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EXAMINING THE HOUSING CONDITIONS OF LOW- INCOME OLDER PEOPLE IN URBAN SETTINGS: A SYSTEMATIC LITERATURE REVIEW (SLR)

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Abstract:

Population ageing and rapid urbanisation are transforming urban housing systems, creating multidimensional vulnerabilities for older persons. While housing is a critical determinant of healthy ageing, existing research remains conceptually fragmented. Prevailing frameworks in environmental gerontology, such as the Person-Environment Fit model, focus primarily on physical attributes. Similarly, conventional housing adequacy indices isolate structural elements from broader socioeconomic and sustainability factors. These traditional models often overlook critical dimensions like energy efficiency and climate resilience within low-income urban populations. This study addresses these conceptual limitations through a systematic literature review. The review identifies and integrates scattered indicators into a unified Integrated Sustainable Housing Condition Framework. Following the PRISMA 2020 guidelines, a structured search was conducted across the Scopus and Web of Science databases, identifying 19 empirical studies for the final synthesis. Methodological quality was appraised using the JBI Critical Appraisal Tools. The findings revealed that while physical housing quality and socioeconomic stability are well documented, there is a substantial deficiency in integrating sustainability and adaptive capacity, including energy efficiency and climate resilience. To address this, the study develops the Integrated Sustainable Housing Condition Framework, which elucidates the inter-dimensional linkages between structural

integrity, financial burden, and environmental performance. The results demonstrate that economic constraints trigger a ripple effect, leading to structural neglect and increased energy poverty, which collectively undermine the health of low-income older persons.

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Housing Conditions, Integrated Sustainable Housing Condition,
Low-Income, Older Persons, Sustainability, Urbanisation



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Introduction

With ageing populations and increasing urbanisation, the global housing scene is changing rapidly, exposing new structural risks for older persons. The world's population of persons aged 60 years and older is projected to increase to 2.1 billion by 2050. A considerable segment of this population is expected to inhabit metropolitan regions, which are increasingly defined by issues related to the unequal allocation of resources, environmental strains, and housing costs (WHO, 2022; United Nations, 2019). In rapidly expanding urban regions, the aged poor are especially vulnerable to poor housing, economic hardship and environmental risks. In addition, these issues can negatively affect their health, independent living and general long-term well-being (Dzerounian et al., 2024; Mehdipanah et al., 2022). In addition, urban residential environments pose a variety of hazards for elderly residents, including the deterioration of housing structures, physical accessibility challenges, and neighbourhood disadvantages (Kantz et al., 2024; Verderber et al., 2023).

Ageing in place has become a dominating paradigm in housing and gerontological research, highlighting the need of allowing older persons to live freely and safely in familiar residential settings (Verderber et al., 2023). Environmental Gerontology and Person-Environment Interaction Theory, which contend that living conditions have a direct impact on functional capacity and adaptive outcomes, serve as the foundation for this paradigm. However, sustainability and adaptive capability have lately emerged as important aspects of housing vulnerability. Climate change exposure and inadequate energy efficiency make people more vulnerable to environmental stress, especially low-income older persons who have little money to adjust their living circumstances (Bhat et al., 2025).

There is a growing body of research on housing for older persons, yet conceptual conflict pervades the present body of academic work. This sometimes results in a concentrated focus on some variables, such as financial limitations or physical access (Cha, 2025; Aziz et al., 2022). The dominant theoretical frameworks in environmental gerontology have always emphasised the relationship between an individual's physical or cognitive capacities and the architectural obstacles he or she encountered. An example of this method is the Person-Environment Fit model by Lawton and Nahemow (1973). Despite these conceptual frameworks confront certain accessibility obstacles, they do not sufficiently address wider cultural dimensions. Major obstacles include of a lack of resources, increasing expenditures in urban districts, and continual hazards to the environment. Conversely, conventional housing adequacy models focus primarily on structural safety and zoning compliance. Consequently, these traditional frameworks largely disregard the unique physical adaptive capacities and distinct financial vulnerabilities of low-income elderly populations in dense urban settings.

Current models used to assess housing suitability generally assess environmental sustainability and the adaptation requirements of older persons as independent issues. This approach is becoming less tenable, particularly in densely populated urban areas. The older persons with limited financial resources frequently choose to live in homes that meet basic structural requirements but result in significant energy costs, uncomfortable temperature conditions, or limited adaptability as their physical mobility and health needs change. It is rare to incorporate these compounding problems into a special mathematical framework (Chen et al., 2025). Although basic frameworks for sustainable housing have been developed, research on a comprehensive model appropriate for older persons with modest incomes is still lacking. Physical housing quality, socioeconomic vulnerability, and ecological resilience should all be incorporated into a cohesive model (Zulkepli & Rahman, 2025; Willis & Mohsin, 2025).

Housing conditions are defined as the physical, economic, and environmental features of residential settings that influence inhabitants' health and well-being (Kantz et al., 2024). Sustainability refers to resource-efficient techniques that avoid environmental impact while continuing to meet the demands of present and future generations (United Nations, 1987). The IPCC (2022) defines adaptive capacity as the degree to which housing systems can adjust to the demands of expanding households and climate-related stresses. Energy poverty occurs when households cannot afford adequate energy services, resulting in thermal discomfort, unsafe interior temperatures, and increased health risks (Boardman, 2010). Climate resilience, on the other hand, refers to housing's ability to withstand and recover from climate-related disasters (IPCC, 2022).

This research significantly contributes to Sustainable Development Goal 11 (SDG 11) and Sustainable Development Goal 3, notably their shared emphasis on appropriate, safe, and affordable housing and health protection throughout life (United Nations, 2015). Against this context, the study is led by the following research questions:

1. What physical housing condition indicators have been examined in empirical research involving low-income older persons in urban settings?
2. What socioeconomic and neighbourhood environment indicators have been identified as determinants of housing vulnerability and wellbeing among low-income older persons?

3. To what extent have sustainability and adaptive capacity indicators, including energy efficiency and climate resilience, been integrated into housing condition research on ageing populations?

