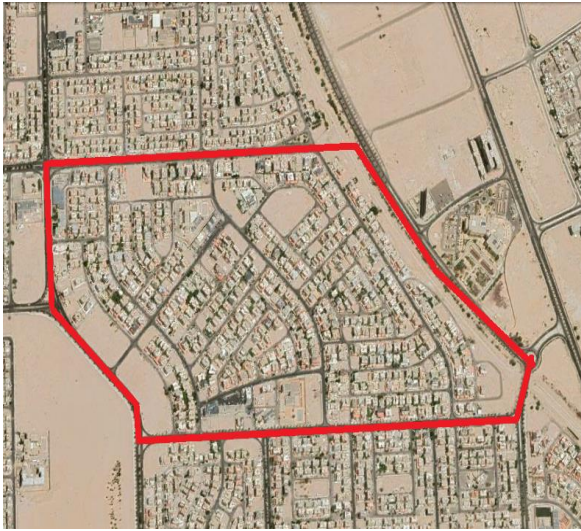


Figure 2. Aerial Satellite image of the zone 8



Figure 3. The four chosen palaces



Figure 4. The connection between the four chosen buildings



Figure 5. Spaces for socialization with and without physical contact



Figure 6. Spaces for socializing without limitation of contact

4. PROJECT VERIFICATION AND FEASIBILITY

In addition to the literature that was made and presented in this research where it was demonstrated the need to find safe and controlled meeting and entertainment spaces that can be used in the event of an epidemic, for further confirmation that the ideas of the project can be welcomed and accepted by the inhabitants of zone-8 "area under study", we made a questionnaire with the people who inhabit the area.

Such spaces must be attached and incorporated through a limited number of condominiums, so the number of people using these spaces is minimal and can be controlled.

During these interviews some questions were asked. On the other hand, during the interview some drawings and simulations were presented and clearly explained that made our ideas more understandable.

In the interviews, people with different sexes and different ages were involved; even the children were participles. In this way, all the people who live in the area under study, adults, men and women and children were participated.

The questionnaire was composed of 14 questions, and on a population number of about 2000 (as there are no precise data regarding the inhabitants of the area in question, therefore through a survey carried out by the researchers, we were able to know the number of inhabitants), the sample size is 323, it was calculated based on a mathematical formula, this formula is used when the population in question is small or medium-sized, practically a standard formula (1) [18]:

$$N = \frac{[z^2 * p(1 - p)]/e^2}{1 + [z^2 * p(1 - p)]/e^2 * N} \quad (1)$$

where, N =size of the population; z =Z-score; e =margin of error (better 3% or 5%=0.05); p =standard deviation (better 50%=0.5).

80% of confidence > 1.28 Z-score.

85% of confidence > 1.44 Z-score.

90% of confidence > 1.65 Z-score.

95% of confidence > 1.96 Z-score.

99% of confidence > 2.58 Z-score.

In these interviews, the "Likert Scale" type of question was used. Likert scales are widely used to measure respondents' opinions and attitudes with a more significant level of nuance than a simple "yes / no" question. In addition, this method will allow you to discover nuances of opinion that could make a difference in interpreting the feedback you receive. Also, it can also help you identify areas where the service or product can be improved [19]. The results were analyzed with the SPSS program.

5. THE RESULTS

In this part the quantitative results of the research will be verified through the interview, the results of the arithmetic mean and the standard deviation, and the answers of the sample of the inhabitants of the neighborhood.

The first section of the questionnaire: basic multiple-choice questions.

323 inhabitants answered the questionnaire. Table 1 shows the distribution according to the questions of the basic variables of the questionnaire.

