IDENTIFYING ISSUES IN GREEN SUSTAINABLE HOUSING FOR OLDER PEOPLE: A SYSTEMATIC LITERATURE REVIEW (SLR)

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ABSTRACT

Older people have an equal right to inclusive, affordable, and secure housing, and one of their basic needs is for them to have a place to call home. Given the growing number of older people worldwide, the trend towards green and sustainable housing to accommodate them is therefore becoming greater more than ever. This includes the instalment of solar panels, good air ventilation, gardening spaces, and thermal elements that can withstand heat, which may make older people's lives more comfortable and safer. Despite the general recognition of the advantages of embracing sustainability and going green, many countries are still encountering great difficulties to embrace the concepts fully. This is alarming because older people who are disadvantaged economically are more susceptible to subpar home amenities. This can then put their lives in jeopardy. Thus, this study aims to explore the issues associated with providing older persons with green and sustainable housing, using a Systematic Literature Review (SLR) approach involving SCOPUS and Web of Science (WOS) databases. Only 19 articles that met the inclusion criteria were included in the study out of the 59 records. The findings indicated that four major themes emerged: (1) the heterogeneous housing demands of older people within social groups; (2) the importance of green space being overlooked; (3) the deficiency of sustainability elements, putting older people at home in danger; and lastly (4) housing demand exacerbated by the growing number of the ageing population. Therefore, while constructing homes for older people, policymakers, municipalities, housing developers, communities and individuals must all consider these green and sustainable factors. Providing older people with the resources they require to live independent, active, and healthy lives that incorporate sustainable and green practices, is undoubtedly crucial.

Keywords: Older person, housing, home, green, sustainable, systematic literature review (SLR)

INTRODUCTION

These days, the world is paying much attention to green and sustainable issues, and this includes when constructing better housing models for the future generations. Since many developed and developing nations have seen an increase in the number of older people in their respective countries, many academics and professionals have then taken interest in the issue of providing green and sustainable housing for the population. Some studies have then explored the implications of green and sustainable housing on the well-being of older people. For them, house is more than just a place for them to reside; it is a place which gives them a meaningful opportunity to maintain their independence and to them the place is what they call home. A safe, decent, sustainable, and green home is where they can age in place. If these housing needs are disregarded, older people would then become more vulnerable to social and economic inequality, health problems, and other issues. For instance, a good and enough light source is important for older people to prevent accidental falls that may risk their lives (Utusan Malaysia, 2024). The need for sustainable housing is also in line with Goal 11 of the Sustainable Development Goals (SDG) which indicates that sustainable cities and communities must

be provided by all countries. This includes creating an inclusive, decent, resilient, and sustainable human settlement. Older people have the same rights as other social groups when it comes to having a decent place to live. However, living independently in a home of their own choice can be difficult as some older people who experience financial difficulties and income loss.

In Malaysia, there is still a lack of attention given to the housing needs of older people. The majority of housing programmes target first-time and low-income homebuyers. However, the current housing programmes fall short in meeting the actual needs of Malaysian older people, and this includes costly and inadequate housing (Aziz et al., 2022; Isa & Daud, 2023). Malaysia's ageing population is predicted to constitute 15% of the total population by 2030, and housing demand will rise along with this gradual growth, particularly in major cities like Kuala Lumpur (Kuala Lumpur City Hall, 2023). To make it worse, a large number of Malaysian older people generally live in inherited homes that are severely damaged. Extensive renovations are often required to convert the space into a decent, secure, and sustainable housing. This includes the walls, roof, and flooring of the ancestral home, which show deterioration with time. To illustrate, few years ago a devastating story involving an old Malaysian woman was reported: with knee problem, she was found to live in a run-down house that she inherited. Because of the knee problem, she struggled to walk normally. Even worse, the restrooms in her house were found to be unsafe apart from having insufficient space (only the second level was accessible) (Utusan Malaysia, 2021). This is similar to the story of another old woman who had to seek assistance in fixing up a rundown property she had inherited. During raining season, the woman was forced to shield herself from the broken and holed walls and rooftop (Malaysia Kini, 2018). These scenarios hence demonstrate the dire need for sustainable and green homes.

This issue is not only observed in Malaysia as housing issues also happen to be among the top concerns in other countries (Eurofound, 2016). According to Molinsky (2022), the housing needs of older people in the United States are likewise not adequately addressed or met. Over 10 million American older people struggle to pay for housing, with housing accounting for over three-quarters of their income (Molinsky, 2022). With other pressing needs like healthcare and essentials, older people have then been put on the brink of danger (Molinsky, 2022). The requirements of older persons must be met in a way that takes into account not just affordability, but also accessibility, independence, security, and adequate housing. To address these concerns, the present study thus examines the issues that arise in providing sustainable and green housing from the lens of academic discourse. This will contribute to a deeper comprehension of the root causes of the issues, which might inspire more research to pursue further opportunities and innovative approaches.

