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The Influence of Urban Safety on Housing Choices

The Case of Traditional and Contemporary Housing Types in Palestine

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Abstract: The paper analyzes Palestinian families' preferences for housing types and explores changes in their choices after the earthquake of March 2023. The aim is to estimate urban resilience with changes in the housing environment regarding feeling safe. To do so, Nablus City was chosen as a case study due to its location in a seismic area. An empirical study was conducted in the city in traditional (cluster) and contemporary housing (apartment buildings), and thus, two neighborhoods were chosen. The study clarifies the differences between the architectural and urban characteristics of the selected types. Using questionnaires also measures users' satisfaction with their homes and the urban environment regarding safety and its influence on their future housing choices. A sample of 60 householders was chosen to explore the study objectives. The result of the study shows superior satisfaction with contemporary housing in terms of feeling safe due to its good physical conditions but dissatisfaction with many modern concepts such as weak relation with the outdoors and high rising. However, many traditional concepts can still give a safe feeling, like a low-rise environment, fewer units that share common areas, private entrances, and strong relations with outdoor spaces. Hence, the study's main conclusion is that current housing environments fail to provide good urban resiliency with the changing of housing choices after an earthquake in terms of feeling safe. Based on these findings, a discussion was conducted to provide detailed changes in housing choice decisions in Nablus City compared to the previous literature. Updating the current housing types for a much safer environment was also clarified and discussed.

1. INTRODUCTION

With the rising social and natural threats worldwide, cities and communities are paying high attention to urban resilience, enabling those cities to withstand the distribution and recovery from emerging crises (Lee, 2017). Different multidisciplinary studies focused on establishing decision-making guidelines for urban resilience. However, those studies leave significant gaps, especially in decision-making guidelines (Rezvani, Falcão et al., 2023). A study on the relationship between urban safety and the resilience and well-being of residents found that safety positively contributed

to the resilience and well-being of the urban (Bakhsh and Rasool, 2019). Urban designers should integrate actions, including people-centered and multifaceted approaches, to achieve the concept of safe cities (Bandyopadhyay and Philip, 2015; Zhou and Homma, 2022). A safe environment should include housing and safe public spaces designed to improve the feeling of safety perception for users (Iqbal, 2021).

From this standpoint, housing resilience with sudden changes is highly related to feeling safe, a basic human need that provides people with tranquillity, stability, and security (Loeb, 2002). Despite the multiple stages of house development throughout history, the house has remained a spiritual, social, and emotional center for human beings (Adedeji and Amole, 1969). Housing contains multiple physical and human dimensions, including roles linked to achieving security, proving identity, and self-respect (Salamati, 2001). The Universal Declaration of Human Rights stipulated by the International Covenant on economic, social, and cultural rights that the family is the natural and essential cell of society, and it has the right to enjoy protection and also to be safe from the diversity of sources of danger and various types of natural disasters. Such dangers as floods and earthquakes significantly impact the stability and reassurance of human beings. Worldwide, many researchers extrapolated the relationship between the architectural and urban design of housing and the importance of residents' sense of safety (Hannum, 1995; Harries, 2008; Veale, Robins et al., 2023); however, in the Palestinian context and the unique social and physical housing types, there is a lack of studies that relates the importance of housing safety resilience and the housing architectural and urban design.

Feeling safe in the housing environment is also a growing concern in countries with threatening hazards, such as Palestine, a seismic area (Cuny, 1994). Such a feeling of safety can affect householders' satisfaction with their housing and may redirect their housing choices (Giacaman, Mataria et al., 2007). Therefore, the need to study the psychological influence of fear after crises such as earthquakes is increasing for two reasons. Firstly, earthquakes cause significant damage to infrastructure and buildings, resulting in loss of life, injuries, and displacement of people. The psychological trauma caused by such disasters is often overlooked, but it is a significant concern. People who experience earthquakes may have post-traumatic stress disorder and other mental health issues, affecting their future housing choices (Dai, Chen et al., 2016). Secondly, the Palestinian context is already stressed due to ongoing conflicts and political instability. Expecting earthquakes can exacerbate these stressors, making the housing environment uncomfortable (Hernández, Phillips et al., 2016). Therefore, studying aspects of feeling safe after earthquakes is essential to examine the current housing environment responding to sudden changes and to develop an approach of design that responds to the basic human needs of residents.

Understanding the psychological impact of earthquakes can help authorities and policymakers plan cities and residential areas using adequate design approaches. Housing types, outdoor spaces, and green areas can be developed based on the specific psychological needs of the residents (Itma, Mohammed and Khaleefa, 2024; Venable, Javernick-Will et al., 2020). Developing effective strategies is also essential to address the need for feeling safe and redirecting the housing market to supply adequate housing types that respond to residents' sociocultural, environmental, and emotional needs (Gurran and Bramley, 2017).

This study discusses the impact of such natural disasters on householders' housing choices to verify how far the current housing environments can

respond to sudden changes in such choices in the future. With particular reference to earthquakes' impacts on the population in Palestine's dominant types of urban housing: cluster housing around courtyards and apartment buildings. Considering issues that can play a role in achieving a sense of safety, the study will analyze the location of the residential unit, its relations with other units, and the external spaces. The importance of the study lies in addressing an ongoing concern, which is the fear of earthquakes and other crises that strike from time to time in Palestine and Nablus City in particular.

2. OVERVIEW OF HOUSING TYPES IN PALESTINE

In Palestine, two housing types are dominant: the traditional cluster type and the modern apartment building type. The studies dealt with the problem of lack of land in Palestine due to the unstable political situation and the importance of considering the traditional compact (cluster) fabric as one of the possible solutions (Itma, M, 2014; Kamal, 2020). Clusters are a way to provide Palestinian areas with housing that meets the need for compactness while providing an environment of external spaces suitable for dense residential areas (Itma, M. A. F., 2016). Another study dealt with the inadequacy of the high-rise apartment blocks to the human needs in Palestine, as they need to meet basic cultural needs such as privacy, territoriality, and self-affirmation (Itma, Mohammed, 2018a).

Regarding specific attitudes of householders in Nablus City, there is a reluctance to live in apartment buildings and a possibility of designing cluster housing in a contemporary way (Itma, Mohammed, 2018b). A study conducted in Nablus city confirmed that residents of the cluster fabric in the traditional town would be satisfied with their home types if some physical deterioration of houses is solved, which leads to thinking that traditional urban forms still have potential for contemporary housing design (Amad, 2003). Another study confirms that most residents in both cluster housing and modern apartment buildings believe that cluster housing is better than apartments, considering their sociocultural values (Tawayha, Braganca et al., 2019). Another study in the same city confirms the importance of the traditional cluster configuration in forming collective spaces, which residents demand more than simple housing on grid streets (Itma, Mohammed and Monna, 2022). Other studies confirmed the potential of living in courtyard houses for responding to the socio-environmental conditions in Palestinian cities (Hussein, Barlet et al., 2010; Salameh, Touqan et al., 2022). Another study was conducted in Palestinian cities, including Nablus, to measure the attitude of residents after the COVID-19 pandemic. This study concluded that people started to demand healthier, more significant, less crowded houses and economic housing as a reaction to the pandemic and the financial crisis (Itma, Mohammed and Hussein, 2023).

As a result of the previous overview, cluster housing can be a good choice for future housing, especially for the residents of Nablus City, in terms of its sociocultural and environmental values. However, cluster housing has never been designed in a contemporary way to produce compact fabric like the traditional one. Thus, the study chooses the traditional houses and their residents as a case study to estimate their satisfaction with the cluster housing. To better understand these traditional and modern housing types, the following is an overview of safety considerations for both the traditional cluster and the contemporary housing in Palestine throughout history.