Materials and Methods

Systematic Review Design and Protocol

This study adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines to ensure that the literature synthesis was accurate and relevant. To find peer-reviewed empirical research, we searched two famous electronic databases, Scopus and Web of Science. Rayyan software was used to systematically organise and choose papers, increasing screening speed and accuracy (Ouzzani et al., 2016). This application makes it easy to extract data, including titles and abstracts, while complying to the inclusion and exclusion criteria established prior to assessment.

Database Selection and Search Strategy

The initial part of the review process, known as identification, entailed obtaining relevant information using two main academic databases: Scopus and Web of Science (WoS). These platforms were chosen for their vast multidisciplinary coverage, effective citation indexing systems, and established reputations as leading repositories of peer-reviewed scholarly literature, in particular in the social sciences, housing studies, and urban research (Zhu & Liu, 2020; Mongeon & Paul-Hus, 2016). The methodological dependability, clarity, and reproducibility of this comprehensive literature review are improved by using Scopus and Web of Science.

The structured keyword technique employed in the literature search was based on four basic conceptual domains: population, housing exposure, socioeconomic background, urban environment, and sustainability and adaptation, all of which aligned to the research objectives. To achieve both sensitivity and specificity in the search process, terms were merged across and within domains using boolean operators ("AND" and "OR"). To review the most recent empirical evidence on ageing, housing vulnerability, and sustainability transitions in urban contexts, the search was restricted to peer-reviewed journal publications published in English between January 2015 and March 2026. The keyword structure and search approach utilised in this study are described in Table 1.

Table 1: Search Strategy and Keyword Structure

Concept Domain	Keywords and Search Terms
Population	"older adults" OR elderly OR ageing OR ageing population OR senior OR older persons
Housing Exposure	housing OR residential OR dwelling OR housing condition OR housing quality OR built environment
Socioeconomic Context	low-income OR disadvantaged OR vulnerable OR

	poverty OR social housing OR public housing
Urban Context	urban OR city OR metropolitan OR inner city OR urban housing
Sustainability and Adaptation	energy efficiency OR climate resilience OR housing sustainability OR adaptive housing OR retrofit

The four domains were combined with AND operators between them and OR operators inside each domain to create the final Boolean search string. This method preserves the conceptual relevance of the retrieved items while enabling a wider and more thorough search. The final Boolean search strings and keyword combinations utilised in this investigation are displayed in Table 2.

Table 2: Keywords and Search Terms

Keywords and Search Terms
("older adults" OR elderly OR ageing OR ageing population OR senior OR "older persons") AND (housing OR residential OR dwelling OR "housing condition" OR "housing quality" OR "built environment") AND (low-income OR disadvantaged OR vulnerable OR poverty OR "social housing" OR "public housing") AND (urban OR city OR metropolitan OR "inner city" OR "urban housing") AND ("energy efficiency" OR "climate resilience" OR "housing sustainability" OR "adaptive housing" OR retrofit)

This systematic Boolean search approach permits the complete identification of research applicable to the living situations of older persons with limited financial resources in urban locations. It keeps exact attention on crucial aspects: the demographic group, housing-related considerations, the socioeconomic environment, and long-term viability. Following the database search, reference lists of chosen publications were manually inspected to discover other relevant research that satisfied the inclusion criteria. All of the results from the search of both databases were exported and combined into reference management software. Duplicate records were removed before the abstract and title were filtered.

Study Selection Criteria

The selection of participants for research is guided by inclusion and exclusion criteria, which serve to delineate the intended group of participants, verify their suitability for the study, and enhance the credibility and consistency of the obtained results (Patino & Ferreira, 2018). The established criteria are derived from the research objectives and conceptual framework of this review. In an effort to enhance structural clarity and transparency, the operational parameters for study eligibility have been integrated into a comprehensive matrix. Table 3 delineates the inclusion criteria employed in this study.

Table 3: Inclusion Criteria

Criterion	Description
Population	Studies involving older persons aged 60 years and above
Housing context	Studies examining housing conditions, residential environment, or built environment
Socioeconomic relevance	Studies involving low-income, vulnerable, or disadvantaged populations
Urban relevance	Studies conducted in urban, metropolitan, or city environments
Study design	Empirical studies, including quantitative, qualitative, and mixed methods
Publication type	Peer-reviewed journal articles
Language	English
Publication year	2015 to 2026

As per illustrated in Table 4, the exclusion criteria ensured conceptual and methodological consistency by removing studies not aligned with the focus on empirical evidence of housing conditions among low-income older persons in urban settings. Institutional, rural, non-empirical, non-housing, non-English, and pre-2015 studies were excluded to maintain relevance, comparability, and analytical rigor across included evidence.

Table 4: Exclusion Criteria

Criterion	Description
Population mismatch	Studies focusing exclusively on younger populations
Institutional settings	Studies limited to nursing homes, hospitals, or institutional care environments

Rural focus	Studies conducted exclusively in rural settings
Non-housing focus	Studies not examining housing conditions or residential environment
Non-empirical studies	Literature reviews, editorials, conference abstracts, and conceptual papers
Non-English	Articles not published in English
Outdated publication	Studies published before 2015

The inclusion criteria were designed to ensure the selection of empirical studies examining housing conditions within urban contexts involving elderly populations. Studies that included only institutional care were not included for the reason that these settings are significantly different than independent housing settings where ageing in place happens. Likewise, research done in rural areas was not included to ensure the analytical consistency with the work that was being reviewed and focused on the urban aspects of housing.

Screening and Study Selection Process

The screening process was conducted according to the PRISMA 2020 guidelines, which included the following three stages: title screening, abstract screening, and full-text eligibility screening. All identified records were exported into reference management software and duplicate records removed before screening. To reduce potential bias and increase reliability, titles and abstracts were independently screened by two reviewers using Rayyan software. Any discrepancies were addressed by discussion and consensus (Ouzzani et al., 2016). Full text articles were retrieved and independently evaluated for the inclusion and exclusion criteria as pre-defined.