LITERATURE REVIEW

Green Sustainable Housing

Sichali (2023) claims that housing development cannot be built without taking into consideration the need for a resilient, safe, and sustainable human settlement. Housing is designed with the owner's prolonged occupancy in mind, which can only be sustained when green and sustainable design elements are integrated into the structure's design. Understanding these two concepts—green and sustainable, by looking at definitions and use of certain terms is crucial first and foremost.

According to Zhao et al. (2023), green housing refers to a "key approach to addressing environmental issues and enhancing human life quality". Sustainable development, on the other hand, is described by Brundtland (1987) as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". More resources are used than necessary in this fast-paced, modern era to produce goods that people want. The construction industry and the majority of industries, for instance, have contributed to the highest energy consumption, endangering the environment. If the harm caused to nature cannot be corrected immediately, both the ecosystem and human hope will be jeopardised for the future. By incorporating green and sustainable concepts, fewer resources will be needed, less energy will be used in homes, residents will be closer to nature, and the environment will be protected.

Some still argue that adding green features to a home comes at an excessive cost (Dwaikat & Ali, 2016). Housing must be remodelled and altered for the magic to occur. Dwaikat and Ali (2016) state that there is a constant debate on the initial cost of construction when compared to traditional methods. The results of the study demonstrated that more than 90% of the reported green cost premiums (based on empirical investigations) fell within the range between -0.4% and 21% . But as the United Nations' Sustainable Development Goals (SDG) demonstrate, the expenses upon making sustainable and green housing available are minimal when weighed next to the benefits (United Nations, 2023). It has been demonstrated that green housing can maximise resource utilisation, which is important to older people. A green building may result in energy and water savings between 25% and 50%, as well as a 12% reduction in maintenance expenses (New Straits Time, 2023).

In addition, the United Nations (2012) claims that a "green element" in housing ideally incorporates the concepts of climate-responsive housing, green building materials, construction technology, and housing design. These green factors would promote housing sustainability, if taken into account. Uncontrollable changes in climate conditions have the potential to bring about calamities that endanger people's lives, particularly those of vulnerable populations like older people (such as extreme weather occurrences) (Gaynor, 2020). The housing development must also take local climate change, material availability, and environmental resource availability into attention. Furthermore, natural and recycled resources may be used to design the material utilisation (United Nations, 2012). By doing this, waste will eventually be reduced and converted into high-quality building materials for homes. The use of renewable energy, rainwater collection, solar gain, and insulation for warmth are other alternatives that house construction can consider (United Nations, 2012). This would not only protect the environment, but also give older people a safe and comfortable housing. Older people can greatly benefit from the inclusion of green features as expenses can be minimised.

Malaysian Current Policy: A Way Forward for Green and Sustainable Housing

Some developed nations including France, Singapore, Germany, the United Kingdom, and the United States, have established themselves as they have among the most mature and extensive green building regulations (Cao et al., 2022). Similar to other countries, Malaysia has also pledged to reduce the emission of greenhouse gas up to 45% in 2030. The Green Technology Master Plan Malaysia (2017-2030) was introduced by the Malaysian government, outlining the country's immediate path towards green growth. It establishes the groundwork for the adoption of a greener lifestyle through the development of new behaviours and mindset (Ministry of Energy, Green Technology and Water (KeTTHA), 2017). To reduce energy consumption by 5%, the Malaysian government has begun to develop ministry buildings in the nation's capital.

By 2040, the proportion of Kuala Lumpur's ageing population is predicted to increase to 17.3% (Kuala Lumpur City Hall, 2023). This has made the government recognise the need to address these issues by creating specially designed housing for older people. The Kuala Lumpur Structure Plan 2040, which was gazetted on 19th October 2023, takes older people's needs into account. Age-friendly and specialised facilities are necessary to create a supportive environment that enables older people to live independently. The Kuala Lumpur Structure Plan 2040 places a strong emphasis on sustainability to support the city's rapid growth and guarantee that community needs are met (Kuala Lumpur City Hall, 2023). It is hoped that the current housing policy incorporates these green and sustainable elements, especially to address the needs of Malaysia's older people.

The reason for this is that green and sustainable elements improve the health of the ageing population. Numerous studies have reported improvements in older people's overall mental and physical health as well as their psychological needs (Bonaccorsi et al., 2023; Xu et al., 2022). By adding green features to their homes, older people—especially those who reside in urban areas, can feel the connection to nature that is difficult to find (Mandal, 2021; Elsadek et al., 2021).

