

# Planning for missing middle housing: an alternative option for combating housing crisis in Jeddah city

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## ARTICLE INFO

Received 15/12/2022; received in revised form 20/12/2022; accepted 30/12/2022

DOI: [10.6092/issn.2281-4485/16042](https://doi.org/10.6092/issn.2281-4485/16042)

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## Abstract

The Kingdom of Saudi Arabia (KSA) has been experiencing a rapid urban growth in the recent decades with intense demand on housing. Government policies are trying to revise strategies to supply more housing units in order to meet the exerting pressure of housing demand, and enhancing the living standard for the urbanites in Jeddah city. In doing so, increasing the population density in missing middle housing units at neighborhoods in Jeddah can be critical to enhance livability index of the city. This study, emphasizes the need of introducing missing middle housing units in Jeddah city upon consulting the residents. In doing so, we have adopted a scientific research method to obtain information from the urbanites by conducting an online survey to the local residents of Jeddah (n = 116). Results demonstrate that 87% of the respondents are Saudi citizens in comparison to 13% Non-Saudis. Also, preferences are given to the courtyard types of building by the residents of Jeddah for their future investments in buying or renting a housing unit. Furthermore, this study may provide the choices of residents regarding missing-middle types of housing units and relevant organizations may introduce policies and strategies to meet up the growing housing demand in Jeddah city.

## Keywords

*housing demand, urban growth, housing policies, preferences, KSA*

## Introduction

Access to affordable and adequate housing is a basic human right for people around the world. As a result, understanding the relationships between housing and wellbeing have been increasingly critical these days in the scientific research (Abdul-Rahman et al., 2014; Agrawal et al., 2020; Baqutayan, 2015; Newman, 2008). Scientists are arguing that the difference between new housing supply and rising demand do not match appropriately to cater the unprecedented housing need around the world (Andrews, 1998; Hulse et al., 2015; Kraatz, 2018; Meehan, 2014; Mich, 2018). Moreover,

affordability and accessibility to the housing market in the face of growing number of population is hindering the sustainability initiatives of major cities in the world (Daniel et al., 2018; Kraatz, 2018; Ndubueze, 2009; Newman, 2008). Several recommendations are found in the recent body of literature to provide affordability in order to offer potential solutions of the housing crisis such as:

Relaxing the regulatory measures at different levels of government strata (i.e., local, provincial/state, and federal) to promote more housing supplies upon considering time and costs (Ades, 2016; Ndubueze, 2009; Wegmann, 2020):

DOI: [10.6092/issn.2281-4485/16042](https://doi.org/10.6092/issn.2281-4485/16042)

- Focusing the innovation in building faster houses while increasing productivity and lowering associated costs (Baqutayan, 2015; Goldman, Ian. and Pabari, 2021; Wegmann, 2020);
- Offering innovative financing packages to people for qualifying mortgages for new buyers and supporting affordable rental housing access to the tenants (Daniel et al., 2018; King et al., 2017; Park & Jung, 2019);
- Assisting renters to improve financial strengths and credit scores to facilitate homeownerships (McConnell, 2013);
- Preserving neighborhoods, empowering local communities, and using existing housing and land to provide greater housing opportunities (Kraatz, 2018; Newman, 2008);

These recommendations are generally provided for enhancing the living quality of citizens living in urban areas. Interestingly, several types of housing options are available in the urban centers such as: detached single-family houses, duplex, cottage, fourplex, townhouse, triple stacked, multiplex medium, courtyard building, mid-rise, and high rise buildings (Baqutayan, 2015; Hulse et al., 2015; Mich, 2018; Saleh Baqutayan, 2014; Zafirah Al Sadat Zyed, Wan Nor Azriyati Wan Abd Aziz, 2016). However, some houses are accessible only for the higher income group of people and some are accessible to lower and lower-middle income strata of the society depending on the affordability (McConnell, 2013; Mich, 2018; Sharam et al., 2015).

The term “missing middle” is elucidated by Daniel Parolek by defining housing structures those are viewed as a critical tool in achieving the higher residential densities of the city while maintaining the appealing low-rise character of the suburbs (Baqutayan, 2015; Diller & Sullivan, 2018; Mich, 2018; Saleh Baqutayan, 2014; Wegmann, 2020). Several studies have identified that single family houses are reflecting the consumer preferences while appropriate for raising children (Wegmann, 2020; Zafirah Al Sadat Zyed, Wan Nor Azriyati Wan Abd Aziz, 2016). Whereas, single-family houses are critically evaluated by the historians in planning as it creates social segregation and class exclusion (Quindara, 2020; Wegmann, 2020). However, increasing higher density in the downtown core is getting popularity these days to mitigate climate change, and to revitalize central business districts (Andrews, 1998; Holleran, 2021; Mich, 2018; Quindara, 2020). Missing middle housing explains that

the middle group of housing schemes (e.g., duplex, cottage court, fourplex, townhouse, triplex stacked, multiplex medium, courtyard buildings, etc.) are usually avoided by zoning regulations, city master plans, and other relevant documents to encourage suburbs and sprawling (Baqutayan, 2015; Mich, 2018; Wegmann, 2020). Consequently, these housing units are providing opportunities for both single family homes and mid-rise buildings around the world (Parolek, 2010). However, missing middle housing is receiving attentions these days as they provide house-scale buildings with multiple units in a walkable neighborhood for ensuring healthy communities. Also, these housing types can decrease environmental footprints upon ensuring blended densities (Al Obaid, 2020; Aljoufie & Tiwari, 2020; Mulliner & Algrnas, 2018).