The 199 identified records (Scopus $n = 90$, Web of Science $n = 109$) were deduplicated ($n = 28$) and the remaining 171 records underwent title and abstract screening. Following this stage, 100 records were removed as being irrelevant. The full texts of the remaining 71 articles were reviewed, and 52 excluded for a variety of reasons such as not explicitly including indicators for housing condition, a focus on institutional care settings, unclear low-income population criteria, a non-empirical design, or failure to meet other inclusion criteria. Finally, 19 studies were selected to be used in the final synthesis given all the eligibility criteria.

Data Extraction and Indicator Classification

The data extraction process was done systematically to obtain the vital information from the nineteen articles chosen for final synthesis. To ensure consistency in the recording of key information, such as author names, year of publication, geographical location, methodology, and primary indicators of housing quality for older persons, a standardisation data extraction form was used (Page et al., 2021). The emphasis was on identifying themes based on the data extracted from the multidimensional scope at the physical, socioeconomic and sustainability level. To promote data integrity, the process of data extraction was anchored by internal research discussions, in order to minimise interpretative errors and robustly document all

relevant aspects of the living environment of low-income older persons. The classification system of the housing condition indicators for the three core dimensions is shown in Table 5.

Table 5: Housing Condition Indicator Classification Framework

Dimension	Indicator Categories
Physical Housing Quality	Structural safety, accessibility, indoor environmental quality, space adequacy
Socioeconomic and Neighbourhood Environment	Affordability, neighbourhood safety, service accessibility, social cohesion
Sustainability and Adaptive Capacity	Energy efficiency, climate resilience, adaptive retrofit, and environmental adaptation

This classification framework was created from existing literature of housing and environmental health literature and evolved through multiple analysis of studies included.

Study Quality Assessment

The methodological quality of the included studies was assessed to guarantee the validity of the synthesised results. The JBI Critical Appraisal Tools were used in this study, as this offers specialised assessment criteria for a variety of research designs such as quantitative, qualitative, and mixed methods studies (Moola et al., 2020). This review was undertaken only with the JBI framework, which resulted in a standardized appraisal process in order to minimise the risk of bias in the selection of evidence of good quality. All studies were judged in terms of methodological rigor and only those that exceeded the necessary criteria to attain a quality level were selected for the final development of the Integrated Sustainable Housing Condition Framework.

Data Synthesis and Analytical Approach

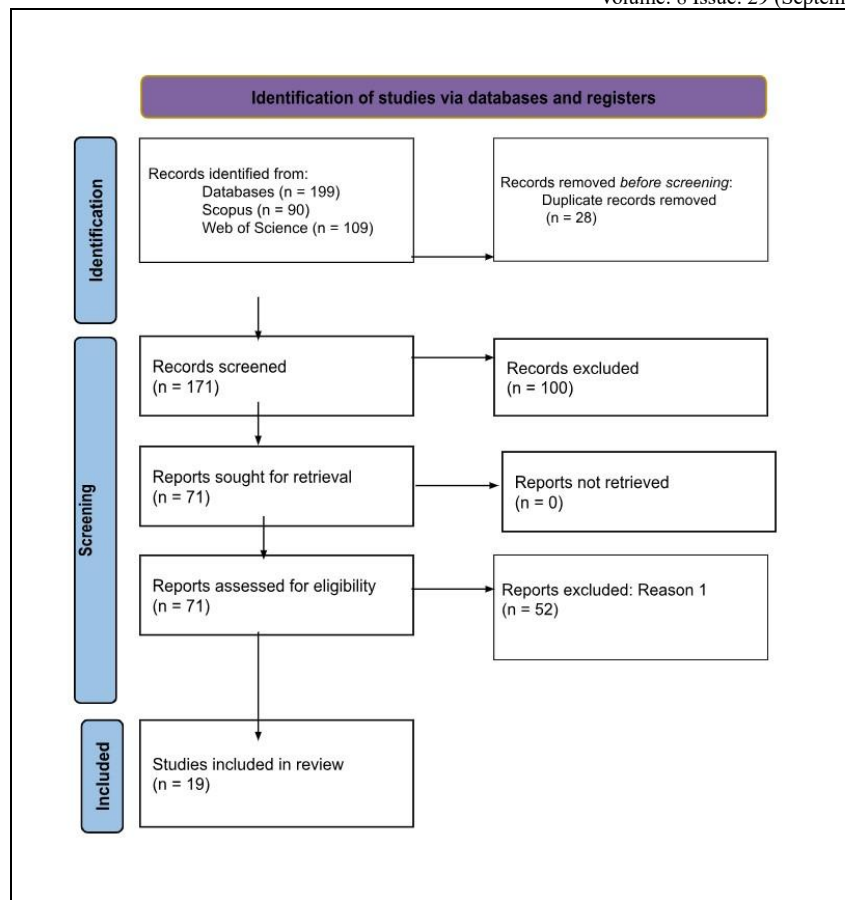
A narrative synthesis approach was used to combine results from the various studies, and descriptive frequency analysis of housing condition indicators was used to support this process (Popay et al., 2006). The synthesis of the narrative was carefully guided by the four-element approach advanced, which involves a preliminary synthesis, examining internal data relationships, assessing synthesis robustness, and creating a single conceptual model (Popay et al., 2006). Each indicator was examined for its presence in the studies, and grouped into the physical, socioeconomic, and sustainability domains. This allowed identification of major and lesser-known housing dimensions and allowed for the development of an integrated conceptual framework. The synthesis also explored the structure of the integration of housing indicators, uncovering conceptual imbalances and research gaps in housing condition research (Snyder, 2019).