METHODOLOGY

The primary goal of the study was to explore the issues associated with providing older persons with green and sustainable housing through a systematic literature review (SLR). SCOPUS and the Web of Science (WOS) databases were the two selected databases. Four steps must be completed in a systematic literature review (SLR): (1) identification; (2) screening; (3) eligibility; and (4) inclusion (Abdul et al., 2023). The study employed theme analysis to analyse and generate coding (similar patterns) related to the issues that arise when providing older people with green and sustainable homes. According to Braun and Clarke (2022), themes will emerge during the early stages of data familiarisation, which entails analytical procedures that represent the primary research questions.
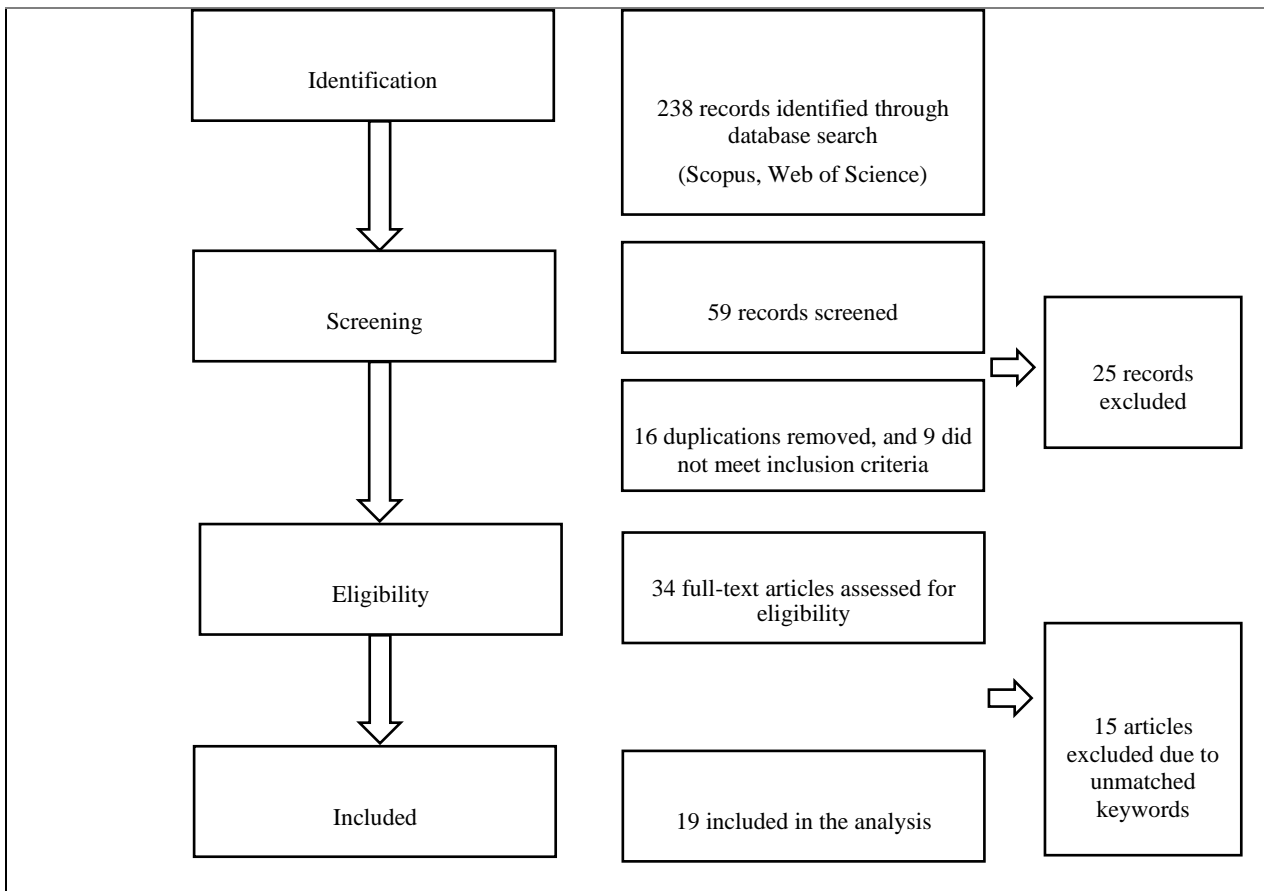
Figure 1: 4 phases in Systematic Literature Review (SLR)

IDENTIFICATION

In the first phase, known as identification, two platforms—Scopus and Web of Science (WOS), were used to search the relevant articles. These two platforms were selected because they are widespread and known to be reputable sources of reliable data, especially in the social sciences (Abdul et al., 2023). As indicated in Table 1, a total of 238 records were found applying the two search strategies (Refer to Table 1). According to Mohamad Faudzi et al. (2023), the identification phase enables researchers to see the number of studies that have been done in that specific area. Given how frequently these terms have been used interchangeably in studies, the terms "senior" and "older people" were used without intending to restrict the quantity of the search. A few tests were conducted on the search strategies to ensure that the terms used were appropriate. According to Mengist et al. (2020), the chosen database has to record the number of articles accessed and the dates of access, based on the search string.