Note that, the housing crisis is still prevailing in most of the countries including the Kingdom of Saudi Arabia (KSA). In the KSA, the Land Grant Program provides right to every Saudi citizen to have the right of a free parcel of land with an approximate size of 400 sq. meters (Aljoufie & Tiwari, 2020).

Consequently, the same program explains that the person is eligible if not have had access to any such program at a prior time. Despite several policy interventions from the government sector, a convenient location with a decent affordable house remains a dream for many of the low-income people in the country. To provide the basic housing access to all citizens, the vision 2030 plan from the government prioritize housing as a critical component of enhancing living standard of the entire population (Arvai et al., 2006; Danielaini et al., 2019; Wegmann, 2020). As a result, affordable housing stands in the core housing policies to include the lower- and middle-income groups for a future sustainability and community development of the country. Also, the affordable housing policy in the KSA has been hit heavily by the rise of land prices during the economic boom in 2004 to 2008 (Al Obaid, 2020). This trend continues at present not only because of the economic boom of the country but also accommodating the population growth in the face of rapid urbanization. Moreover, researchers have identified several reasons of housing shortage in the recent time as (i) supply of houses are not keeping up with demand; (ii) housing costs rising faster than the income; (iii) demographical changes across the country with special focus on urban areas; and (iv) scarcity of land for potential big housing projects (Al Obaid, 2020; Alqahtany, 2021; Mulliner &

Algrnas, 2018). Interestingly, the ministry of housing has pinpointed several challenges for the residents in accessing to the existing housing market of the country, those are: (a) heavy reliance on government loans; (b) difficulties in securing loans from personal sources; (c) shortage of appropriate housing choices according to the need of the people; and (iii) inefficiency of private real estate sector to cater the existing housing demand (Alqahtany, 2021; Branco & Alves, 2020; Quindara, 2020). Thus, for providing more housing supplies to cater the unprecedented urban growth in KSA, more affordable housing is required. Moreover, the options for missing middle types of housing can be an alternate to shelter many urbanites in the country.

This paper intends to understand the potentials of 'missing middle housing' schemes as an instrument for providing more housing facilities to the growing urban population in KSA. Also, the government is considering policies to enhance livability indices in the country by providing more housing units to people who need affordable houses. Delivering affordable units within the context of walkable, mixed-income, quality environment, and cultural aspects are critical manifestos from the central and local governments to set up multiple directions. Missing middle housing units are considering as an instrumental option for decision-makers to deliver more housing units aligned with existing cultural, religion, and environmental perspective of the country. Also, it is apparent that the local communities and citizens need to understand the different types of housing units available for them in order to satisfy their expectations from the housing units. As a result, we have conducted a detail survey among people in four major cities to perceive their expectations whether the housing unit can serve their expectations while increasing the density coupled with sustainability considerations. In doing so, the paper considers key objectives such as: (i) understanding the views of the local citizens about missing middle housing typologies and if they have prior knowledge about densities; (ii) grasping the sense of the citizen's preference of specific housing units (e.g., duplex, fourplex, courtyard buildings, townhouse, live-work, etc.) and their expectations of a particular type and price; and (iii) recommending the policies for decision-makers in the light of obtained information from this research to enhance density while considering the existing zoning and planning regulations of the country.

### **Study Area**

We have considered Jeddah city of Saudi Arabia as our study area in this research (See Figure 1 for details). Several respondents have participated the online survey while staying in Makkah, Al Madina, Riyadh, and Dammam. However, all of these respondents have primary home in Jeddah city and are considered as the residents of Jeddah. The city stands primarily the commercial capital of KSA and considered as the major gateway by Muslim pilgrimage traveling to Mecca and Medina (Naji et al., 2020). The city is situated on the west coast of Saudi Arabia along the shore line of the Red Sea at 21.4858° N and 39.1925° E (Elfadaly et al., 2020). Consequently, the area of the city is approximately 1765 km<sup>2</sup> with a total land area within the jurisdiction is around 5460 km<sup>2</sup> (Aljoufie and Tiwari, 2020; Alqahtany, 2021; Elfadaly et al., 2020). Population of the city is estimated around 3,425,999 inhabitants living in 13 sub-municipalities that comprise 113 districts (Hesham El-Askary, Zeynal Abiddin Erguler, Murat Karakus, 2022). Also, the population growth rate in the KSA is anticipated around 2.3% in last two decades with a maximum peak recorded around 6.52% in 1982 (Addas and Alserayhi, 2020; Hesham El-Askary, Zeynal Abiddin Erguler, Murat Karakus, 2022; Mulliner and Algrnas, 2018).

Interestingly, Jeddah is the only city in KSA with a historic city district (i.e., Al Balad) and is attempting to preserve the cultural heritages in the city (Hegazy et al., 2021). Jeddah has been experiencing a rapid urban growth, spatial expansion, and transportation corridor extensions in last 40 years to accommodate the exerting pressure of urbanization (Aljoufie et al., 2013). Moreover, the city has been going through a transition of introducing mega-infrastructure facilities (e.g., housing, and transportation networks) to offer the residents a higher quality of life (Aljoufie & Tiwari, 2020). Thus, affordable housing and higher density neighborhoods are the priorities from local and central government to support the citizens in ensuring higher quality living environment (Addas & Alserayhi, 2020). In the context of climate, Jeddah fell in the arid belt to the Koppen's climate classification (Naji et al., 2020). The average winter temperature of the city endured around 15°C, and during the summer it happened approximately 45°C (Şen et al., 2017).