Findings

Study Selection and Characteristics

The “systematic search of databases” and the “manual cross-referencing” resulted in a final analytical sample of 19 peer-reviewed empirical studies that fulfilled all the eligibility criteria. The last sample size is dependent on the specificity of the intersection in which the search is being conducted. The search string purposefully focused studies of older persons aged 60 years and older, high density and urban-study settings, and low-income groups. These very specific multi-domain boundaries effectively eliminated broad macro-economic policies on housing and clinical healthcare interventions. As a result, the 19 studies included are a comprehensive and complete representation of the peer-reviewed landscape within this domain, which is rather targeted and specific. The process of study selection after the PRISMA 2020 guidelines is presented in Figure 1. In total, a total of 199 papers were found in the database search (90 in Scopus and 109 in Web of Science). 171 records were left for the screening of the title and abstract after removing duplicate records ($n = 28$). After the screening process, 100 records were removed because they did not concern housing conditions, did not meet the inclusion criteria or were irrelevant. The full text of 71 articles was reviewed for eligibility, and 52 of these were excluded because they lacked measurable housing condition indicators, institutional care settings, and a low-income population definition or did not meet the established inclusion criteria. Of the 19 studies that met all eligibility criteria, 17 were included in the final synthesis.

The geographical diversity of the included studies covered the whole range of international research in the field of housing and ageing, with Europe ($n = 4$), Asia ($n = 5$), North America ($n = 5$), Oceania ($n = 1$), and multi-country ($n = 4$) studies including. The majority ($n = 14$) were quantitative studies and followed by qualitative ($n = 3$) and mixed-methods ($n = 2$) studies. The majority of studies were either carried out in urban or metropolitan settings, or in communities that have high population density, housing affordability issues, and ageing demographic structures. The diverse methodology of the studies included allowed for the examination of housing condition indicators in a structural, socioeconomic, and environmental way.

**Figure 1: PRISMA 2020 Flow Diagram of Study Selection Process**

Source: Page MJ, et al. BMJ 2021;372: n71. doi: 10.1136/bmj. n71.

As seen in Table 6, most of the studies included were quantitative, reflecting the relatively high emphasis on measurable, statically based evaluations of older persons' housing situations.

Table 6: Summary of Included Study Characteristics (n = 19)

Characteristic	Frequency	Percentage
Quantitative studies	14	73.7 %
Qualitative studies	3	15.8 %
Mixed methods studies	2	10.5 %

Table 7 shows the geographical distribution of the studies included and indicates that the variable housing vulnerability of older persons is a globally relevant issue and not exclusive to a particular region.

Table 7: Summary of Included Study Characteristics (n = 19)

Region	Articles	Percentage
Asia	5	26.3%
Europe	4	21.1%
North America	5	26.3%
Oceania	1	5.3%
Global / multi-country	4	21.1%

The results show that the majority of research is quantitative and takes place in urbanised areas where the housing system is under stress and demographic ageing is advanced.

Summary of Included Studies

Table 8 provides a detailed overview of the 19 empirical studies that were synthesised in this review. The literature includes a wide variety of urban settings, with most concentrating on the relationship between physical housing quality, socioeconomic vulnerability and the new sustainability measures.

Table 8: Synthesis of Empirical Studies on Housing Conditions of Older Persons in Urban Context

No	Study	Location	Methodology	Key Sustainability and Housing Indicators
1.	Biglieri & Hartt (2024)	Canada	Quantitative	(Spatial/GIS) Vulnerability index, suburban dependency, walkability, accessibility of public infrastructure
2.	F. Chen et al. (2025)	USA	Quantitative	(Longitudinal/Cox Model) Social determinants of health (SDOH), housing stability, mortality risk, housing quality.
3.	Ghaedrahmati (2019)	Tehran, Iran	Quantitative	Physical building quality, interior space size, construction materials, accessibility (elevators).
4.	Guo (2020)	Hong Kong	Quantitative	Building density, green space access, indoor lighting, walkability, and neighbourhood social attributes.
5.	Han et al. (2025)	New York,	Mixed-	Indoor temperature (heat

		USA	Methods	exposure), heat adaptation behaviors, energy poverty, thermal insulation.
6.	Han et al. (2024)	Shenzhen, China	Mixed-Methods	Age-friendly evaluation, public space accessibility, affordable housing infrastructure, and green ratio.
7.	Hsu & Bai (2021)	Taiwan	Quantitative	Cognitive function, indoor lighting, universal design (accessibility), and neighbourhood greenness.
8.	Jiang (2026)	Urban China	Quantitative	Thermal performance, passive ventilation, nudge architecture, and climate change adaptive behavior.
9.	Kim et al. (2022)	Seoul, S. Korea	Quantitative	Green remodelling, insulation quality, energy-saving potential, and social cost of carbon.
10.	Lee (2017)	USA	Qualitative	Structural safety, maintenance costs, residential satisfaction, and low-income homeownership.
11.	Lima et al. (2022)	Portugal	Quantitative	Energy affordability, wall insulation, dampness/mold presence, and self-reported health status.
12.	Ma (2025)	China	Mixed-Methods	Subjective well-being, neighbourhood disadvantage, social interaction, and safety perceptions.
13.	Mahmood et al. (2022)	North America	Qualitative	Housing security, privacy, autonomy, and environmental fit (Ageing in the Right Place).
14.	Mehdipanah et al. (2022)	USA	Quantitative	Mortgage debt, financial burden, housing status, and healthcare access barriers.
15.	Miller et al. (2017)	Australia	Quantitative	Energy efficiency, indoor temperature sensors, utility bill costs, and building fabric performance.

16.	Nowossadeck (2023)	Germany	Quantitative	Barrier-free features, mobility restriction, fall prevention, and home modification needs.
17.	Sokołowski et al. (2024)	Poland	Quantitative	Energy poverty, structural defects (leaks/damp), heating systems, and self-assessed health.
18.	Torrego Gómez et al. (2024)	Madrid, Spain	Quantitative	Summer energy poverty, solar orientation, facade materials, and heat stress risk.
19.	Williams (2019)	USA	Quantitative	Indoor temperature exposure, building vulnerability, health outcomes (heat events), and extreme heat risk.