Table 1: Identification phase

Database	Search Strategy	Number of articles identified	Date of accessed
SCOPUS	"housing" AND "sustainable" AND ("senior" OR "older persons")	73 records	27th January 2024
	"housing" AND "green" AND ("senior" OR "older persons")	43 records	
WEB OF SCIENCE (WOS)	"housing" AND "sustainable" AND ("senior" OR "older persons")	74 records	28th January 2024
	"housing" AND "green" AND ("senior" OR "older persons")	48 records	
	Total	238 records	

Table 2: The inclusion and exclusion criteria used to select the related articles

Criterion	Inclusion criterion	Exclusion criterion
Year	5 years ago, to the current 2020-2024	More than 5 years
Language	English version	Other languages
Type of access	Open access	Except for open access
Type of document	Journal (article)	Except for article
Keyword used	Housing, Green, Sustainable, Older Persons and Senior	Other than these keywords

Using the inclusion or exclusion criteria during the first identification phase resulted in the identification of a total of 238 records. Mengist et al. (2020) stated that the use of inclusion and exclusion criteria can aid in narrowing the search for data so that it can be used for further evaluations. The selection of the scholar's works was based on a time frame of five years, from 2020 to 2024, which can be considered as recent publication. The following keywords were used to finish the search for articles: (1) "housing" AND "sustainable" AND ("senior" OR "older persons"), and (2) "housing" AND "sustainable" AND ("senior" OR "older persons"). Sustainable (keyword 1) and green (keyword 2) were the two primary keywords that were utilised in these two search strategies differently.

SCREENING PROCESS AND ELIGIBILITY

During the screening procedure, 25 articles were eliminated from the total of 59 articles due to the removal of 16 duplicates and 9 irrelevant articles that did not meet the inclusion criteria. Table 3 illustrates that only 33 records for keyword 1 (sustainable) and 26 records for keyword 2 (green) made it beyond the screening phase. As claimed by Abdul et al. (2023), only articles that meet eligibility criteria remain.

Table 3: Screening process

Word string		Number of articles identified for screening
"housing" AND "sustainable" AND ("senior" OR "older persons")		33 records
"housing" AND "green" AND ("senior" OR "older persons")		26 records
	Total	59 records

INCLUDED

To extract and significantly reflect the data required to address the research question—that is, the issues associated with providing older people with sustainable and green housing, a total of 34 articles were carefully reviewed in the final phase. Given this, only 19 publications fit the inclusion criteria and were included in the study.

Table 4: Number of articles included in the analysis

Word string		Number of articles included in the analysis
"housing" AND "sustainable" AND ("senior" OR "older persons")		11 record
"housing" AND "green" AND ("senior" OR "older persons")		8 record
	Total	19 records

FINDINGS AND DISCUSSION

Based on thematic analysis, there were four major themes emerged: (1) the heterogeneous housing demands of older people within social groups; (2) the importance of green space being overlooked; (3) the deficiency of sustainability elements, which puts older people at home in danger, and lastly (4) housing demand which was exacerbated by the growing number of the ageing population. A detailed overview of the scholars' work on the issues that arise in providing green and sustainable housing can be found in Table 5, which classifies the scholars' work by key themes. Table 5 also presents the names of the journals, the year the work was published, the place of origin of the scholars' work, the title, and the summary of their works. The study analysed 19 articles that were released in 2020–2024; the most recent ones were published in 2023. The results also showed that most of the four papers were published in the Journal of Sustainability (Switzerland) and that five of the authors were from China.

Table 5: An overview of the 19 articles' analysis

Themes	Year, Origin Country	Name of Journals	Scholars, Title	Findings
The heterogeneous housing demands of older people within social groups	2023 China	Sustainability (Switzerland)	*Zhang, K., & Yan, D.* Exploring Indoor and Outdoor Residential Factors of High-Density Communities for Promoting the Housing Development	▪ Older people who dislike living in compact urban areas place a high priority on indoor living standards. ▪ Older people' preference for residential living is connected with building age and green space.
	2023 Poland	Acta Scientiarum Polonorum, Administratio Locorum	*Trzaskowska, E.* Recreational and Leisure Development for the Elderly in Residential Areas in Lublin	▪ The demands of older people are not uniform in society, making it challenging to design public areas with their needs in mind.
	2023 China	Applied Mathematics and Nonlinear Sciences	*Li, W. Jiang, P. & Zhang, Y.* A study of spatial rationality in the architectural design of senior citizen apartments in terms of calculation and biological effects	Another significant problem for architects is locating senior housing that is liveable. Designing Older People Apartment Buildings with Physiological Needs: ▪ Needs for a visual environment (light source) ▪ Needs for the organisation, location, and design of the audio environment ▪ Soft texture material is needed for an auditory environment. ▪ Barrier-free environment requirements (easy-to-clean, non-slip floor)