**Figure 1.** Location of major cities of KSA. Note that, we considered Jeddah city as our study area.

## Methods

We conducted a quantitative survey method to collect primary data from the citizens of Jeddah city regarding their preferences of housing. The structured interviews and included attributes demonstrated the missing middle housing types, preferences, and potentials in Jeddah. In conducting this research, we used several data sets (i.e., primary, secondary, and GIS data). Figure 2 demonstrates the details of the methods adopted in this study. Also, several steps were followed in completing this research as such:

(a) Literature review: In the first stage, we collected secondary information obtained from reliable resources (e.g., scientific articles, government documents, published and unpublished reports, and municipal development plans). These materials assisted us to synthesize the issues related to missing middle housing potentials, understanding the theories and contemporary research methods adopted in the similar studies, and preparing the structured interview questionnaire to be distributed among the urbanites. Additionally, we summarized the methods of data analysis techniques adopted in contemporary literature to assist us in summarizing information in our study. Consequently, the literature review supported us to identify appropriate sources of information

required for this study in understanding the theories and applications. Note that, we searched the literature mostly using internet web portals (e.g., google scholars, Jeddah municipality, KAU, university libraries, etc.).

(b) Data collection: Once the sources of materials and relevant sources were identified in the previous section, we started to collect both primary and secondary information. For collecting the primary data, we prepared a structured online questionnaire to be distributed through email, social media, and website (KAU) and made the link available using google form for one month during June and July 2021. We received 116 responses from people of different socio-economic background and in this specific time and then closed the google form's link. Additionally, we collected geographic information system (GIS) dataset from the research labs at KAU, and municipality of Jeddah. Note that, all the GIS data sets were transformed and projected using the Universal Transverse Mercator (UTM), and the World Geodetic System (WGS84) for preparing study area map (Alashaikh, 2017).

(c) Data processing, analysis, and summarizing results: Once we collected the data using online platform (i.e., google form), we started processing the data using MS excel. In the first step, we cleaned the data and coded (e.g., men and women respondents were coded as 1 and 2 using MS excel) them according to the responses

received using online questionnaire survey. Additionally, several obtained data were coded using SPSS software (i.e., version 27) in order to prepare them for statistical models and analysis. Interestingly, we identified diverse socio-economic group of respondents (e.g., gender, age, income, etc.) as dependent variable to assess the preferences of missing middle housing options available

for evaluation. Furthermore, we employed descriptive statistical analysis tools for summarizing information for understanding the perception of missing middle housing potentials and people’s willingness to support this scheme if available from the government housing policies.

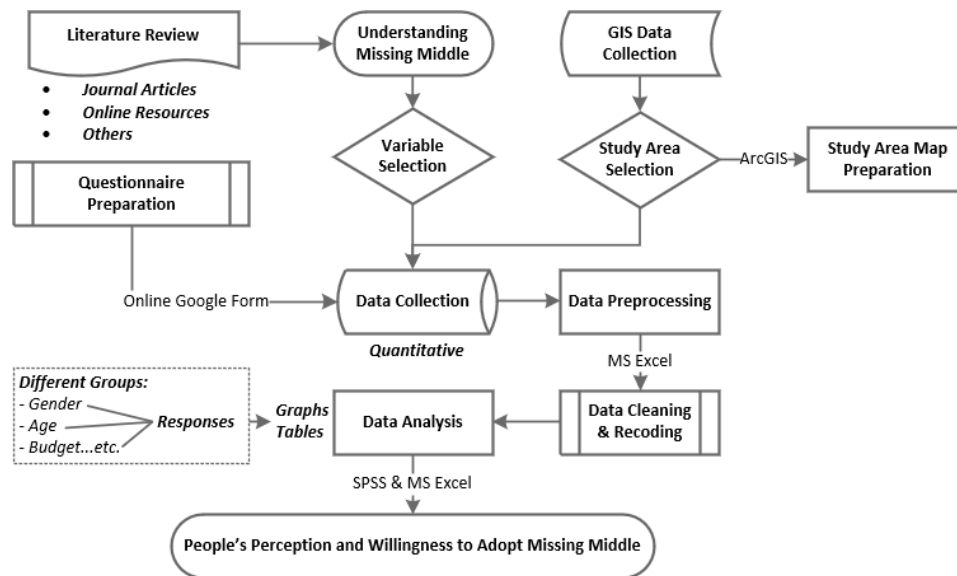


Figure 2. Schematic diagram of the methods employed in the study.

**Results**

We obtained diverse results highlighting the importance of missing middle housing options in Jeddah city. The major findings are summarized in this section.