2.1 Feeling safe in the cluster vs apartment buildings housing

Palestinian cities were built in the past on different foundations, including environmental and social ones. Still, safety was one of the most essential criteria found in those cities throughout history (Safty, 1981). The reason is that the region is constantly exposed to various dangers, including human ones, such as wars (Elsheshtawy, 2008). Therefore, the city resembles a sizeable fortified castle built of solid and thick stone walls with a large stacking between buildings and streets of narrow widths that permeate the extended urban mass to form endless cluster housing around courtyards (Doumani, 1995).

The mutual relationship between the inside and the outside characterizes the traditional design of the traditional dwellings in Palestinian cities. The courtyard -or internal space- is the most essential element of traditional urban housing, as it constitutes a place for social interaction and provides fresh air and natural lighting (Raymond, 1994). In addition, the courtyard provides a sense of safety for the residents, as they can stay in it and be far away from various dangers (Dabbach, 2018). Hence, two factors make the cluster around the courtyard a haven for the residents: the first is that it is spatially protected due to the high enclosure of the space. The proportions that do not exceed 1 in height to 2 in width of the courtyard are surrounded by low-rise buildings from two to three floors. The second factor is psychological and is related to the material used in the construction, which is the rough stone that gives a feeling of strength and fortification (Abdulac, 1982). Therefore, the traditional concepts to achieve feeling safe can be summarized by taking into consideration the human proportions in designing the outdoor space, the high enclosure of the outdoor space, its strong relationship with the inner space, and the use of rough building materials that give the appearance of solidity and strength.

The following describes the transformation of traditional concepts in the contemporary housing of Palestine. Contemporary housing in Palestine is composed of apartment blocks. In such apartments, some traditional ideas continued, and others disappeared in terms of providing a sense of safety. The current blocks still depend mainly on the use of solid stone. The reason for the wide use of stone is somehow emotional, as there are tactile negatives of using stone, such as increasing building costs and polluting the environment by the stone factories (Qanazi and Zawawi, 2022). However, the design criteria for the external space have been replaced by openness towards the view instead of direct interaction between the internal and external space, which led to the loss of the discussed potentials of the courtyards. The current apartment buildings are multi-story, on average 6-8 floors, with small common or shared areas such as staircases and elevators. Thus, the only way for residents to interact with the outside is through balconies. So, the traditional housing design concepts for courtyards and low-rise buildings are wholly abandoned in contemporary housing design (Bawardi, Kaplan et al., 2022). In conclusion, there are three weaknesses in the apartment buildings that make them not supposed to provide a sense of emotional safety for the residents, which are not sufficiently considering the human scale -because of their proportions big size and height-, the weak relationship between internal and external spaces, and the weak enclosure of external spaces.

3. MATERIALS AND METHODS

To achieve the study objectives, two basic approaches were relied upon that support each other: the first is an analysis of the architectural characteristics of a case study, the city of Nablus. The second is a survey of the residents' opinions about their satisfaction with urban safety in traditional and modern neighborhoods. The following explains the two approaches in detail.

3.1 The case study

The chosen case studies are in Nablus, an ancient and essential Palestinian city. The chosen time of the study is the period after the devastating earthquake occurred in Turkey and Syria and affected the east Mediterranean countries in February 2023, followed by a moderate earthquake in Palestine and Jordan in March 2023 (Cinar, Abbara et al., 2023). The study argues that even if the residential buildings were physically safe against such moderated earthquakes in Palestine, there is a difference between each type of housing when considering the psychological need of the residents to feel safe.

The city of Nablus was based on its location in a seismic area, as shown in Figure 1a. The city is located along the Dead Sea Transform Fault (DSTF), a major tectonic plate boundary between the Arabian and African plates. This fault line is known to be one of the most active seismic zones in the world and has been responsible for many earthquakes in the region. The last destructive earthquake to Nablus was in 1927, which had a magnitude of 6.2, caused widespread damage to buildings and infrastructure, and caused significant loss of life. Since then, there have been more minor earthquakes in the region, but none have been as devastating as the 1927 quake (Al-Dabbeek and El-Kelani, 2008). While it is impossible to predict when the next earthquake will occur, conducting studies for this city is an essential step toward a housing environment that provides a sense of safety.

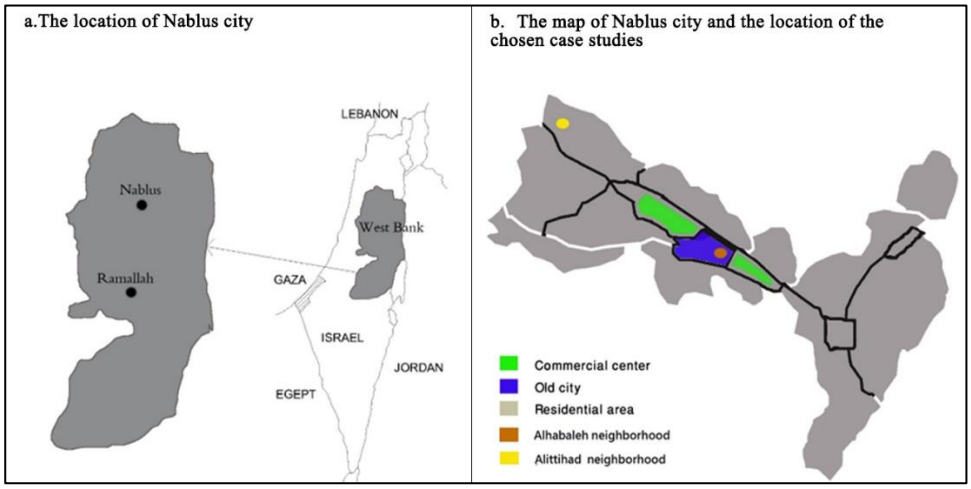


Figure1. The location of the case study

To estimate the changes in choice with urban housing types, we can understand the parameters affecting the choices of urban housing in Palestine and Nablus City, specifically before the last earthquake. A field survey was

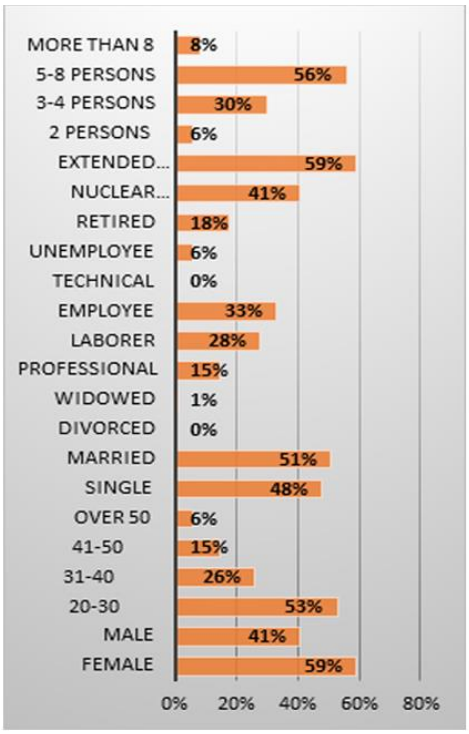
conducted for two residential neighborhoods in the traditional city of Nablus. The first is "Haret al-Habala," which determines the architectural characteristics and the construction system used in this neighborhood. The second survey was conducted for a modern neighborhood in the city of Nablus, Al-Ma'ajin neighborhood, to determine the architectural characteristics and the structural system used in its apartment buildings as shown in *Figure 1b*.