Table 8 is a thorough synthesis of the current research concerning the built environment and the well-being of older persons across all dimensions, which highlights the many parallels between physical quality of the built environment and the overall well-being of the elderly population. The findings show that a lack of structural elements, such as a lack of thermal insulation and barrier-free access, are the main drivers of both energy poverty and elevated mortality risk for low-income older Europeans and North Americans and East Asians, irrespective of their geographical location. Moreover, the adoption of innovative approaches including GIS-based spatial mapping and multi-level econometric modelling demonstrates the capacity to see housing as not only a place to live, but also as an essential social determinant of health for which sustainable interventions like green remodelling or adaptive reuse are needed. This systematic consolidation is an important research gap in the tropical environment and underlines the need for the development of a resilient housing model that is able to respond to environmental sustainability and the inherent physiological fragility of the elderly population.

Based on the thematic synthesis, the literature review has shown that there is a big conceptual disparity. Physical housing indicators and socioeconomic determinants are well documented in all 19 studies, while sustainability indicators and adaptive capacity indicators are only explicitly discussed in a small number of studies. This gap represents a significant knowledge gap; environmental resilience is often overlooked when considering housing adequacy for low-income older persons.

Main Themes of Findings

The included studies were synthesized into three broad themes that are interrelated and inform the evidence about housing conditions for older persons in urban areas. These themes are: (i) physical housing quality and structural integrity, (ii) socioeconomic and neighbourhood environment and (iii) sustainability and adaptive capacity. These themes represent the multi-dimensionality of housing conditions in which physical and social environments and environmental resilience all influence housing vulnerability and ageing outcomes. Each theme

represents a unique, but related area of housing assessment, and has formed a foundation for understanding the results of this systematic review.

Physical Housing Quality and Structural Integrity

The most often studied aspect is still physical adequacy, with an emphasis on barrier-free alterations and structural safety. Nevertheless, recent research indicates that mere physical accessibility is insufficient to ensure long-term well-being. While Nowossadeck (2023) and Williams (2019) focus on structural integrity and fall prevention, Miller et al. (2017) propose that physical safety should be combined with enhanced housing energy performance to maintain stable interior temperatures for older persons. Additionally, the results show that structural flaws like moisture and leaks are not just physical problems but also significant causes of energy poverty in low-income homes (Sokołowski et al., 2024).

Socioeconomic Vulnerability and Neighbourhood Environment

Socioeconomic vulnerability broadens housing analysis beyond the physical “house” to the extent that financial capacity, stability, and security influence older persons' ability to sustain housing conditions. This conceptual change is required due to the understanding that housing outcomes are a product of the interaction between the material dwelling conditions and the economic constraints that influence adaptive capacity. The financial cost and housing insecurity thus become important stressors, affecting low-income elderly's capacity to secure stable, decent housing (Mehdipanah et al., 2022). Neighbourhood environments also affect housing adequacy by providing access to green space and social interactions as protective factors against cognitive decline and social isolation, beyond economic determinants (Hsu & Bai, 2021; Pancani et al., 2021). Collectively, these dynamics emphasize the concept of ‘environmental fit’ as the match between persons' abilities and supportive neighbourhood infrastructure (Mahmood et al., 2022).

Sustainability, Energy Efficiency, and Adaptive Capacity

The synthesis revealed a growing need to embed sustainability into housing evaluations. Older persons in poorly insulated buildings are more susceptible to climate stressors like extreme heat, which is not always considered in traditional models (Han et al., 2025; Torrego Gómez et al., 2024). Kim et al. (2022) and Miller et al. (2017) found that as insulation and thermal performance increases, so do savings on utility costs, which can help lighten the financial burden for older persons. In particular, Jiang (2026) and Abedin and Stafford (2025) proposed the concepts of “adaptive reuse” and “nudge architecture,” respectively, emphasizing that sustainable ageing housing should be designed in a modular and resource-efficient manner, and should have biophilic and flexible characteristics that can adapt to changes in the functional health of its occupants.

Physical Housing Condition Indicators

Physical housing quality was the most common dimension studied, with 14 of the 19 studies (73.7%) looking at at least one indicator of physical housing quality. Indoor environmental quality, accessibility, structural safety and space adequacy were the most frequently studied physical indicators, with accessibility being the most studied indicator (10 studies, 52.6%),

followed by indoor environmental quality (8 studies, 42.1%), structural safety (7 studies, 36.8%), and space adequacy (4 studies, 21.1%).

Accessibility indicators include barrier-free design, mobility support features and environmental usability, highlighting the key role that accessibility plays in ageing in place. The literature reviewed also shows consistent evidence that housing environments that are accessible to older persons are linked to increased functional independence and decreased mobility-related risks for older persons (Cha, 2025; Nowossadeck et al., 2023).

The main focus of indoor environmental quality indicators is the thermal comfort, temperature exposure, ventilation characteristics and energy performance. As shown in the synthesis, exposures to the housing environment are emerging as important factors of health vulnerability in older age, including heat stress and energy inefficiency (Williams et al., 2019; Miller et al., 2017; Han et al., 2025).

Structural safety indicators are structural condition, maintenance, and structural adequacy, whereas space adequacy is related to housing density, crowding, and functional spatial provision. The analysis indicates a gap in the coverage of physical housing dimensions, with space adequacy receiving less emphasis than structural safety and indoor environmental quality in the current literature (Verderber et al., 2023; Kantz et al., 2024).

Table 9 shows the frequency distribution of the indicators of physical housing condition, highlighting the prime focus on accessibility and indoor environment quality, and the lesser focus on space adequacy in current empirical research.

Table 9: Physical Housing Condition Indicators (n = 19)

Physical Indicator	Frequency	Percentage
Accessibility	10	52.6%
Indoor environmental quality	8	42.1%
Structural safety	7	36.8%
Space adequacy	4	21.1%

The findings provide evidence for the strong focus on access to the home and environmental exposures of physical housing assessment, which is related to the functional and physiological relevance of the housing environment for older persons. So far, however, space safety has received only very limited research attention, implying that the spatial vulnerability is not fully captured in existing research.

Socioeconomic and Neighbourhood Environment Indicators

The most dominant dimension in the literature was socioeconomic and neighbourhood indicators, with 15 studies (78.9%) focusing on this dimension. While affordability was the most frequently examined socioeconomic indicator, reported in 13 studies (68.4%), followed

by service accessibility (11 studies, 57.9%), neighbourhood safety (9 studies, 47.4%), and social cohesion (8 studies, 42.1%).