**Social status of the respondents**

Respondents took part the online questionnaire survey were mostly Saudi citizens (87%) living in Jeddah. The rest 13% respondents were non-Saudi and considered as immigrants working in the country. Out of the 87% Saudi citizens, 44% respondents were male and 43% were female. Also, majority of the respondents were between 26 to 35 years age group (22% respondents in particular). Table 1 summarizes this information below. In grand total, 53% respondents were male and 47% were female considering both Saudi and Non-Saudi citizens. This explained that the participation of the online survey platform was attracted both male and female residents to explain their thoughts. Also, most of the respondents were in the age group between 26 to 35 years (34% out of the total). This information illustrated that the younger people were keen to know about the

future strategies and policies related to housing issues in Jeddah city. Also, this particular age group responded to the questions enthusiastically.

Citizenship Status	Female	Male	Grand Total
Non-Saudi	4%	9%	13%
18-25 Years	2%	1%	3%
26-35 Years	2%	5%	7%
36-45 Years	0%	1%	1%
46-55 Years	0%	2%	2%
Saudi	43%	44%	87%
18-25 Years	14%	5%	19%
26-35 Years	14%	20%	34%
36-45 Years	11%	11%	22%
46-55 Years	4%	5%	8%
56-65 Years	1%	1%	2%
66 Years or more	0%	3%	3%
Grand Total	47%	53%	100%

Table 1. Summary statistics of the respondents took part in the online survey platform.

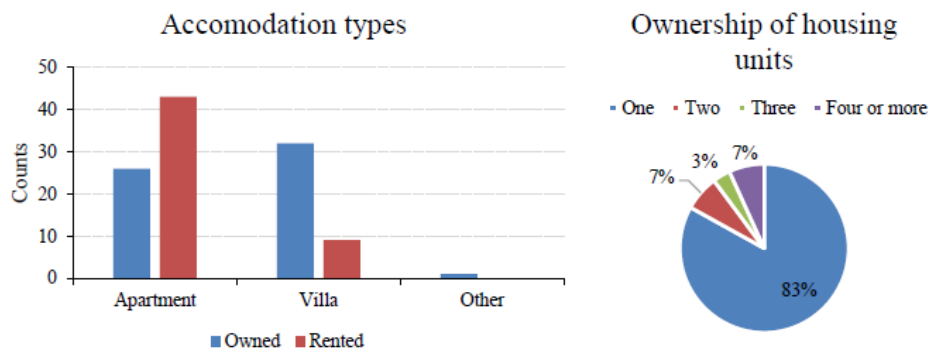


Figure 3. Respondents currently living in the type of housing and ownership status

**Ownership and types of housing units**

Figure 3 illustrates that majority of the households are now staying in apartment buildings (i.e., either owned or rented).

Consequently, 83% of residents own at least one house/ apartment building in Jeddah city. Whereas, 7% people own two and four houses or apartments. It is worth noting that most of the people have two different types of accommodations such as apartment, and villas. In Jeddah, villas are considered as an independent dwelling unit having a comfortable and spacious living space (Alqahtany, 2021; H Ojah Maharaj, 2020; Kraatz, 2018; Naji et al., 2020). Owners of more than one house are typically renting their second, third, and fourth dwelling units to other people.

**Preference of housing types by the residents of Jeddah city**

Local citizens have demonstrated differences of their choices of specific housing units. Interestingly, the choices differ in terms of age. Figure 4 summarizes the

housing units choose by the residents of Jeddah city those are highly aligned with missing middle types of housing.

Also, Figure 4 shows that younger population are highly inclined to chose courtyard types of building. Especially, 18 to 25 years age group has a top preference of courtyard types of housing units.

Additionally, duplex types housing units are also preferable for each age groups considered in this study. However, 26 – 35 years age group has the highest preference for duplex type housing units when they want to buy or rent. Figure 5 represents the different types of housing units for the missing middle type in Jeddah city. Note that, townhouses are the least preferable one for the local citizens as they feel that this particular type of housing may not be suitable for raising kids, and for the culture of privacy in the country. Another interesting outcome demonstrates that 56-65 years age group only prefers side-by-side duplex houses to move in. This is because of the opportunities of socialization among the neighbors during their retirement period.

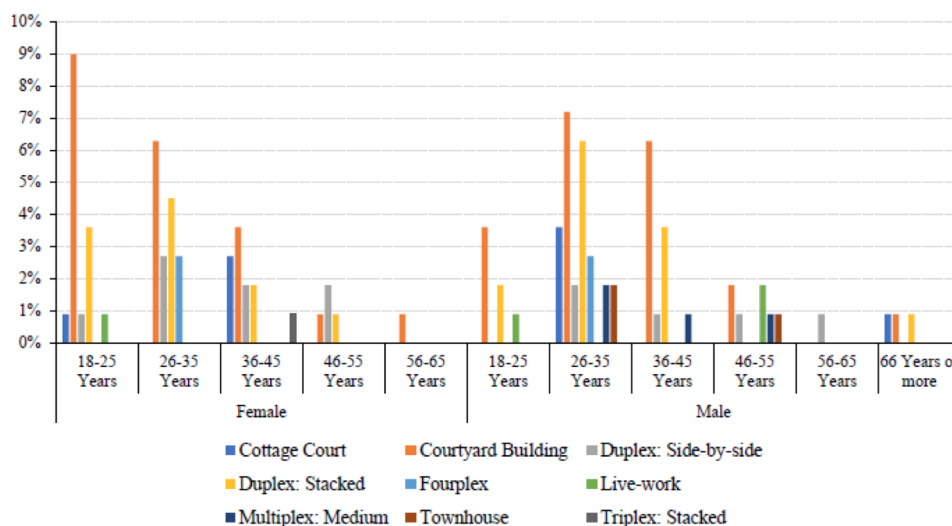


Figure 4. Respondents' preference of housing units relevant to missing middle types in Jeddah city.