2023 Canada	International Journal of Care Coordination	*M Kokorelias, K., L Sheppard, C., & L Hitzig, S.* The Role of Patient Navigation in Supporting Low-Income Older Adults in Their Housing Needs During Hospital to Home Transitions: A Qualitative Descriptive Study from Ontario, Canada	▪ The housing demands of low-income older people are influenced by their increasingly complicated care needs, yet there are few and challenging housing services available.
2023 Sweden	BMJ Open	*Sturge, J., Miedema, E., Elf, M., & Nordin, S.* Socially Sustainable Housing and Built Environments to Support The Health and Social Inclusion of Older Adults: Protocol for a Scoping Review and Stakeholder Consultation	▪ An overview of best practices study is needed to understand how design elements might favourably affect older occupants' levels of social engagement and well-being. ▪ This is necessary to construct socially sustainable housing and built environments for older people.
2023 New Zealand	International Journal of Housing Markets and Analysis	*James, B.L* What housing characteristics support seniors? Seniors' experiences of housing and home in New Zealand during the COVID-19 pandemic	The following factors can help older people become more resilient to natural disasters like COVID-19 pandemics: ▪ Possessing a view or outlook operating appliances; ▪ installing ventilation and heating systems; ▪ having enough space for storage; being able to live in a flexible and adaptable manner; ▪ having access to private indoor and outdoor areas; ▪ being able to grow a garden and produce food;
2023 Europe	Sustainability (Switzerland)	*Rogelj, V., Bogataj, D., Bogataj, M., Campuzano-Bolarín, F., & Drobež, E.* The Role of Housing in Sustainable European Long-Term Care Systems	▪ At home, where 44% of older residents need better stair modifications, 33% want elevators installed in their buildings, and 21% want thermal isolation or waterproofing to make their homes more weatherproof, they are more vulnerable to falls and other risks.
2023 Africa	International Journal of Building Pathology And Adaptation	*Ige, V.O., & Akinbogun, S.P.* Consideration of Senior Citizens in Private Residential Design in Sub-Saharan Africa: Reflections from Akure, Nigeria	▪ For older people to be safe and functioning, building design is essential. ▪ Though it is inevitable, people frequently avoid discussing old age and the care it requires ▪ It would promote the idea that it is everyone's responsibility to provide a sustainable house that is safe for the elderly both physically and emotionally.
2020 United States	Building and Environment	*Tsoulou, I., Andrews, C.J., He, R., Mainelis, G., & Senick, J.* Summertime thermal conditions and senior resident behaviors in public housing: A case study in Elizabeth, NJ, USA	▪ More research is required to understand the indoor thermal conditions in older people low-income homes and the factors that affect them. ▪ Vulnerable populations, such as the older people, should be prioritised during heat events.

The deficiency of sustainability elements which puts older people at home in danger

2021 Korea	Sustainability (Switzerland)	*Park, J.-A., & Choi, B.* Factors Affecting the Intention of Multi-Family House Residents to Age in Place in a Potential Naturally Occurring Retirement Community of Seoul in South Korea	Residential services linked to willingness to participate in ageing-in-place include: - Assistance with a diagnostic service for preventing accidents among the older people - Support for residential home repair and modification, - A safe and secure neighbourhood - Assistance with safe walking, - Facilities for the older people - Green spaces and rest areas - Support for a healthy neighbourhood environment for both the homes and the neighbourhood community
2023 Poland	Acta Scientiarum Polonorum, Administratio Locorum	*Trzaskowska, E.* Recreational and Leisure Development for the Elderly in Residential Areas in Lublin	The continuous production of greenery poses an additional challenge. The manner in which green spaces are developed, especially in developer towns, suggests that little methodical thought is being done.e
2021 India	Advances in Science, Technology and Innovation	*Mandal, A.* Neighborhood Urban Green Spaces for Senior Citizens and Children, Case Study: Delhi	- The growing trend of urbanisation has made it increasingly challenging for city dwellers to connect with nature, and creating more urban green areas is one way to help close this gap. - People of all ages benefit from green areas, which provide a variety of advantages such as enhanced health, social interaction, leisure, and the opportunity to simply enjoy nature while in the city.
The importance of green space being overlooked	2020 Poland	Environmental Science and Policy	*Sikorska, D., Łaszkiewicz, E., Krauze, K., & Sikorski, P.* The role of informal green spaces in reducing inequalities in urban green space availability to children and seniors	There is an uneven distribution of formal Urban Green Space (USG) in both cities. When it comes to UGS availability, Warsaw older people are most excluded,
	2021 China	Health Environments Research and Design Journal	*Elsadek, M., Shao, Y., & Liu, B.* Benefits of Indirect Contact With Nature on the Physiopsychological Well-Being of Elderly People	Older people who have indirect interaction with nature have improved physical and mental health.
	2020 China	Applied Sciences (Switzerland)	*Jin, Y., Li, J., & Wu, W.* i-Yard 2.0: Integration of sustainability into a net-zero energy house	A domestic net-zero energy home was developed to meet the needs of an ageing population and achieve energy self-sufficiency by using both passive and active design techniques, such as solar energy.