The indicators of affordability include housing cost burden, energy affordability, and financial housing stress, and highlight the importance of economic constraints in determining housing vulnerability. Evidence is abundant that housing insecurity and the lack of access to adequate housing are caused by affordability pressures, which also constrain households' ability to make adaptive changes and mitigate environmental risks (Mehdipanah et al., 2022; Lima et al., 2022; Sokołowski et al., 2024; Bentley et al., 2025; Bhat et al., 2025).

Service accessibility indicators involve the proximity to healthcare and transportation and essential services which are important factors of spatial accessibility and influence functional independence and ageing outcomes. Neighbourhood safety and social cohesion indicators reflect both perceived and actual levels of safety, as well as community support, interactions and integration. Together, these dimensions emphasize the importance of a supportive social environment in promoting older persons' health and wellbeing (Han et al., 2024; Guo et al., 2020; Hsu & Bai, 2021; Ma et al., 2025). However, the synthesis suggests that not all physical housing aspects have received equal study focus, with spatial adequacy somewhat under-emphasised compared to structural safety and indoor environmental quality in the assessed evidence base.

Table 10 shows the frequency of the socioeconomic and neighbourhood environment indicators that are included in the studies examined and their distribution, with the most common indicators being affordability, followed by service accessibility, neighbourhood safety, and social cohesion.

Table 10: Socioeconomic and Neighbourhood Indicators (n = 19)

Socioeconomic Indicator	Frequency	Percentage
Affordability	13	68.4%
Service accessibility	11	57.9%
Neighbourhood safety	9	47.4%
Social cohesion	8	42.1%

Housing vulnerability among older persons is also significantly influenced by socioeconomic and neighbourhood characteristics, suggesting the potential inter-connections between financial capacity, environmental accessibility, and social environment in determining housing finding.

Sustainability and Adaptive Capacity Indicators

Indicators of sustainability (9 studies, 47.4%) and adaptive capacity (7 studies, 36.8%) were reported in several of the studies; adaptive retrofit (6 studies, 31.6%) and assistive technology (2 studies, 10.5%) were also reported in some studies. Energy efficiency measures include both thermal performance and insulation characteristics as well as energy consumption features,

highlighting their importance in affecting housing affordability and environmental exposure. The evidence shows how the energy-related housing condition causes vulnerability due to energy poverty and thermal stress among older persons (Miller et al., 2017; Lima et al., 2022; Sokołowski et al., 2024; Bentley et al., 2025). Climate resilience indicators reflect exposure to extreme temperatures and environmental stressors as well as adaptive capacity in housing systems. The relation between heat exposure and environmental stress with a higher health risk has been found consistently in existing studies in the ageing population (Williams et al., 2019; Han et al., 2025; Jiang et al., 2026).

Adaptive retrofit indicators include modifications to and adaptations to the environment that increase suitability for ageing in place. Home modification is an important mechanism to support independent living and adaptability of housing, which is highlighted from the evidence (Cha, 2025; Kim et al., 2022; Mahmood et al., 2022). There was relatively little literature found regarding AT indicators, suggesting a lack of integration of AT solutions in housing assessment frameworks and a lack of digitally enabled housing adaptation for older persons.

The distribution of the sustainability and adaptive capacity indicators among the studies included is summarised in Table 11, which shows that the majority of studies are focused on energy efficiency, with assistive technology being the least represented dimension.

Table 11: Sustainability and Adaptive Capacity Indicators (n = 19)

Sustainability Indicator	Frequency	Percentage
Energy efficiency	9	47.4%
Climate resilience	7	36.8%
Adaptive retrofit	6	31.6%
Assistive technology	2	10.5%

The findings show that the indicators of sustainability and adaptive capacity are still significantly underrepresented in relation to the physical and socioeconomic housing dimensions.

Integrated Synthesis of Housing Condition Dimensions

Comparative analysis across dimensions indicated a large disparity in the use of indicators of housing conditions. Socioeconomic indicators were most commonly explored (78.9%), followed by physical indicators (73.7%), with sustainability indicators used in less than half of the studies included (47.4%). The distribution pattern suggests that current housing condition studies are still predominantly focused on current functional and economic vulnerability and are neglecting long-term environmental sustainability and adaptive capacity. A comparative distribution of housing condition dimensions across the studies included in the analysis is provided in Table 12, which shows that there is a strong dominance of social-economic and physical dimensions, with relatively few studies covering sustainability issues and adaptive capacity.

Table 12: Comparative Distribution of Housing Dimensions

Housing Dimension	Frequency	Percentage
Socioeconomic and neighbourhood	15	78.9%
Physical housing quality	14	73.7%
Sustainability and adaptive capacity	9	47.4%

This overview shows pervasive disparity in housing studies. Most study is on the physical aspects of residential structures and focuses on safety and accessibility. This indicates that the architectural design and appropriateness of housing functions and structures presented significant difficulties for prior housing research (Hsu & Bai, 2021; Lee et al., 2017; Han et al., 2024; Guo et al., 2020). In contrast, sustainability, such as energy efficiency, climate resilience, adaptability, and retrofitting potential of dwellings, is addressed with considerable inconsistency across housing research, reflecting different levels of attention in different studies (Miller et al., 2017; Sokołowski et al., 2024; Lima et al., 2022; Williams et al., 2019).

This also demonstrates inconsistency of the conceptual, sustainable and adaptive permeability of home evaluation, especially in the structural and social assessment. With the limited inclusion of these elements, approaches become disjointed and fragmented that fail to capture the housing needs of the elderly and the vulnerability that is associated with housing. Overall, the research calls for housing frameworks to be designed and developed to incorporate environmental sustainability and the housing social and physical determinants of housing mobilities and the housing as a complex social determinant of health (Bhat et al., 2025; Bentley et al., 2025).