**Figure 5.** *Medium Density Housing Design Options.* (Photo Sources: Authors, 2021)

#### **Budget allocation of preferable housing units by the residents:**

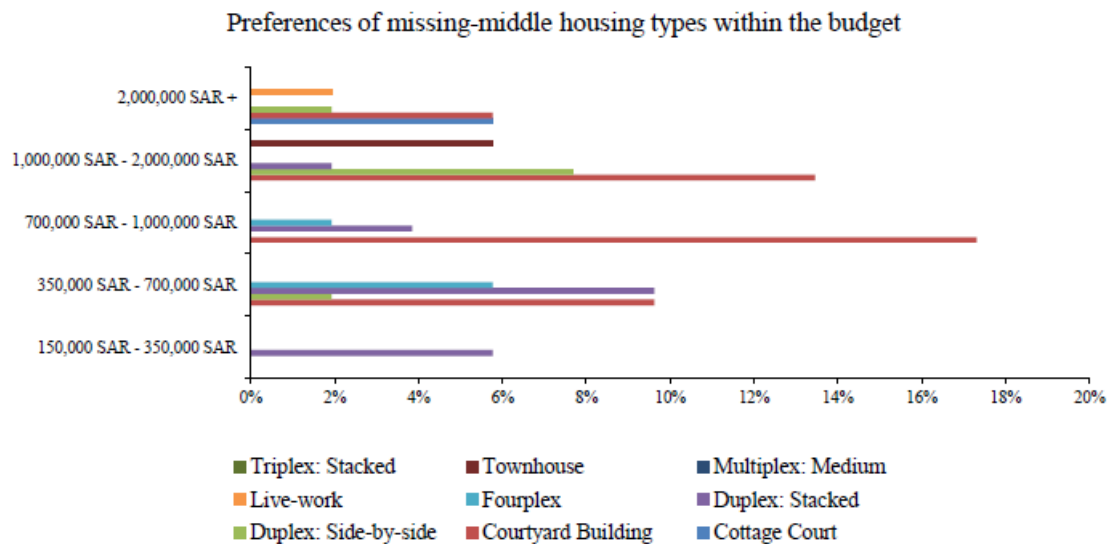
Interestingly, most of the local residents are willing to buy a house to dwell in. Their preferences are focused mostly on courtyard type of buildings in Jeddah city. Additionally, Figure 6 demonstrates that the expected price for obtaining a housing unit by the residents can be divided into three main cohort, the first is 3500,00 – 700,000 SAR; the second, 700,000 – 1,000,000 SAR (the most expected price); and the third, 1,000,000 – 2,000,000 Saudi Riyal (SAR). Within the price and budget recommended by the respondents, they want to own a house within 2 million SAR and the optimal expectation is a courtyard building. However, cottages and duplex stacked houses are considered the second demanded type and cost approximately 0.7 to 1 million SAR. Interestingly, duplex stacked housing type is the only one among the other types that are expected to be available at an affordable price for the respondents. Live-work type is the only one the respondents categorized to be the most expensive type among the others.

#### **Familiarity of the missing-middle housing types by the respondents**

In the literature, missing middle housing type describes a wide range of single and multi-family units those are compatible at the neighborhood level and are somewhat missing in several cities with high demand of housing units (King et al., 2017; Mich, 2018; Naji et al., 2020; Osra & Jones, 2018; Parolek, 2010). Additionally, these types of housing are favoring the increase density at neighborhood level to enhance vibrant urban experience in several major cities in the world (Abdul-Rahman et al., 2014; Branco & Alves, 2020; Daniel et al., 2018; Diller & Sullivan, 2018; Quindara, 2020). In our study, 58% of the respondents have heard about the high-density missing housing units and the remaining (42%) respondents have not heard about this term. It signifies that there are options to make this term ‘missing middle housing unit’ popular to the local residents for increasing urban density and enhancing the livability of the city. Additionally, 81% respondents are willing

to buy their next house those are within the missing middle types and only 19% of the respondents are in dilemma to choose this type. Furthermore, 46% female respondents have head about

this high density missing middle housing options available for them and are willing to buy these housing units if available to them depending on government loans and mortgages.



**Figure 6.** Respondents' preference of housing unit types according to the budget of owning a new house. (1 Saudi Riyal (SAR) = 3.76 USD as per October 11, 2022)

**Activites preferred by the respondents during the Covid-19 pandemic**

Over the past two years, humanity has faced repeated quarantine and medical isolation due to the Covid-19 pandemic. Our results have demonstrated several architectural functions that users may like to have in one of their future middle densities homes. The most requested architectural function the respondents are required to perform inside their missing middle housing unity is an indoor Gym. Also, the respondents seek a private entertainment floor in the building. The

respondents have additionally requested other indoor and outdoor recreational functions like a library, study area, and gardening. Furthermore, the most requested exterior architectural function the majority of the respondents have preferred outside their missing middle houses is opportunities for gardening around the house. They also have mentioned about the opportunities for walking inside the housing unit without going outside. A few more prominent requests appear from the respondents are the availability of gardens, places to walk, and a courtyard as an open space to the sky in the housing unit.