2.2. The survey

People were asked about their opinions through online-based questionnaires. The questionnaire was designed to measure three main categories: the first category evaluated the physical condition of the building, including the materials and method of construction, the age of the building, and the physical damage, if it exists, in the building due to the earthquake. The second category measures people's satisfaction with the levels of safety in their housing environment regarding their resistance to the past earthquake, whether at the apartment level, the building, or their relationship with its surroundings, including streets and different spaces. The third category sheds light on the future choices of residents based on their previous experience with earthquakes to understand that feeling safe influences their future choice of housing. Therefore, residents were asked to fill out a form consisting of questions related to each of the three previous categories. People's satisfaction with a specific point was calculated by choosing 1-5. Number 1 has the lowest satisfaction rate, and number 5 has the highest satisfaction rate. Then, these scores were converted into a percentage of satisfaction with each question using the following equation:

$$Percentage\ of\ satisfaction = \frac{Summation\ of\ scores\ for\ each\ question}{number\ Of\ recipients * 5} * 100\% \qquad (1)$$

The questionnaire was distributed to many residents of the two selected areas, and 64 families of the case studies were able to fill it out. After sorting the questionnaires, four incomplete questionnaires were excluded, leaving 60 questionnaires to be included in the analysis. Of these, 30 were for the traditional neighborhood in the traditional town, and 30 were for apartment buildings in the modern neighborhood. *Figure 2* shows the characteristics of the selected sample of houses and their residents. The houses were chosen so that they vary in area and floor location. Houses were also diverse in the buildings in which they were located in terms of the number of apartments per floor, building height, building age, etc. *Figure 3* also shows the diversity in the sample in terms of recipients. There were recipients of both sexes with varying ages from 20-60, and their families had different numbers of children, often 2-4. The parents' profession, level of education, and other questions were also asked, which led to understanding the characteristics of the selected sample and linking them to the results after sorting the questionnaire, as shown in *Figure 2* and *Figure 3*.



General information about your householder	
Female	59%
Male	41%
20-30	53%
31-40	26%
41-50	15%
over 50	6%
Single	48%
Married	51%
Divorced	0%
Widowed	1%
Professional	15%
Labourer	28%
Employee	33%
Technical	0%
unemployed	6%
Retired	18%
Nuclear household	41%
Extended household	59%
2 persons in the house	6%
3-4 persons	30%
5-8 persons	56%
More than 8	8%

Figure 2. Characteristics of the surveyed sample of houses and residents

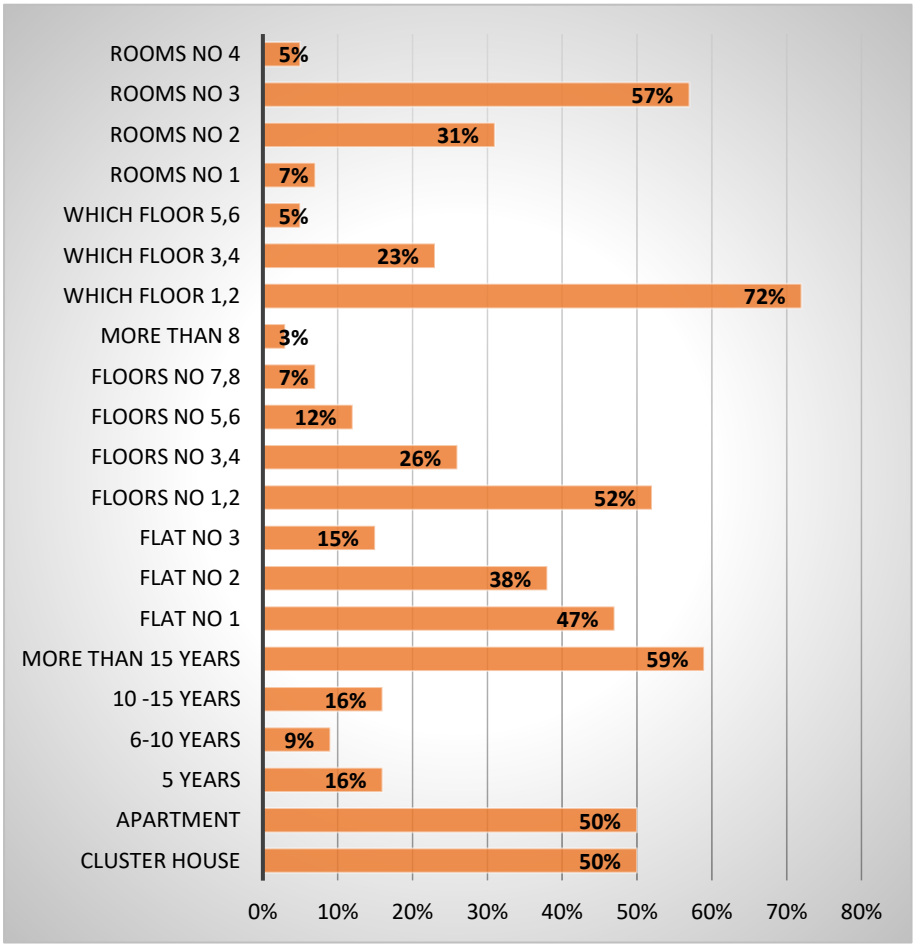
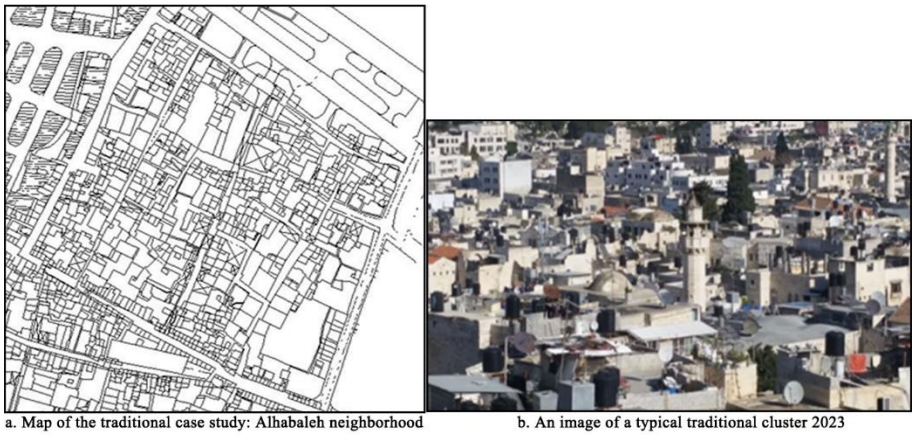


Figure 3. Characteristics of surveyed dwelling circumstances

4. INFLUENCES OF THE EARTHQUAKE ON HOUSING CHOICES

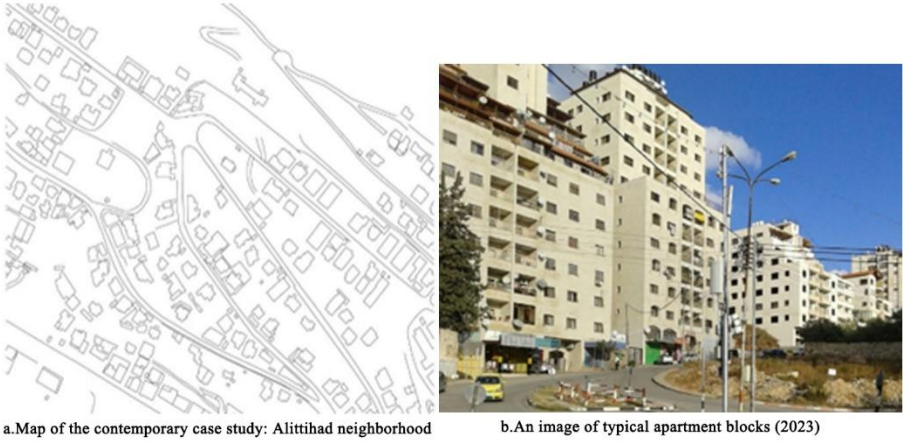
The survey of traditional neighborhood has revealed that most of the existing houses are articulated buildings clustered around a shared courtyard or houses with private courtyards. The areas of the surveyed houses range between 100-175 square meters, and they are mainly composed of 2-3 bedrooms for each of them, as shown in *Figure 4* and *Figure 5*. In addition, the structural system in these houses often consists of load-bearing walls and external facades of weight-bearing stone. Some houses have a modified structural system due to consolidation and reconstruction in some rooms to contain reinforced concrete columns and hollow concrete blocks. As for the added facades, the interior partitions are mostly made of hollow concrete blocks and sometimes made of gypsum boards.