Framework Development and Conceptual Integration

This study demonstrates the importance of an integrated housing framework. We found that, while research on housing conditions has increased across several disciplines, the integration of the physical, socioeconomic and environmental elements of housing is not balanced among disciplines. Evidence suggests that important indicators are generally considered in isolation, hence reducing the ability to reflect the complex and interrelated character of housing risk among the elderly population. This pattern of fragmentation points to the need for a more integrated approach to analysis, one that brings together complementary facts into a cohesive framework for a full examination and interpretation of housing.

In response, an Integrated Sustainable Housing Conditions Framework is proposed involving three interrelated domains: physical housing quality, the socio-economic and neighbourhood environment, and sustainability and adaptive capability. This paradigm perceives housing vulnerability as an intricate phenomenon resulting from the interplay of various structural, social, and adaptive environmental factors (Bentley et al., 2025; Bhat et al., 2025). While housing research has stemmed and grown from the gaps in knowledge and the research areas included, most cite sustainable housing and ageing, climate resilient housing, and the development of robust, targeted, and research-informed housing policies (Verderber et al., 2023).

Development of the Integrated Sustainable Housing Condition Framework

The framework employs a straightforward, three-stage inductive procedure. As a first step, a narrative synthesis and descriptive frequency analysis were performed, applying the framework established by Popay et al. (2006) to sort housing indicators from the studies included into the sectors of physical, socioeconomic, and environmental sustainability (see Tables 9–12). Furthermore, comprehensive evidence mapping to analyse the integration of the indicators indicated substantial conceptual fragmentation (refer to Table 14). The assessment discerned the links among the dimensions and encompassed essential structural omissions about housing and the protracted situation of energy scarcity.

This adheres to the principles of the Human-Environment Interaction Theory (Lawton & Nahemow, 1973) and inductively enhances the theory from this angle. The model created from this technique of synthesising indicators of dynamism and adaptive ability at the community level is derived from the demands of low-income older persons. It transcends the integration of dynamic and adaptive capacity measures to address the housing vulnerability faced by low-income elderly populations.

This paradigm perceives housing circumstances as a multidimensional, intricate construct comprising three interconnected domains: the quality and volume of physical accommodations; the socioeconomic and community environment; and sustainability and flexibility. Only five studies (26.3%) concurrently addressed the physical, socioeconomic, and sustainability dimensions of housing quality, demonstrating considerable fragmentation within studies focusing on housing conditions. In the majority of studies, physical housing conditions and socioeconomic indicators were the only dimensions investigated, leaving sustainability and vulnerability dimensions unaddressed. In this regard, this framework aims to advance beyond traditional approaches to assess housing adequacy and incorporate a multidimensional perspective to assess the cumulative housing vulnerability of low-income older persons (Kim et al., 2022, Lima et al., 2022, Williams, 2019). The framework's integrated structure is shown in Table 13.

Table 13: Integrated Sustainable Housing Condition Framework Structure

Framework Dimension	Core Indicators	Empirical Support
Physical Housing Quality	Structural safety, accessibility, indoor environmental quality, space adequacy	Mahmood et al. (2022); Lee (2017); Sokołowski et al. (2024)
Socioeconomic and Neighbourhood Environment	Affordability, neighbourhood safety, service accessibility, social cohesion	Lima et al. (2022); Biglieri & Hartt (2024); Ma (2025)
Sustainability and Adaptive Capacity	Energy efficiency, climate resilience, adaptive retrofit, and environmental adaptation	Williams (2019); Miller et al. (2017); Kim et al. (2022)

To demonstrate transparency in the synthesis process, Table 14 maps the contribution of each included study across the three housing condition dimensions. This mapping highlights the

inconsistent integration of housing variables and underscores that just five studies simultaneously addressed physical, social, and sustainability dimensions, reinforcing the presence of persistent fragmentation within the existing evidence base.

Table 14: Evidence Mapping of Housing Condition Dimensions Across Included Studies (n = 19)

No	Study	Physical Housing Quality	Socioeconomic & Neighbourhood Environment	Sustainability & Adaptive Capacity
1.	Biglieri & Hartt (2024)	✓	✓	—
2.	F. Chen et al. (2025)	—	✓	—
3.	Ghaedrahmati (2019)	✓	✓	—
4.	Guo (2020)	✓	✓	—
5.	Han et al. (2025)	✓	—	✓
6.	Han et al. (2024)	✓	✓	—
7.	Hsu & Bai (2021)	✓	✓	—
8.	Jiang (2026)	—	✓	✓
9.	Kim et al. (2022)	✓	✓	✓
10.	Lee (2017)	✓	✓	—
11.	Lima et al. (2022)	✓	✓	✓
12.	Ma (2025)	✓	✓	—
13.	Mahmood et al. (2022)	✓	✓	—
14.	Mehdipanah et al. (2022)	—	✓	—
15.	Miller et al. (2017)	✓	✓	✓
16.	Nowossadeck (2023)	✓	—	—
17.	Sokołowski et al. (2024)	✓	✓	✓
18.	Torrego Gómez et al. (2024)	✓	✓	✓

19. Williams (2019)



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The physical housing quality dimension is the structural and environmental aspects of housing that directly and essentially relate to safety, accessibility, and environmental comfort. The physical housing indicators were found to be consistently linked with functional independence, health outcomes and ageing in place, across the studies reviewed. Structural safety, accessibility, and spatial adequacy were found to be important factors for older persons with housing insecurities and their suitability in housing by Mahmood et al. (2022). Likewise, poor housing conditions were strongly associated with higher housing vulnerability and worse health outcomes, as reported by Sokołowski et al. (2024) which highlights the pivotal importance of physical housing adequacy.

The socioeconomic and neighbourhood dimension reflects financial capacity, social context and neighbourhood resources that affect the stability of housing and long-term housing sufficiency. The most constant socioeconomic factor was financial constraints, highlighting the role of affordability in causing housing hazards. Lima et al. (2022) found that energy affordability had a statistically significant impact on housing adequacy and health outcomes. Biglieri and Hartt (2024) found that neighbourhood vulnerability and spatial inequality were important factors influencing housing supportiveness among older persons. The results show the interplay between financial vulnerability and the immediate housing environment in influencing housing adequacy.