**Figure 7.** During the Covid-19 lockdown, citizens of Jeddah city have spent their time in different activities, which are highly aligned with the opportunities provided by missing middle housing units. This figure summarizes the list of activities respondents have experienced during the Covid-19 pandemic.



## **Discussion**

Very recently, government has allotted housing for 5,589 Saudi families whose homes are razed in order to accommodate the new development plans of Jeddah (Alhajri, 2022; Hegazy et al., 2021; Maddah et al., 2022). Also, challenges faced by Jeddah city for the housing need exacerbates the options of introducing the missing-middle types of housing if the citizens are willing to accept them considering future plans, budget, and accessibility. Based on our findings in this research, we opt to summarize few interesting discussion points for future policies and strategies of housing development in Jeddah. Those are as follows:

- We have included a wide range of age group as respondents of the survey to distinguish the preferences of missing middle housing types for any potential housing supply. Government can consider that the missing-middle housing types are not still popular among the residents, however, population of Jeddah are somewhat familiar with the housing units and are willing to purchase in the future depending on availability. Interestingly, young population (e.g., age groups between 25 – 40 years) are also inclined to buy new house. This may open up opportunities for new housing supply targeting the missing middle units
- Majority of the residents in Jeddah prefers apartment houses (Figure 3 for details) because the apartment buildings are affordable and they ensure security for the residents. Also, majority of the population own one housing unit which is apartment. Once people buy their second unit, usually they think for the houses fall into the missing middle category (e.g., townhouse, cottage, courtyard building, etc.). Also, courtyard types of housing units are popular among different age groups in the city. Thus, we are recommending that courtyard types of housing units can be introduced in the newly developed areas of the city. Furthermore, the demolition of older buildings and a few neighborhoods are carried out by the city authority started in 2022. This may provide opportunities for the relevant authorities to introduce courtyard type housing units in the city's jurisdiction so that people can have access for better urban environment.
- Covid-19 has changed the life of people living in Jeddah since 2020. During and after the Covid-19 pandemic, residents have been highly engaged in gym, spending more time inside their houses, and turned housing units into work space. This situation exerts demand on higher and compact housing unit to

accommodate several needs. Additionally, some social opportunities for indoor activities (e.g., social clubs, indoor swimming, social gatherings for kids, etc.) have been in demand to be accommodated in new housing units. This demand maybe useful for policy makers to supply additional housing units in the city by choosing missing middle type housing units. Figure 7 of this paper summarizes the additional activities and that the potential buyers may have been interest to add in.

The current population growth (1.2%) and urbanization rate (84%) (Alhajri, 2022; Alqahtany, 2021) maybe considered as an opportunity to introduce the missing middle types of housing units for the next generation urbanites in the city. Interestingly, most of the housing in KSA are built prior to introducing the housing policies that emphasizing building licenses and land use approval (Al Obaid, 2020; Alhajri, 2022; Mulliner & Algrnas, 2018). Within the present framework of land use policy, and building approval legislation, government maybe in a position to introduce the missing middle types of housing units for the new home buyers and can increase the density at neighborhood level. Increasing the density will be enhancing quality of life at neighborhood level while decreasing sprawling.

- Regarding the budget and willingness to pay for a new housing unit among citizens of Jeddah, it is evident that most of the respondents are agreed to chose courtyard and duplex-stacked housing units for their next home (see Fig. 6 for details). Also, they have agreed to consider the required budget for these two types of units. This information can be useful for the decision-makers related to housing policy and research to emphasize supply of missing middle types of units for the next generation home owners.

## **Concluding remarks**

In this research, we primarily have attempted to answer the questions whether the citizens of Jeddah city are familiar with missing-middle housing units, and if the available housing types are a good fit considering budget and potential policies. Upon completion of a primary survey to local citizens in Jeddah city, we have summarized that young population are familiar with the missing middle type of housing units and welcoming the supply of such units for their next home. Consequently, people from different age groups have agreed to have access to few indoor activities, gardening options, and availability of gyms in the neighborhood or inside the newly built housing facilities. Interestingly,

this demand of indoor activities within the housing units or neighborhood appearing to be new addition as a direct impact of covid-19 pandemic. This research paper demonstrates that missing-middle types of housing units can be popular for the residents of Jeddah city if available in the near future. In addition to the existing housing stocks, policy-makers can unlock the potentials of introducing missing-middle units in Jeddah to enhance livability of the city. In the recent past, approximately 30 neighborhoods out of 126 are demolished for redeveloping and regenerating the livability of city (Fatma, 2022). Thus, new policies can be introduced to align the future expansion and development of housing units under the present US\$20 billion project highlighting missing middle units. Also, this paper attempts to highlight the significance of missing middle housing issues within the present housing policies and frameworks in Jeddah so that scholars can study further about the preferences of residents.