For the modern neighborhood, most of the existing apartment buildings are blocks that contain 2-4 apartments on each floor distributed around one or more staircases with an elevator. The areas of the surveyed apartments range between 130-165 square meters, and they are mainly composed of 2-3 bedrooms for each of them. *Figure 5* shows an example of this surveyed area. In addition, the structural system in these buildings consists of load-bearing columns and external facades of hollow concrete blocks covered often with stone. The facades and internal partitions are mostly made of hollow concrete blocks and sometimes gypsum boards, often used in decorations.



a. Map of the traditional case study: Alhabaleh neighborhood b. An image of a typical traditional cluster 2023

Figure 4. Architectural characteristics of the chosen case (Alhabaleh neighborhood) of traditional and contemporary housing in Nablus city



a.Map of the contemporary case study: Alittihad neighborhood b.An image of typical apartment blocks (2023)

Figure 5. Architectural characteristics of the chosen case (Alittihad neighborhood) of traditional and contemporary housing in Nablus city

4.1 Housing physical properties

Table 1 shows the results of the first category of the questionnaire; housing physical properties and the extent of damage due to the earthquake. The table is divided into two main parts: the first describes the physical characteristics of the surveyed buildings, such as their aging and the construction materials used. The second part details the possible damages to the building and the treatments that the residents did.

It was already known by the researchers that the earthquake was weak and that its physical damage was negligible. However, the questions were asked about those damages, if any happened, for two reasons. The first is to ensure that there is equality in the percentage of damages- if it happened- between the traditional buildings in the traditional town and the apartment buildings in the modern areas so that we can obtain appropriate accuracy in the results. The other reason is to ensure the validity that these damages are minor and do not directly impact the decisions of the people in the selected samples. Because the research aims to identify the impact of housing type on feeling safe and its effect on the future decisions of the people living in the selected samples, it has a limited focus on the structural characteristics of buildings.

The first question from the first part of *Table 1* shows an apparent discrepancy in cluster and apartment buildings' ages. The results show that most cluster buildings are old; 56% are over 40 years old. It is essential to mention here that many recipients may not be aware of the accurate age of such historic buildings, which the researchers estimate to be even more than residents' estimation, as most cluster houses refer to the Ottoman period (more than 100 years old). However, many additions, reconstructions, and maintenance projects were conducted on these buildings, which may affect the estimation of the residents of their houses' ages to be less than reality. Moreover, the apartment buildings in the sample are relatively new and less than 40 years old- as follows: 48% of apartments are less than 20 years old, and 44% are less than 40. This result increases the gap between clusters and apartments regarding building ages, as shown in *Table 1*. This fact should be considered when discussing the results of feeling safe for residents of both types.

The second, third, and fourth questions from the first part of *Table 1* show the types of materials used in building and dividing spaces for both patterns. Stone is the main component in clusters and the external walls of apartment buildings. However, the difference is that the structural system in the cluster relies on stone as a load-bearing material, so the width of the outer wall ranges from 60-80 cm. In modern constructions, the stone is an external covering material whose thickness does not exceed 6-8 cm. The construction system relies on buildings with concrete and hollow concrete blocks, but stone is the only aesthetic element. As for the internal partitions, hollow concrete blocks are more widely used in the 68% cluster and 80% apartments, with some gypsum partitions in a limited manner of 16%. Gypsum boards are used to reversibly redirect the interior spaces in many of those traditional houses. As for the roofs, the difference between the two types appears clearly, according to the table. 68% of cluster buildings frequently use a volt roof and domes; the rest are reinforced concrete. The domes were replaced because of the reconstruction and rehabilitation works. Modern houses are mostly roofed

with reinforced concrete in the form of flat roofs 88% and there are 12% of the sample roofed with roofing tiles, as shown in *Table 1*.

Table 1. Housing physical properties, damages, and treatments after the earthquake

Item	Sub-item	Clarification	Cluster	Apartments
Description of physical properties	1. House age	less than 20	12%	48%
		21-40	32%	44%
		41-60	12%	4%
		61-100	20%	4%
		100- more	24%	0%
	2.Outdoor walls	Block	24%	48%
		Concrete	0%	12%
		Reinforced	8%	8%
		Stone	64%	32%
	3.Indoor walls	Block	68%	80%
		Concrete	12%	12%
		Reinforced	4%	8%
		Gypsum	16%	0%
	4. Roofing	Vault	68%	0%
		Reinforced	32%	88%
		Roofing tiles	0%	12%
Description of damages and modifications	1.Describe damages to the house due to the current earthquake	Cracks	8%	8%
		Wall	4%	0%
		Glass	0%	0%
		Tanks falling	0%	0%
		Roof collapse	0%	0%
		Others	0%	0%
	2.Describe the supposed damages to the house in case of a future earthquake	High	4%	4%
		Medium	4%	4%
		low	28%	24%
		I don't know	64%	68%
	3.Any modifications by users after the earthquake	Close opening	16%	12%
		Create a	32%	44%
		Conversion of	12%	12%
		Closed	4%	8%
		Adding	24%	12%
		Other	8%	16%

As for the second part of the table, the damage and modifications to homes due to the earthquake were minimal. The first question of the second part shows the presence of some cracks in the traditional and new houses after the earthquake, at a rate of approximately 8% for each of them. The second question shows the partial collapse of the walls in some traditional buildings with a rate of 4%, and there are no collapses in the modern buildings according to the surveyed sample. The rest of the damages that were asked about were not found in either type, such as broken windows, falling water tanks, and others.

Although the current damages due to the earthquake are minimal, the residents show some fear of more damages in the case of another future earthquake, as shown by the second question in the second section of *Table 1*. This question shows close rates between the two types for expecting minor

damages: 28% in clusters and 24% in apartments, with a high percentage choosing "I don't know" as an answer to that question, 64% in clusters, and 68% apartments. However, the last percentages seem reassuring at first glance. However, this percentage may reflect the need for more confidence among the residents in their buildings that they can resist the upcoming earthquakes. Otherwise, they would choose to answer the few damages. The previous idea leads to the expectation that there will be dissatisfaction, or at least uncertainty, among the respondents regarding the upcoming housing choices that are appropriate for them, regardless of the limited damage that occurred in the recent earthquake.

The table's last question confirms the uncertainty mentioned; many residents are willing to make changes in their houses to feel safe. Creating a shelter is the highest score point in 32% of clusters and 44% of apartments. A shelter can be a room inside the house with a safe structure, ventilation, and outdoor accessibility. Residents will make other changes, such as making structural supports 24% in the cluster and 12% in the apartments. These percentages led researchers to think that residents in the cluster houses are less trusting of their houses' physical condition than residents of apartments. This result is logical due to the old age of most cluster houses.