Table 1. The answers to the basic variables of the questionnaire

Variables		Frequency	Percent %
Gender	Male	166	51.4%
	Female	157	48.6%
Age	6-12	22	6.8%
	13-18	29	9.0%
	19-40	109	33.7%
	41-60	88	27.2%
	Above 60	75	23.2%

Source: The author, 2021

Table 2. Overview of the Covid and treatment

#	The Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Do you agree that he gets bored during the lockdown	273	32	13	4	1
2	Do you agree that it is nice to see other people during the lockdown	246	25	17	33	2
3	Do you agree that it is nice to see other people besides the family who live with you in the same apartment during the lockdown	267	42	9	5	0
4	Do you would like to practice some entertainment and leisure activities during lockdown in an area that is easy to control in the presence of infectious diseases	212	62	15	21	13
5	Do you would like to practice some entertainment and leisure activities in an area very close to your home, in the presence of infectious diseases and in the lockdown period	297	13	7	6	0
6	Do you would like to practice some entertainment and leisure activities in an area very close to your home even when there are no infectious diseases and there is no lockdown	241	26	23	29	4
7	Do you agree if we create and connect via walkways between the roof of your building with the roofs of the buildings closest to your condominium, so we can have a larger common space (as seen in the images)	238	37	9	31	8
8	Do you would like it if in this space obtained from the meeting of the palaces, we do some entertainment and leisure activities (as seen in the images)	261	24	7	25	6
9	Do you would like it if in this space obtained from the meeting of the buildings, we make room for walking	186	57	8	43	29
10	Do you would like it if in this space obtained from the meeting of buildings, we give space for children, so they can play together	294	4	2	16	7
11	Do you would like it if in this space obtained from the meeting of the buildings, we make space to be able to sit with others and talk	148	32	61	72	10
12	Do you would like it if in this space created by the meeting of the buildings, we made space to watch movies with others, or watch a football match	219	34	27	20	23
13	Do you would like it if in this space obtained from the meeting of the buildings, we make room for gardening	161	42	36	52	32
14	Do you agree if on the facades of your building and where you can obviously, create a walkway that connects all the apartments on the same floor, so you can have an open space and put you in contact with your neighbors on the floor (as seen in the images)	253	13	6	36	15

Source: The author, 2021

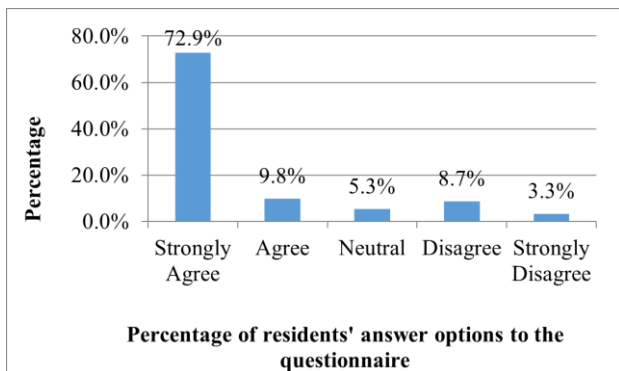


Figure 7. Percentage of residents' answer options to the questionnaire

The Second Section of the questionnaire: Covid and treatment.

This section contains 14 questions to measure the overall effectiveness of the proposal from a physical and psychological point of view (Table 2).

The Second Section of the questionnaire has the aim of obtaining confirmation from the inhabitants of the area in question on the idea we proposed to them, as regards first of all whether they really got bored during the Lockdown period and if they had the desire to see people who are not of the same family safely and without the risk of transmitting the epidemic to themselves. Secondly, be sure if people agree to have space for recreation and entertainment within a residential complex, where they can find space for walking, play areas for children, meeting spaces and being able to chat with others.

From the analysis of the interviews it appears that 72.9% of the interviewees strongly agree; 9.8% agree and 5.3% are neutral, while only 8.7% disagree and 3.3% disagree (Figure 7).

6. RECOMMENDATIONS AND CONCLUSION

Designing city districts by guaranteeing and recovering condominium spaces and transforming them into green spaces and social spaces, contributes and helps people to stay in good health, and also helps people to feel psychologically well;

Designing these spaces in this way allows us to continue life in an acceptable way, without having any contact with people, thus decreasing the number of viruses and diseases, and helping to better manage the situation in the event of any epidemics;

Public bodies are advised to allow condominiums to be able to deduct from taxes all the works intended to recover the condominium spaces and transform them into green spaces and social spaces, so that people can be encouraged to do the work;

Transforming some parts of the space obtained into vered improves the health of humans and the planet.