## References

- ABDUL-RAHMAN H., WANG C., WOOD L. C., KHOO Y.M. (2014) Defects in Affordable Housing Projects in Klang Valley, Malaysia. *Journal of Performance of Constructed Facilities*, 28(2):272–285. [https://doi.org/10.1061/\(asce\)cf.1943-5509.0000413](https://doi.org/10.1061/(asce)cf.1943-5509.0000413)
- ADDAS A., ALSERAYHI G. (2020) Quantitative Evaluation of Public Open Space per Inhabitant in the Kingdom of Saudi Arabia: A Case Study of the City of Jeddah. *SAGE Open*, 10(2). <https://doi.org/10.1177/2158244020920608>
- ADES D. (2016) Preserving Existing Affordability Through a Social Purpose REIT. I(I).
- AGRAWAL S.K., PALLATHUCHERIL V., SANGAPALA P. (2020) Affordable Housing for Emiratis in the United Arab Emirates: The Case Study of Ras Al Khaimah. *Housing Policy Debate*, 900–925. <https://doi.org/10.1080/10511482.2020.1772336>
- AL OBAID H.M.A. (2020) Factors Determining Housing Demand in Saudi Arabia. *International Journal of Economics and Financial Issues*, 10(5):150–157. <https://doi.org/10.32479/ijefi.10262>
- ALASHAIKH A.H. (2017) Numerical transformation technique for coordinate systems in the Kingdom of Saudi Arabia. *Arabian Journal of Geosciences*, 10(6):10–15. <https://doi.org/10.1007/s12517-017-2903-6>
- ALHAJRI M.F. (2022) Housing challenges and programs to enhance access to affordable housing in the Kingdom of Saudi Arabia. *Ain Shams Engineering Journal*, 13(6):101798. <https://doi.org/10.1016/j.asej.2022.101798>
- ALJOUFIE M., TIWARI A. (2020) Exploring Housing and Transportation Affordability in Jeddah. *Housing Policy Debate*, 1–27. <https://doi.org/10.1080/10511482.2020.1815070>
- ALJOUFIE M., ZUIDGEEST M., BRUSSEL M., VAN MAARSEVEEN M. (2013) Spatial-temporal analysis of urban growth and transportation in Jeddah City, Saudi Arabia. *Cities*, 31:57–68. <https://doi.org/10.1016/j.cities.2012.04.008>
- ALQAHTANY A. (2021) Affordable housing in Saudi Arabia's vision 2030: new developments and new challenges. *International Journal of Housing Markets and Analysis*, 14(1):243–256. <https://doi.org/10.1108/IJHMA-04-2020-0035>
- ANDREWS N.O. (1998) Housing Affordability and Income Mobility for the Poor : A Review of Trends and Strategies.
- ARVAI J., BRIDGE G., DOLSAK N., FRANZESE R., KOONTZ T., LUGINBUHL A., ROBBINS P., RICHARDS K., KORFMACHER K.S., SOHNGEN B., TANSEY J., THOMPSON A. (2006) Adaptive management of the global climate problem: Bridging the gap between climate research and climate policy. *Climatic Change*, 78(1):217–225. <https://doi.org/10.1007/s10584-006-9094-6>
- BAQUTAYAN S.M. (2015). The Impact of Housing Issue on the Well-being of Middle-Income Group. *Mediterranean Journal of Social Sciences*, 6(6): 522–527. <https://doi.org/10.5901/mjss.2015.v6n6s1p522>
- BRANCO R., ALVES S. (2020) Urban rehabilitation, governance, and housing affordability: lessons from Portugal. *Urban Research and Practice*, 13(2):157–179. <https://doi.org/10.1080/17535069.2018.1510540>

DOI: [10.6092/issn.2281-4485/16042](https://doi.org/10.6092/issn.2281-4485/16042)