4.2 Satisfaction with housing in terms of safety

Table 2 compares the levels of satisfaction with safety among the residents of both clusters and apartments. Those levels are divided into three sections: the first is satisfied with the safety of the house, the second section is confident with the building, and the third is satisfied with the surrounding outdoor spaces and environment.

The first part of *Table 2* contains five questions to measure the extent of residents' satisfaction with safety in the home. Residents were asked about satisfaction with rooms and their locations, such as safe rooms inside the house and children's rooms in case of danger. They were also asked about the level of safety in terms of designing external openings, ventilation, and distances to reach the emergency exit. The table results show an apparent increase in the satisfaction rates with the previous five questions among the residents of the modern apartments compared to the traditional cluster housing. Nevertheless, the levels of satisfaction between the questions are similar. The highest score was related to ventilation, 85% in modern apartments, compared to 58% in clusters. Modern windows are more oversized and more accessible to open than older windows. As for the lowest points, satisfaction with having a safe room in case of danger was 43% in modern apartments and 34% in clusters, as shown in *Table 2*. This is a logical result, as the desire of the most significant percentage of the sample in the two types to make a shelter in case of danger was expressed, as shown in Table 1.

The second part of *Table 2* contains four questions to measure the residents' satisfaction with safety in their apartment building. Such buildings are easy to recognize as these include a group of apartments with clear boundaries. In the case of clusters, the building is not easy to identify; it is a group of attached houses that may extend as a cluster with other close residential groups. However, residents were asked about their satisfaction with ventilation in the common areas of their building, such as staircases and exits. Residents were asked about their satisfaction with the resistance of the building during the earthquake and whether large vibrations occurred or not. Other questions were whether there is confidence in the building in the event of other earthquakes and whether that last earthquake caused fear among the

residents. The table results show an apparent increase in the satisfaction rates with the previous four questions among apartment residents compared to the cluster, except for fear rates during the earthquake, which were close to 54% and 52%. However, there is a difference in satisfaction levels between the questions. It is found that the level of satisfaction with the ventilation of shared spaces in apartment buildings is very high, 81%, compared to the population of clusters, 54%. However, the people's confidence is not high in their buildings in case of a future earthquake, 59% compared to 41% in the cluster buildings, as shown in *Table 2*.

Table 2. Satisfaction of residents with their dwelling and its surrounding environment in terms of safety (see Appendix1)

Safety type	Item of safety satisfaction	Cluster	Apartments
1. Safety inside houses	1. Satisfaction with safe places in your house for emergencies.	34%	43%
	2. Do you think that the locations of the children's rooms are safe?	38%	50%
	3. Do you think the way windows are designed in your home poses a danger?	47%	53%
	4. Describe your satisfaction with natural ventilation in your house.	58%	85%
	5. The distance to the entrance inside the house is short enough to save your life.	42%	50%
2. Safety inside the building	6. Describe your satisfaction with natural ventilation in your shared building spaces.	54%	81%
	7. Describe your satisfaction with the building resistance from the last earthquake.	46%	66%
	8. Do you trust the resistance of your building in future earthquakes?	41%	59%
	9. Describe the degree of fear you felt during the earthquakes as high	54%	52%
3. Safety of the surrounding	10. Describe your satisfaction with safe shelters near your building.	29%	34%
	11. Do you think that you can leave the house for a safer place if needed?	38%	48%

Safety type	Item of safety satisfaction	Cluster	Apartments
	12. Describe your satisfaction with outdoor spaces in your surrounding environment.	34%	44%
	13. Describe your satisfaction with the street near your house. How is it safe to stay in?	37%	45%
	14. Describe your satisfaction with green areas in your surrounding environment.	37%	43%
	15. Describe your satisfaction with the surrounding environment in terms of safety	35%	51%
	Average of satisfaction	**42%**	**54%**

The third part of Table 2 contains six questions designed to measure the extent of residents' satisfaction with safety in the environment surrounding their building. Residents were asked about their satisfaction with safe places, the relationship of the building to the outdoor spaces, satisfaction with streets close to the residence, and the green areas that are of great importance to keep people away from buildings that could threaten residents during their evacuation. The results of the table show an apparent increase in the rates of satisfaction with all the previous six questions among the residents of the modern apartments compared to the residents of the cluster by more than a 10% difference in most cases. However, the satisfaction rates with nearby shelters or green places were close in both types, and this is a logical result because of the lack of enough such places in the residential areas in general due to the scarcity of land and its high prices in the Palestinian cities. However, there is a difference in satisfaction levels between the questions. It is found that the level of satisfaction with the built environment generally is at most 51% in apartments and 35% in clusters, which confirms the lack of sufficient satisfaction between the two types of residents, especially residents of clusters in the Traditional City.

Finally, the total satisfaction rates among the residents of the two types show superiority for modern apartment housing, 54%, compared to 42% for cluster housing. This gap is expected after reviewing all the previous questions, in which the highest points were preferred for modern apartments in most cases. The possible reason for this gap can be noted in the high score variation of questions 4, 6, and 7 between traditional and contemporary housing. These questions show less satisfaction with the environmental qualities of traditional buildings and streets because of the expected deterioration of these buildings and narrow streets in the traditional city compared to the contemporary housing areas.

4.3 Influences of the earthquake on future householders' Decisions

After the sample was asked about their satisfaction with their current housing, they were asked about their future choices that would satisfy their feeling of safety, either by living in an apartment building or a cluster area.

Four questions were designed for each type related to the relations between housing and the surrounding environment to determine which would be the best according to the selected sample. The results were divided into two parts: the first is for the clusters, and the second is for the apartment buildings, as shown in *Table 3*.

The first part of *Table 3* shows that a large percentage of the sample live in apartments; 78% and 65% of the cluster residents consider that the courtyard housing is a suitable type for them in the future. Subsequent questions reinforce this desire, as 69% of the apartment and 57% of the cluster residents prefer to share their home with a smaller number of neighbors, entrances, and staircases. In addition, about 70% of the residents of the two types agree on their desire to live in a low-rise residential environment. As for the last question in this part, it shows an average desire for this housing to be close to the center of services. 44% of the residents of the apartments compared to 61% of the cluster's residents, as shown in the first part of *Table 3*. It is concluded from this analysis that the courtyard is still a symbol of feeling safe for the Palestinians. Hence, the urban sprawl of the city may contain the courtyard type, which a large segment of the population will well receive to obtain the safety benefits of that type in addition to other benefits such as social interaction and privacy,

The second part of *Table 3* shows a low desire of the respondents to live in high-rise buildings: 29% of the residents of the apartments compared to 41% of the residents of the cluster. This percentage increases from 62% of the residents of the buildings to 65% of the cluster residents wanting to live in medium-rise buildings. One of the possible reasons for wanting to live in apartment buildings is the extended view. This result is shown in the third question in the second part of the table, where 87% of the residents of the buildings, compared to 66% of the residents of the cluster, wish to have an extended view. In other words, the recipients want to have a reasonable distance between adjacent apartment buildings. Ultimately, about 70% of the sample chose to live on the city's outskirts, often to obtain modern buildings that make them feel safe.