REFERENCES

- [1] <https://www.hsr.it/news/2020/aprile/stress-quarantena>, accessed on Apr. 18, 2020.
- [2] <https://www.internazionale.it/notizie/laura-tonon/2020/03/20/isolamento-salute-fisica-mentale>, accessed on Apr. 18, 2020.
- [3] <https://www.hsr.it/news/2020/aprile/stress-quarantena>, accessed on Apr. 18, 2020.
- [4] Kokkinos, P. (2012). Physical activity, health benefits, and mortality risk. *International Scholarly Research Notices*, 1-14. <https://doi.org/10.5402/2012/718789>
- [5] Penedo, F.J., Dahn, J.R. (2005). Exercise and well-being: A review of mental and physical health benefits associated with physical activity. *Current Opinion in Psychiatry*, 18(2): 189-193. <https://doi.org/10.1097/00001504-200503000-00013>
- [6] Dishman, R.K., Berthoud, H.R., Booth, F.W., Cotman, C.W., Edgerton, V.R., Fleshner, M.R., Gandevia, S.C., Gomez-Pinilla, F., Greenwood, B.N., Hillman, C.H., Kramer, A.F. (2006). Neurobiology of Exercise. *Obesity*, 14(3): 345-356. <https://doi.org/10.1038/oby.2006.46>
- [7] http://www.salute.gov.it/portale/nuovocoronavirus/detta_glioContenutiNuovoCoronavirus.jsp, accessed on Jan. 15, 2021.
- [8] <https://www.pisatoday.it/cronaca/misure-linee-guida-parchi-divertimento-coronavirus.html>, accessed on May. 28, 2020.
- [9] Alvisi, M., (2022). La Citta' Felice.
- [10] Holland, O. (2020). Our cities may never look the same again after the pandemic. <https://edition.cnn.com/style/article/cities-design-coronavirus/index.html>.
- [11] Goldman, H. (2020). NYC to close 40 miles of streets to give walkers more space. https://news.yahoo.com/nyc-close-40-miles-streets-143303512.html?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAKo_SQArA8oVCGhUQ0LscU43NbGgA3HEJR1h9UX1MIgW8khZ_yB4aThwcdqZzxYJqdxk8aMs2e5xFxkag8loA-r0tMCeaeAt6iUixoV83Jrle8Pj32rnX8WLR3l4g2E4EQ1Aw-63vzuXVGXNTcd9fUFx5jAntdft1WLRMb5LIp3.
- [12] <https://www.houzz.it/magazine/4-modi-felici-per-usare-meglio-lo-spazio-condominiale-sul-tetto-stsetivw-vs~85726988>, accessed on Jun. 2, 2017.
- [13] Biennale dello Spazio pubblico, Istituto Nazionale di Urbanistica, Carta dello Spazio Pubblico, http://www.biennalespaziopubblico.it/wp-content/uploads/2016/12/CARTA_SPAZIO_PUBBLICO.pdf.
- [14] Dessì, V., Farnè, E., Ravanello, L., Salomoni, M.T. (2016). Rigenerare la città con la natura. Strumenti per la progettazione degli spazi pubblici tra mitigazione e adattamento ai cambiamenti climatici. https://territorio.regione.emilia-romagna.it/paesaggio/formazione-lab-app-1/rigenerare_la_citta_con_la_natura_2_ed.pdf/.
- [15] Indaco, S. (2016). La costruzione condivisa dello spazio pubblico, Architettura e Programmi Sociali per Zingonia. Alma Mater Studiorum, Università di Bologna. <https://amslaurea.unibo.it/11969/>.
- [16] Brugellis, P., Pezzulli, F. (2006). Spazi Comuni, Reinventare La Città, Bevivino Editore. Italian, Drink Wine.
- [17] <http://www.planum.bedita.net/planum-magazine/siu/xvi-conferenza-nazionale-siu-atelier-9a>, accessed on Jun. 1, 2021.
- [18] <https://www.wikihow.it/calcolare-la-dimensione-di-un-campione>, accessed on Jun. 1, 2021.
- [19] <https://www.surveymonkey.com/mp/likert-scale/>, accessed on Jun. 6, 2021.