- DANIEL L., BAKER E., LESTER L. (2018) Measuring Housing Affordability Stress: Can Deprivation Capture Risk Made Real? *Urban Policy and Research*, 36(3):271–286. <https://doi.org/10.1080/08111146.2018.1460267>
- DANIELAINI T.T., MAHESHWARI B., HAGARE D. (2019) An assessment of household water insecurity in a rapidly developing coastal metropolitan region of Indonesia. *Sustainable Cities and Society*, 46:101382. <https://doi.org/10.1016/j.scs.2018.12.010>
- DILLER P.A., SULLIVAN E.J. (2018) The Challenge of Housing Affordability in Oregon: Facts, Tools, and Outcomes. In *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3125125>
- ELFADALY A., ELDEIN A.S., LASAPONARA R. (2020) Cultural heritage management using remote sensing data and GIS techniques around the archaeological area of ancient Jeddah in Jeddah city, Saudi Arabia. *Sustainability (Switzerland)*, 12(1):1–15. <https://doi.org/10.3390/SU12010240>
- FATMA T. (2022) Saudi Arabia is razing whole neighborhoods to make way for tourism and wealth. 1–19. <https://www.npr.org/2022/09/13/1121317025/saudi-arabia-demolition-jeddah>
- GOLDMAN I., PABARI M. (2021) Innovative solutions for the housing crisis. *Stanford Social Innovation Review*, 1–6.
- HOJAH MAHARAJ S. (2020) Factors Affecting the Supply of “Missing Middle” Housing Types in Walkable Urban Core Neighborhoods. *Muma Business Review*, 4(1):001–015. <https://doi.org/10.28945/4544>
- HEGAZY I., HELMI M., QURNFULAH E., NAJI A., SAMIR IBRAHIM H. (2021) Assessment of urban growth of Jeddah: Towards a liveable urban management. *International Journal of Low-Carbon Technologies*, 16(3):1008–1017. <https://doi.org/10.1093/ijlct/ctab030>
- HESHAM EL-ASKARY, ZEYNAL A. E., MURAT K. (2022). Research Developments in Geotechnics, Geo-Informatics and Remote Sensing. In *Journal of Intercultural Studies*. <https://doi.org/10.1007/978-3-030-72896-0>
- HOLLERAN M. (2021) Millennial ‘YIMBYs’ and boomer ‘NIMBYs’: Generational views on housing affordability in the United States. *Sociological Review*, 69(4), 846–861. <https://doi.org/10.1177/0038026120916121>
- HULSE K., REYNOLDS M., STONE W., YATES J. (2015). Supply shortages and affordability outcomes in the private rental sector: Short and longer term trends. In *AHURI Final Report (Issue 241)*.
- KING R., ORLOFF M., VIRSILAS T., PANDE T. (2017). Confronting the Urban Housing Crisis in the Global South: Adequate, Secure, and Affordable Housing. *World Resources Report*, 40.
- KRAATZ J.A. (2018). Innovative approaches to building housing system resilience: a focus on the Australian social and affordable housing system. *Australian Planner*, 55(3–4):174–185. <https://doi.org/10.1080/07293682.2019.1632361>
- MADDAH R., SONG J., DEGUCHI A. (2022). Diversification of Villa-Type Neighborhoods and Its Impact on Housing Shortages in a Growing Saudi Arabian City: A Case Study of Jeddah. *Sustainability (Switzerland)*, 14(13). <https://doi.org/10.3390/su14137716>
- McCONNELL E.D. (2013) Who has Housing Affordability Problems? Disparities in Housing Cost Burden by Race, Nativity, and Legal Status in Los Angeles. *Race and Social Problems*, 5(3):173–190. <https://doi.org/10.1007/s12552-013-9086-x>
- MEEHAN J. (2014) Reinventing Real Estate: The Community Land Trust As a Social Invention in Affordable Housing. *Journal of Applied Social Science*, 8(2):113–133. <https://doi.org/10.1177/1936724413497480>
- MICHLA. (2017) The missing middle: Understanding low-rise, moderate-density housing in Greater Boston. Dissertation, Massachusetts Institute of Technology. Retrieved from <http://hdl.handle.net/1721.1/111424>
- MULLINER E., ALGRNAS M. (2018) Preferences for housing attributes in Saudi Arabia: A comparison between consumers’ and property practitioners’ views. *Cities*, 83:152–164. <https://doi.org/10.1016/j.cities.2018.06.018>

DOI: [10.6092/issn.2281-4485/16042](https://doi.org/10.6092/issn.2281-4485/16042)

- NAJIA.A., ALMAIMANIA., RAHAMAN K.R. (2020) Analysis of the current development of community centers in Jeddah city. *Open House International*, 45(3): 249–268. <https://doi.org/10.1108/OHI-05-2020-0044>
- NDUBUEZE O.J. (2009) Urban Housing Affordability and Housing Policy Dilemmas in Nigeria. Centre for Urban and Regional Studies, January, 1–450.
- NEWMAN S.J. (2008) Does housing matter for poor families? A critical summary of research and issues still to be resolved. *Journal of Policy Analysis and Management*, 27(4):895–925. <https://doi.org/10.1002/pam.20381>
- OSRA O.A., JONES P. (2018) Understanding Change of Urbanism Patterns in Jeddah Between 1938-2017. Proceedings of the 5th International Conference S.ARCH-2018: The Way It's Meant to Be, Venice, Italy, 22-24 May 2018, October 2018, 1–23.
- PARK G.R., JUNG Y. (2019) Housing insecurity and health among people in South Korea: focusing on tenure and affordability. *Public Health*, 171:116–122. <https://doi.org/10.1016/j.puhe.2019.02.017>
- PAROLEK D. (2010) Missing Middle Housing: Responding to the Demand for Walkable Urban Living. *Journal of the American Society on Aging*, 33(4):5–6.
- QUINDARA J.P. (2020) Low-rise, high-density housing in Hawaii (Issue May). <https://scholarspace.manoa.hawaii.edu/server/api/core/bitstreams/0ed54bbd-a572-4bda-8ce7-aec6a55138c8/content>
- SALEH BAQUTAYAN D.S.M. (2014) The Affordable Housing Stress among Middle-Income Group. *IOSR Journal of Humanities and Social Science*, 19(7):82–90. <https://doi.org/10.9790/0837-19748290>
- ŞEN Z., AS-SEFRY S., AL-HARITHY S. (2017) Probable maximum precipitation and flood calculations for Jeddah area, Kingdom of Saudi Arabia. *Environmental Earth Sciences*, 76(1). <https://doi.org/10.1007/s12665-016-6312-z>
- SHARAM A., BRYANT L., ALVES T. (2015) De-risking development of medium density housing to improve housing affordability and boost supply. *Australian Planner*, 52(3):210–218. <https://doi.org/10.1080/07293682.2015.1034146>
- WEGMANN J. (2020) Death to Single-Family Zoning...and New Life to the Missing Middle. *Journal of the American Planning Association*, 4363. <https://doi.org/10.1080/01944363.2019.1651217>
- ZYED Z., AZIZ W.N.A., HANIF N.R. (2016) Housing affordability problems among younger working households paperback. Scholars' Press. Pp.338. ISBN-10:3659838225.