Housing demand which was exacerbated by the growing number of the ageing population.	2020 Italy	TQM Journal	*Angioni, M., & Musso, F.* New Perspectives from Technology Adoption in Senior Cohousing Facilities	▪ It has been shown that having green spaces for gardening and horticulture is very beneficial on a physical and psychological level.
	2022 Sweden	Bmc Public Health	*Heller, C., Ekstam, L., Haak, M., Schmidt, S.M., & Slaug, B.* Exploring Housing Policies in Five Swedish Municipalities: Alternatives and Priorities	▪ Current housing supply in Sweden is under strain from a lack of available homes brought on by ageing population increase in the population in urban area.
	2021 Finland	Frontiers in Public Health	*Jolanki, O.H.* Senior Housing as a Living Environment That Supports Well-Being in Old Age	▪ The rapid increase in new senior housing models could be an indication that existing housing and care models are not fulfilling the hopes and needs of current and new generations of older people.
	2020 Europe	Sustainable Mediterranean Construction	*Mangiatordi, A.* Strategies and Design Tools for Smart Residential Interventions for the Elderly	▪ The world's aging population is causing a progressive shift in the demographics of our cities and changing the demand for older people housing. ▪ This shift is intended to increase the productivity, autonomy, and independence of the older people while also utilising contemporary digital technologies.
	2022 China	Sustainability (Switzerland)	*Xiao, J., Liu, H., & Wu, J.* The Status Quos and Causes of Concentrated Elderly Populations in Old Urban Communities In China	▪ The older people will be able to have happier, healthier, more active, more inexpensive, and more inclusive retirement lives in society if they are given access to large, tidy, safe, pleasant, and dynamic residential environments.

THE HETEROGENEOUS HOUSING DEMANDS OF OLDER PEOPLE WITHIN SOCIAL GROUPS

The housing needs of older people are unique and should not be treated in the same way as those of other homeowners, and so there is a need to take into account their age, health, and psychological demands (safety, comfort, and good vision, barrier-free zone) (Zhang & Yan, 2023; Trzaskowska, 2023; Li & Zhang, 2023; M Kokorelias et al., 2023; Sturge et al., 2023). The humane viewpoint takes older people's comfort, safety, and health into account (Li & Zhang, 2023; M Kokorelias et al., 2023F). Among the problems that real estate planners and housing developers encountered is that it is difficult to effectively meet older persons' needs. The study by Trzaskowska (2023) states that the lack of uniformity in older people's demands in social groups makes it challenging for developers to provide for them. Trzaskowska (2023) contends that the majority of residential properties do not suit the needs of older people in Poland and are therefore poorly ranked throughout the continent. Zhang and Yan's (2023) study also found that older people' diminished satisfaction and happiness are largely due to cramped living quarters, especially in urban regions, and subpar indoor living conditions.

The same issue arises, as shown in the study by Li and Zhang (2023), as architects were unable to identify the demands of older peoples in the homes they have constructed. Li and Zhang (2023) further stated that while designing homes, it is essential to consider the lifestyle preferences of older people and prioritise their ability to recognise visual cues in their immediate environment. According to a study by Kokorelias et al. (2023), the housing needs of older low-income persons will grow increasingly in complexity, and there is insufficient assistance available for them. This is concerning, and if the needs of older people are not met, the developer needs to be made aware of how important the issue is. According to Zhang and Yan's (2023) study, real estate planners can enhance their comprehension of possible customers' wants by considering the housing preferences of different age groups and the surrounding area.

Interestingly, James (2023) studied the aspects of housing that assist older people in a health emergency, such as the COVID-19 pandemic. Sustaining this group requires a functional ventilation system, green space and room for vegetable gardening, flexible living quarters, and sufficient access to both indoor and outdoor environments. James's (2023) study also highlighted how crucial it is to take older people's housing needs into account to increase their resilience and safety at home. Thus, the demand for housing

for older people has already been considered in many industrialised nations, demonstrating that it is possible to achieve a sustainable and green housing. As they make up a big part of the population, the needs of the older people should then not be disregarded or taken for granted. Rather than viewing this as a challenge, housing developers must perceive this as appealing chances. This is because they will control the majority of products and services offered on the market.