Table 3. The influence of feeling safe on the future choice of housing type (see Appendix2)

Housing type	Architectural characteristics of preferable future housing	Cluster	Apartments
1. Cluster housing	Courtyard houses would be a good choice for me	65%	78%
	I prefer sharing the building entrance and stairs with fewer neighbors	57%	69%
	I prefer to move to live in a relatively low-rise area	70%	71%
	I prefer to move to near the city center	61%	44%
Average		**63%**	**66%**

Housing type	Architectural characteristics of preferable future housing	Cluster	Apartments
2. Apartment buildings	High-rise blocks (up to 10 floors) are a good choice for me in the city district	41%	29%
	Medium-rise blocks (4-6 floors) are a good choice for me	65%	62%
	I prefer to have an extended view	66%	87%
	I prefer to move to the outskirts of the city	70%	68%
Average		**61%**	**62%**

When looking at the average points for all respondents in choosing clusters around the courtyard, approximately 65% while 62% chose apartment buildings, which are close percentages. The future design of housing should take both these desires into account. For example, a merger of the two models can be found in the form of medium-rise apartment buildings wrapped around the courtyard common space to achieve spacing between the surrounding buildings and reduce the number of apartments that share the same entrances and staircases.

The importance of feeling safe is an influential force for directing housing choice in the future. Hence, people in the sample were asked about their reasons for choosing housing types by choosing other factors affecting the housing choice, such as economic, cultural, and social factors, as shown in *Table 4*.

The results indicate that the most preferred reasons for choosing apartment buildings in the future are economic consideration and proximity to services. This type provides reasonable prices for people with limited income and proximity to essential services compared to other types, such as detached houses. The results also indicate that the most common reasons for not choosing apartment buildings are overcrowding and the weak relationship with the external spaces related to feeling safe. This result confirms the results in the previous *Table 3*.

The results also indicate that the most important reason for choosing clusters in the traditional city in the future, 26%, is residents' emotions because these houses are part of Palestinian heritage. Another reason is that the traditional cluster is better than apartment buildings, according to 10% of respondents. This type also provides shared spaces for social interaction, suitable prices for people with limited income, and proximity to essential services compared to apartment buildings. The results also indicate that most reasons for not choosing the cluster in the traditional town are 34% the poor structural condition and a lot of deterioration in the load-bearing elements, which directly affects the residents' feeling of safety in the traditional environment, as shown in *Table 4*.

Table 4. Future households' directing forces of decisions in terms of housing types (see Appendix3)

Question		Item	Cluster	Apartments	Average
1.	**If you are going to live in an apartment building, which reason/s describe why?**	Modernity	12%	4%	8%
		My income is limited	16%	36%	26%
		Relations with neighbours	12%	0%	6%
		Accessible for the services	20%	20%	20%
		Safety and Security	8%	8%	8%
		It is not an option	32%	32%	32%
2.	**If you do not want to live in an apartment building, which reason/s describes why?**	Relation to outdoor spaces	24%	32%	28%
		Lack of safety	24%	16%	20%
		Crowding	36%	36%	36%
		Relations with neighbours	12%	4%	8%
		Not enough services	0%	8%	4%
		Dwellings design	4%	4%	4%
3.	**If you want to live in the cluster of the traditional city, which reason/s describes why?**	More emotional	40%	12%	26%
		It is better than apartments	20%	0%	10%
		Strong relations with neighbors	0%	4%	2%
		Accessible for the services	8%	4%	6%
		Safety and Security	4%	4%	4%
		My income is limited	4%	0%	2%
		It is not an option	24%	76%	50%
4.	**If you want to avoid living in the cluster of the traditional city, which reason/s describe why?**	Society relations	12%	24%	18%
		Prestige	4%	0%	2%
		Deterioration	28%	40%	34%
		Not enough safety	40%	16%	28%
		Crowding	8%	20%	14%
		Not enough services	4%	0%	2%
		Dwellings design	4%	0%	2%

5. CONTINUE AND CHANGE OF HOUSING CHOICES

According to the previous practical experience of the authors before preparing this study, expectations were focused on obtaining positive results in terms of feeling safe in traditional cluster housing compared to modern high-rise buildings. This idea was supported by the potential of traditional concepts and the previous housing choices of Nablus city residents, as discussed in section 1. However, satisfaction with existing housing was the opposite of that expectation, as residents' satisfaction in modern apartment buildings was 54% higher than that of traditional cluster housing 42%. There are two possible reasons for this unexpected result. First, the physical condition of the apartment buildings is better due to their relatively recent construction date compared to the traditional housing in the traditional city, as traditional housing suffers from some deterioration. The second reason is the narrow streets of the traditional city that may not provide adequate distance for residents from the buildings in case of evacuation after an earthquake—referring to the overview of housing choices in Palestine in section 1.

The study's results confirm some of the previous literature and contradict others. It shows that recipients are still reluctant to live in apartment blocks because of their weak relationship with the outdoors and crowdedness. However, if recipients have to live there, their decision changed from the desire to occupy high-rise apartment buildings -to obtain the view- to the desire to occupy the low-rise apartment buildings compared to the reference (Itma, Mohammed, 2018b). However, satisfaction with the existing cluster housing is decreased compared to previous studies because of the physical conditions of the houses; although this issue existed before the conduction of this study, it doubled when considering earthquakes. Refer to reference (Amad, 2003).

The results of this study also clarify that the dominant reason for choosing a cluster in the traditional city is more emotional compared to previous studies that described buildings of cluster housing as a better choice than apartment blocks. The reason is the weakness of such deteriorated buildings against earthquakes. However, a reasonable percentage of recipients still prefer traditional clusters to modern apartment housing. Refer to reference (Tawayha, Braganca et al., 2019).

Despite the decline of traditional houses as a choice for living, the study's results confirm that the courtyard type is still a preferable choice for the Palestinian family. Courtyards that function as a collective space for the residents are the highly preferred type of outdoor space in terms of feeling safe, as indicated in the reference (Itma, Mohammed and Monna, 2022).

The study shows that satisfaction with ventilation -which is a part of environmental conditions- is redirected to apartment blocks compared to traditional clusters because of the large modern windows in these buildings. This fact makes the contemporary design of windows a preferable approach in disaster times that contradicts the results of some previous references (Hussein, Barlet et al., 2010; Salameh, Touqan et al., 2022). Another demand for feeling safe in the future is adequate proxemics in the housing environment. Taking health measures in choosing future houses for the residents in their future choices is needed, such as insufficient distancing and low rates of overcrowding, as confirmed in the reference (Itma, Mohammed and Hussein, 2023).

Finally, the need for earthquake safety affects many of the residents' requirements. Some requirements are becoming more critical, such as the external courtyards and their suitability for times of escape, and there are some

other requirements whose importance to residents may decrease, such as the relationship of the residential unit to other units and the privacy of entrances and exits. This result indicates that the future housing design in seismic areas should consider all these emotional requirements for a more incredible feeling of hope in residential areas.

6. CONCLUSION

This study tried to address the ongoing concern of residents from disasters by analyzing housing types. It investigates the relationship between feeling safe and the urban environment in the Palestinian urban context after the moderated earthquake in March 2023. The aim is to explore the sudden change in a family's choice of housing due to such hazards and the resilience of current environments to respond to these changes. To do so, two common types of urban housing in Palestine are chosen: traditional cluster housing and modern apartment buildings. The study compares these types in terms of the safety of their residents. A field survey was conducted on thirty housing units of each type in Nablus City. Three characteristics are examined: houses' spatial design, houses' relationship with other houses, and buildings' relationship with the outdoor environment.