THE DEFICIENCY OF SUSTAINABILITY ELEMENTS PUTTING OLDER PEOPLE AT HOME IN DANGER

Older people should be less exposed to risk and have a sense of safety and security in their dwelling, as they are considered vulnerable individuals who require protection. According to Ige and Akinbogun (2023), for older people to be safe and functioning, building design is essential. Though it is inevitable, people frequently avoid discussing old age and the care it requires. Ensuring that older people reside in appropriate, safe, and sustainable housing is a crucial responsibility. Older people's ability to remain at home will eventually be in jeopardy if their voices are not heeded regarding sustainable and safety aspects (Eurofound, 2016). According to Rogelj et al. (2023), suitable and adequate housing is the cornerstone of housing rights. If an older person loses their functional abilities, it could be difficult for them to stay in their existing house.

The study by Rogelj et al. (2023) found that older people are more vulnerable to falls and other dangers. At the same time, changes in temperature are brought on by climate change and other health issues (Rogelj et al., 2023; Tsoulou et al., 2020). A study by Tsoulou et al. (2020), found that a strong thermal system was necessary to safeguard and soothe older people who live in areas where climate change poses a threat in some countries. For older persons, it can be more difficult to live comfortably in areas with extreme heat or cold. Several safe features need to be considered in sustainable and green housing design, especially for older persons. For instance, a robust heating system and the necessity to modify the stairs could lower the hazards for older people living at home. Park and Choi (2021) proposed that, in order to reduce the risk of accidents, appropriate modifications, home repairs, and safety elements should be taken into consideration in the housing of older people.

Another safety precaution that needs to be built is the community engagement as well. According to Ige and Akinbogun (2023), it is everyone's responsibility to provide a sustainable house that is safe for the older people both physically and emotionally. In Korea, for example, community involvement is essential to guaranteeing older people live safely. It is interesting to note that the Park and Choi's (2021) study covered one aspect of NORC in Korea, which supports older adults in staying in their homes and aging in place. The idea of NORC is strongly linked to ageing-in-place (AP), which will eventually support older people in living independently in the house of their own volition. Redesigning the communities is necessary to safeguard older people's settlements, particularly in neighborhoods or apartment buildings where the NORC phenomenon is prevalent. To further achieve this, a service programme, an institutional and physical environment, and assistance with everyday activities for the older people are all necessary.

THE IMPORTANCE OF GREEN SPACE BEING OVERLOOKED

Maintaining a green component in housing developments is crucial, especially for older people who are becoming more conscious about environmental protection. In addition to ensuring a healthy home environment, the green aspect also maximises resource efficiency, improves resident comfort, and promote better health promotion, lessens environmental impact (Mandal, 2021). According to Trzaskowska et al. (2023), the production of constant greenery is another problem. It appears that no systematic thinking is being done based on the way that green areas are being formed, primarily within developer towns. Mandal (2021) adds that widespread urbanisation has made it more difficult for people to connect with the environment, particularly for those who live in cities where there is a significant divide between people and the nature. This is concerning for the health of older people living in cities because they have no other choice but to live far from these elements.

Sikorska et al. (2020) also mentioned that older people are mostly excluded when it comes to green aspect in housing, particularly in urban areas. Older people should be given a priority when it comes to providing access to green housing. Elsadek et al. (2021) stated that the renovation, redesign, and alteration of older people's and those with limited mobility living quarters are imperative. Green living will provide older people with an indirect means of interacting with nature, even though some of them are unable to be in close proximity to it. Their physical and emotional well-being may gradually improve as a result of this. The study by Angioni and Musso (2020), which involved a case study of a housing facility, serves as another example of optimal practices. Two-story residential flats' layout was purposefully created to encourage older individuals to engage in more physical exercise. This was done to provide constant stimulation for the residents. For example, having green spaces for gardening and horticulture (one of the stimuli) is very advantageous for mental and physical health (Angioni & Musso, 2020).

Additionally, there is yet another option to incorporate the green aspect into residential architecture. The study conducted by Jin and Wu (2020) on the implementation of the i-Yard 2.0, a home net-zero energy house, provides the evidence. The concept was created with the goal of achieving energy self-sufficiency and catering to the demands of an ageing population by utilising active and passive design elements like solar energy. Additionally, the concept innovates in a number of areas including construction techniques, intelligent building control, community modelling, passive spatial planning, and the energy and building environment, from an older citizen-focused design (Jin & Wu, 2020).

HOUSING DEMAND WHICH WAS EXACERBATED BY THE GROWING NUMBER OF THE AGEING POPULATION

Due to the increasing number of older people over the years, many developing nations are finding it difficult to build more decent housing for them (Molinsky, 2022; Heller et al., 2022; Eurofound, 2016). It is concerning that Xiao et al. (2022) also indicated that older individuals make up a larger percentage of urban areas than younger people. Because they live in substandard housing, the ageing population is more vulnerable to social isolation and health concerns (Eurofound, 2016). Heller et al. (2022), for example, stated that a lack of housing is putting pressure on the Swedish government to provide for the needs of the ageing population. The increasing number of older people in Sweden has led to a growing number of housing-related issues, including the need for affordable and readily available housing for this demographic group.

According to Mangiatordi (2020), the rising of ageing population is gradually changing the way cities are laid out and changing the needs that older people have for housing. This is because the cramped and constrained spaces in various housing layouts may negatively impact older people's autonomy, independence, and productivity (Mangiatordi, 2020). It is, nevertheless, unavoidable because a large number of older people will reside in densely populated areas and their numbers will only rise (Xiao et al., 2022; Van Hoof et al., 2021). Therefore, the main concern that should be addressed is how to help this group to deal with the challenges that they face, particularly about living safely and freely at home.

Another concern raised by Jolanki's (2021) study is the rapid emergence of new older people housing models. This could indicate that older people's needs are not being met by the housing and care models that are already in use. According to Jolanki (2021), views on what sort of housing is ideal for older people differ, with some older people favouring a home that allows them to participate in social events and maintain contact with others. Others, meanwhile, can see housing as an apartment or an outdoor space that requires little maintenance. On the other hand, the Xiao et al.'s (2022) study highlighted the necessity for spacious, neat, secure, comfortable, and dynamic living environments for older people. It would be difficult to design a housing plan that is both economical and inclusive while also satisfying each person's unique demands, as indicated by Jolanki (2021). In the absence of a suitable housing model, this has illuminated how to ensure that older people reside in high-quality houses. If there is no clear direction, individuals will just give up trying to meet older people' housing demands.

The Heller's (2022) study outlined the difficulties in making homes accessible to older people. These difficulties include ongoing upkeep and remodelling, ambiguous legislation that can be interpreted in different ways, customised adaptation to meet individual needs, and a greater need for collaboration with private developers (Heller, 2022; Van Hoof et al., 2021). The challenges faced by older people who fall into different age groups vary. For example, compared to older people who are capable of being independent, those who are 80 years of age or more may find it difficult to move around (Heller, 2022; Jolanki, 2021).

CONCLUSION

Four themes emerged from the findings of the Systematic Literature Review (SLR),in relation to the study's main objective, which was to explore the issues involved in providing older people with green and sustainable housing. This includes (1) the heterogeneous housing demands of older people within social groups (6 articles out of 19 articles); (2) the deficiency of sustainability elements, which puts older people at home in danger (4 articles out of 19 articles); (3) the importance of green space being overlooked (6 articles out of 19 articles); and lastly (4) housing demand which was exacerbated by the growing number of the ageing population (4 articles out of 19 articles).

The results showed that many countries do not only encounter difficulties to build green, sustainable housing, but a number of them are also falling short upon meeting the needs of older people. This is because it is difficult to meet such demands which are brought on by a growing ageing population. Numerous articles made the point that the needs of older people are heterogeneous, making it difficult for housing developers and architects to come up with a housing model that suit every older person's needs. Nonetheless, the population will inevitably age and get older. Therefore, providing for their actual housing requirements is the greatest way to enable people to live independently in safe and comfortable homes. In addition, the results also showed a growing trend in the population of older people living in urban areas, which is concerning. Older people who live in crowded, busy cities with a limited access to green space are more vulnerable to mental health problems, loneliness, and the lack of sense of security. These issues must be addressed in order to shed light on the provision of secure and conducive housing for older people.

Therefore, it is essential to incorporate sustainability and green elements into the specialised housing design to meet the needs of older people. The study's conclusions demonstrate the multiple advantages that both components provide for the wellbeing of older people. Everyone must recognise the advantages and ramifications of neglecting the need toaddress the housing needs of the older people, as well as the necessity to adapt to everyone's needs. Every step taken towards enabling older people to live independently, autonomously, and securely will hold the key to the future.

The study's time length, which spans only five years, from 2020 to 2024, limits its ability to fully examine the issues associated with providing older people with green and sustainable housing. Furthermore, it is challenging to identify genuine housing concerns as scholars have not delved deeper into topics like building costs and procedures, holistic design of homes, and gaps in housing standards and regulations. Perhaps further research should focus on less urbanised places, where older people are also likely to live in subpar housing in old houses, remote locations, and rural areas. This is due to the fact that the study's findings primarily identified the issues associated with delivering green and sustainable homes in urbanised areas. It does, however, suffice to address the main objective of the study.

IMPLICATIONS

Understanding older people's needs for a green and sustainable element in their housing is one of the study's main implications. This is not just for their comfort; it can also help safeguard the lives of older people whose quality of life is at risk due to inadequate living conditions. Several research has demonstrated the alarming problems with older people living in cramped, metropolitan areas with less natural surroundings. Providing green and sustainable housing could protect people from health risks, loneliness, and financial difficulties. Besides, the study also highlights the issues associated with giving older people green and sustainable housing. Acknowledging these issues may assist in finding alternative solutions to enhance the current housing paradigm and better serve the needs of older people.

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