The study has monitored some reluctance to live in the traditional city because of the narrow streets and deteriorated physical conditions. Therefore, rough materials with narrow distances may have been initially used in the traditional towns to give a sense of safety against strangers; these tools are used to discourage their staying near houses, as can be noticed from the traditional urban form in Figure 2.a. Nevertheless, these tools are no longer preferred in contemporary society, especially when talking about safety from earthquakes as shown in the contemporary urban form figure 2. c. The results also assess apartment buildings in Palestine in terms of feeling safe, high-rising, weak relation with outdoor spaces, and crowded common areas are three disadvantages of this type that go against the feeling safe of their residents compared to the traditional clusters, as shown in figure 2. b, and d.

The study's main conclusion is that current housing environments fail to provide good urban resiliency with the changing of housing choices after an earthquake in terms of feeling safe. The cluster was designed in the past in a compact way to protect residents and provide safety from external matters. However, it cannot give a feeling of safety because of the narrow streets and the need for more open spaces in the traditional city. Apartments are based on rising vertically with less relationship with the outdoors and more crowding points. This conclusion confirms a relationship between feeling safe and housing type, especially after hazards. The study shows that housing environments in their contemporary and traditional forms do not fully support the feeling of safety in hazardous situations. This feeling directs householders' future choices for traditional and modern concepts. Such traditional concepts are mainly the low-rise environment, the low-crowding common areas, and the strong relationship with the outdoors using courtyards. However, future housing should consider the potential of both forms indicated in this study. Future housing can then be clustered apartment buildings around courtyards with relevant distances and wide streets. Urban and housing designers can use the results from this study to consider safety concerns and address the residents' demands for modern housing that integrates traditional concepts like low-rise housing and courtyard outdoor space.

Finally, the study discussed future housing design recommendations based on a survey of householders' satisfaction with their homes. And compare the results of this survey with those of previous studies. Hence, there is a need for more studies that adapt architectural and planning methods to reduce the effect of earthquakes on the housing environment and increase urban resilience by changing housing choices as a reaction to feeling safe. Although this effect is fundamental for all residents, other effects are also important to be considered in future design, such as building resistance against earthquakes and its relations with structural design, architectural shoring, and consolidation. The study recommends that these topics should be considered in future studies towards a suitable and safe housing environment in Palestine. The study also suggests that the influences of other types of disasters and pandemics on housing design should be further studied in future research.

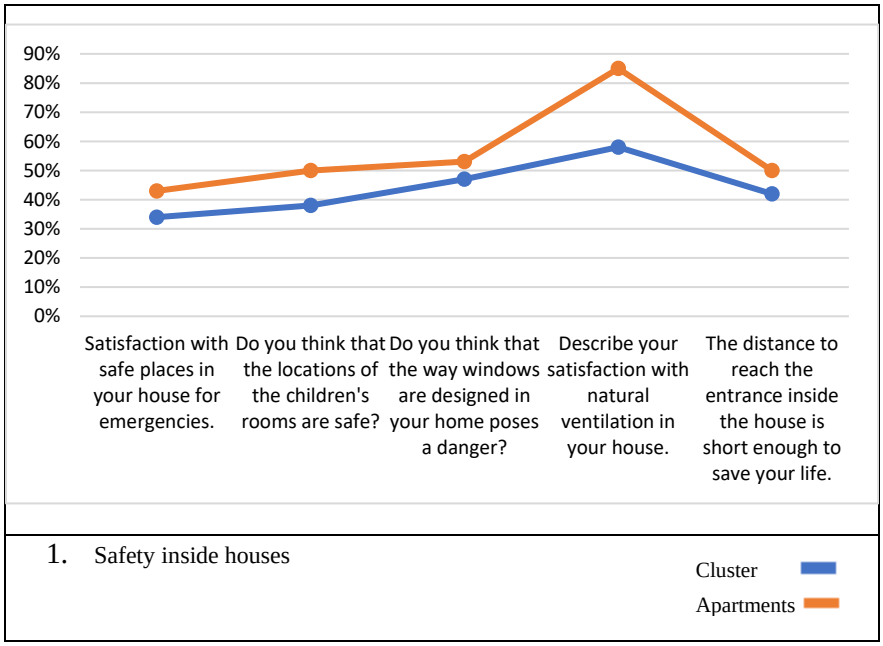
AUTHOR CONTRIBUTIONS

Conceptualization, M.I. and L.K.; methodology, M.I. and L.K.; software, M.I.; investigation, L.K.; resources, M.I., and L.K.; data curation, M.I.; writing—original draft preparation, M.I.; writing—review and editing, M.I. and L.K.; supervision, M.I. All authors have read and agreed to the published version of the manuscript.

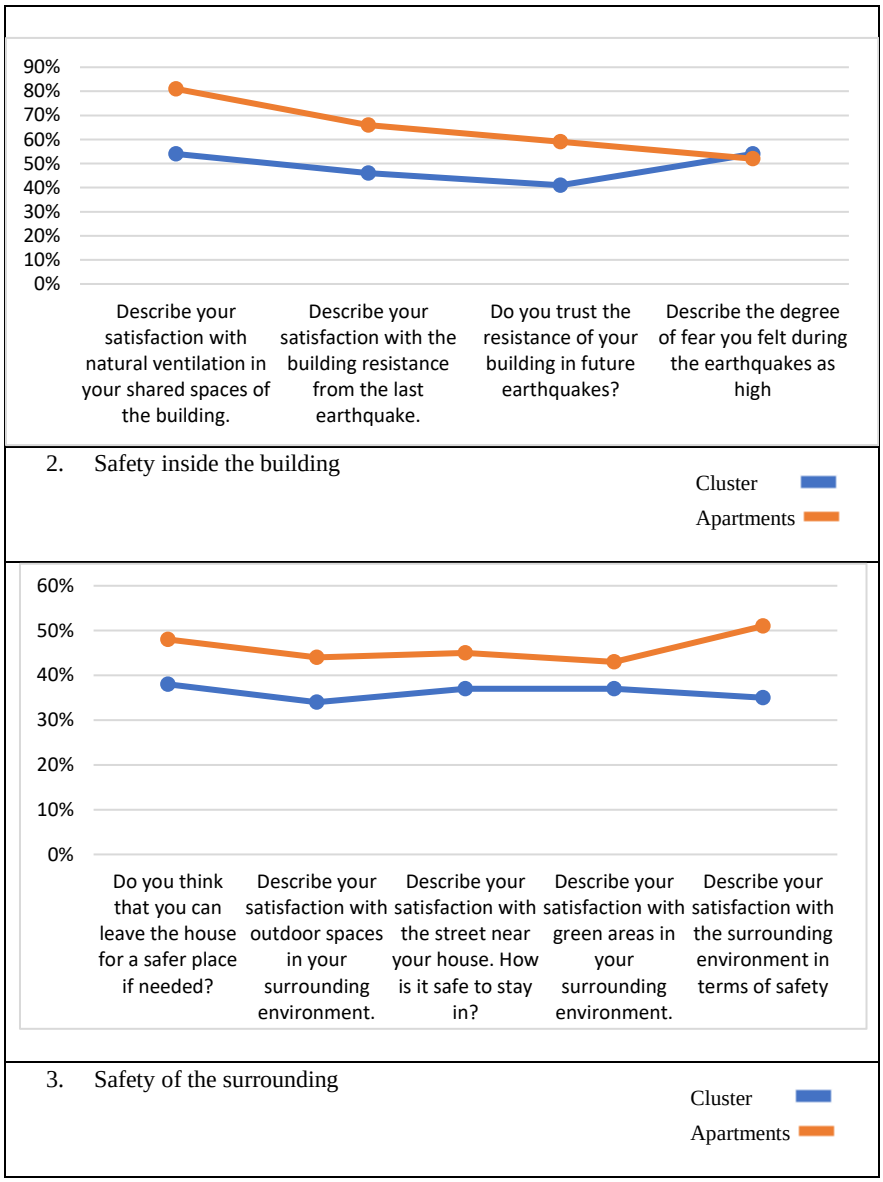
ETHICS DECLARATION

The authors declare that they have no conflicts of interest regarding the publication of the paper.

APPENDIX 1



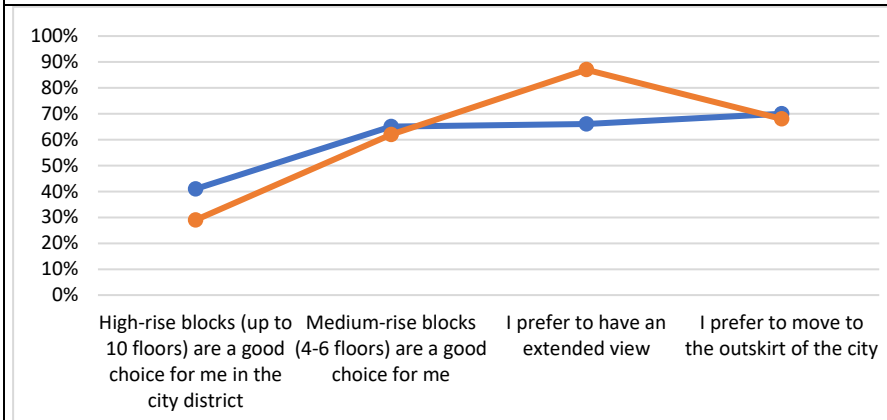
1. Safety inside houses


90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Describe your satisfaction with natural ventilation in your shared spaces of the building.
Describe your satisfaction with the building resistance from the last earthquake.
Do you trust the resistance of your building in future earthquakes?
Describe the degree of fear you felt during the earthquakes as high
2. Safety inside the building
Cluster
Apartments
60%
50%
40%
30%
20%
10%
0%
Do you think that you can leave the house for a safer place if needed?
Describe your satisfaction with outdoor spaces in your surrounding environment.
Describe your satisfaction with the street near your house. How is it safe to stay in?
Describe your satisfaction with green areas in your surrounding environment.
Describe your satisfaction with the surrounding environment in terms of safety
3. Safety of the surrounding
Cluster
Apartments

APPENDIX 2


90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Courtyard houses would be a good choice for me
I prefer sharing the building entrance and stairs with fewer neighbors
I prefer to move to live in a relatively low-rise area
I prefer to move to near the city center

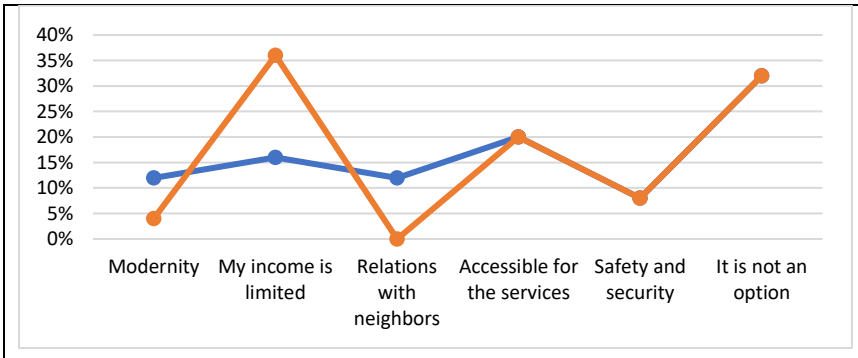
1. Cluster housing



2. Apartment buildings

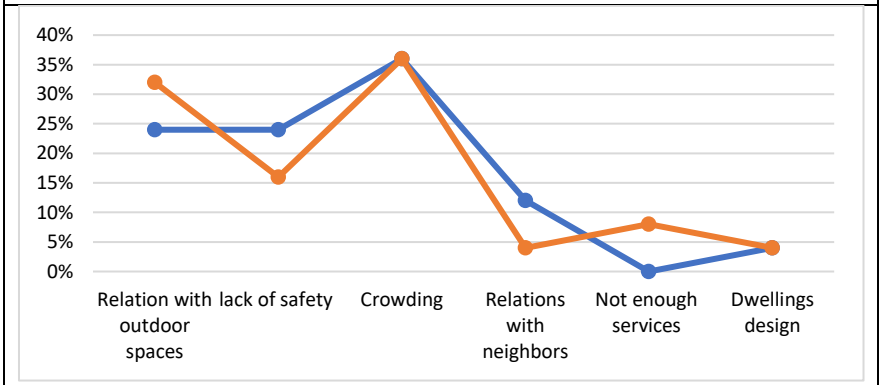
Cluster
Apartments

APPENDIX 3



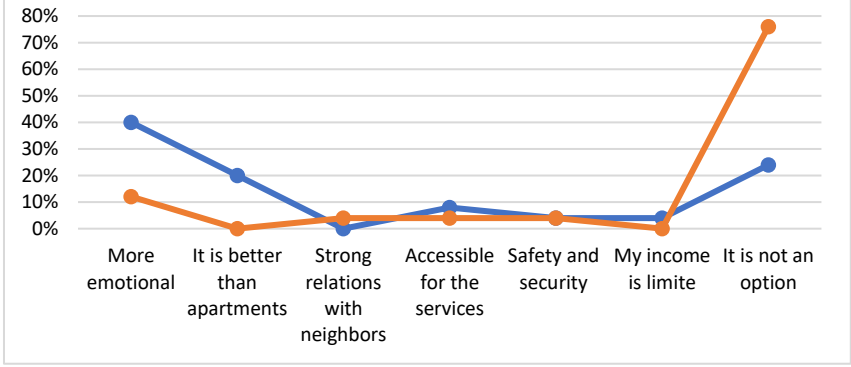
1. If you are going to live in an apartment building, which reason/s describe why?

Cluster
Apartments



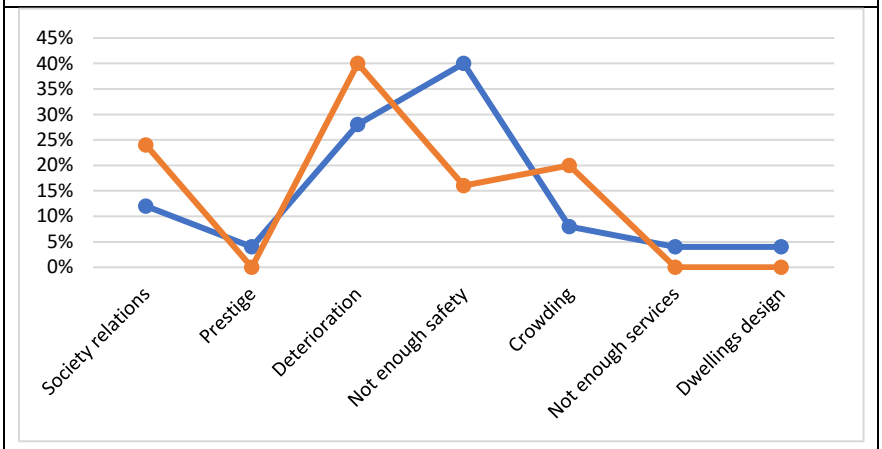
2. If you do not want to live in an apartment building, which reason/s describes why?

Cluster
Apartments



3. If you want to live in the cluster of the traditional city, which reason/s describes why?

Cluster
Apartments



4. If you want to avoid living in the cluster of the traditional city, which reason/s describe why?

Cluster
Apartments

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