The sustainability and adaptive capacity component refers to the capacity of housing environments to remain adequate in response to environmental stresses, especially those conditions that are climate-related and/or long-term environmental change. Research on sustainability indicators also always showed that housing energy performance and climate resilience had a significant impact on housing vulnerability of older persons. Williams (2019) has found that older persons in energy in-efficient public housing are exposed to hazardous heat in their homes, and Miller et al. (2017) has shown that housing energy efficiency has a strong effect on housing vulnerability and energy affordability. It is clear from these findings that sustainability indicators are important for including as part of housing condition assessment frameworks.

The intersection of these three dimensions offers a strong conceptual framework to account for cumulative housing vulnerability. The Integrated Sustainable Housing Condition Framework is different from traditional housing adequacy frameworks that focus solely on structural sufficiency, and instead treats housing as a system dynamic that is shaped by structural condition, socioeconomic capacity and environmental resilience. The multi-dimensional integration offers a structured analytic support to the evaluation and analysis of housing vulnerability of low income older persons, which is rendered visually in Figure 2, and helps to develop evidence based housing policies and targeted housing intervention strategies.



Figure 2: Integrated Sustainable Housing Condition Framework

Discussion

Dimensional Integration within the Integrated Sustainable Housing Condition Framework

The systematic review suggests the current research has made significant contributions to the housing conditions of older persons, especially in terms of structural safety and housing basic adequacy. The contributions are drawn from a range of disciplinary perspectives and are based on a wide and scattered evidence base. Yet, the synthesis shows that there are differences in how the dimensions of housing are integrated, both physically, socio-economically and environmentally, indicating that there is variation in the conceptualisation of the different housing determinants as a whole. This phenomenon underscores the importance of a more integrated analytical approach that will systematically consider the convergence of complementary lines of evidence in an interpretative framework. The Integrated Sustainable Housing Condition Framework, in turn, integrates the physical and social dimensions with sustainability and climate-resilience as essential factors in the multidimensional evaluation of housing conditions, reflecting the response of the integrated approach.

The framework is supported by prior studies, and the concept of housing quality is defined as the interplay of structural integrity, socioeconomic stability and adaptive environmental capacity (Jiang, 2026). Unlike traditional models, which consider housing indicators separately, it highlights the interdependency of housing indicators in relation to the well-being of older persons (Chen et al., 2025). This integrated view complements the current evidence by providing a framework of analysis to delineate vulnerability and resilience in urban housing systems, specifically for low-income elderly populations. The framework includes a flexible

and adaptive environmental component that increases the explanatory power of current frameworks for tackling complex and multiple housing issues in later life (Cha, 2025).

Inter-dimensional Linkages: The Ripple Effect of Vulnerability

One of the novelties of this framework is the emphasis on the inter-dimensional links, which illustrate how failures in one dimension generate a chain reaction in others. Based on the synthesis, the main factors that lead to a deterioration in physical housing quality are economic constraints and debt burdens (Mehdipanah et al., 2022). Older persons with low incomes are at higher risk of morbidity due to financial ability and the inability to maintain their physical surroundings and make needed modifications to reduce falls (Nowossadeck, 2023). In addition, these connections are manifested by tangible defects which directly affect energy poverty, such as poor wall insulation and structural leaks. In this cycle, high energy costs (energy inefficient performance) exacerbate the financial situation of older persons and lead them to make energy consumption choices in exchange for other basic necessities (Sokołowski et al., 2024). This analysis supports the point that interventions that are effective at the housings level need to tackle economic and physical root causes together to ensure residential stability (Lima et al., 2022).

The systematic synthesis showed that space adequacy is the least discussed physical dimension with a 21.1% of the reviewed studies. This research gap is alarming, as it affects the older person's capacity to carry out the activities of daily living, with the direct impact of the lack of indoor space in low-income urban dwellings. Lack of space can make it harder to stay safe and accessible, which can create more of a barrier to ageing in place (Mahmood et al. 2022).

Moreover, the study revealed that there was a considerable gap in the literature in the field of assistive and smart home technologies, as only 10.5 percent of the literature focused on them. The traditional approaches to the housing model are oriented towards the structural safety, whereas the modern urban ageing calls for the transformation to technologically integrated environments, which enhance environmental performances. The adoption of quality insulation and energy-efficient technologies is crucial to ensure a comfortable thermal environment and lower the economic burden on older persons in high-density urban settings, as proposed by Kim et al. (2022). Further studies should focus on the development of low cost, environmentally sustainable technological solutions that can be adapted to the needs of lower income households to help reduce this digital and environmental gap.

Adaptive Capacity and Sustainability as the Core of Resilience

This framework extends the concept of housing sustainability by incorporating adaptive capacity as a key element in the context of older persons living in cities. The results highlighted the critical role of energy efficiency and building thermal performance in ensuring the health of older persons facing extreme heat risks, revealing that these factors go beyond being technical issues. The results showed that energy saving and building thermal performance are not only technical matters but also play a primary role in ensuring older person's health under extreme heat risks (Han et al., 2025). Sustainable and affordable housing should no longer be limited to the structural aspects but should also be designed to promote climate change resilience and social health by ensuring access to green spaces and natural light (Zulkepli & Rahman, 2025; Hsu & Bai, 2021). Including adaptive capacity in the framework provides a fresh perspective for policy development, focussing on housing as a means to sustain the ageing

in place process and be flexible in the face of future changes in the environment (Mahmood et al., 2022).

Implications

This research makes a contribution to the field of environmental gerontology by questioning the fragmented conceptualization of housing vulnerability in ageing research. The findings from the synthesis show that current research tends to focus on physical conditions of housing and socioeconomic and environmental factors separately, offering only partial insights into cumulative housing vulnerability of low-income older persons. This is partly because of the continued lack of representation of sustainability and adaptive capacity, which is also a structural imbalance in dominant housing adequacy frameworks. This research, in turn, proposes the Integrated Sustainable Housing Condition Framework, which redefines housing as a multi-dimensional and adaptive system where the various structural conditions and financial constraints result in the formation of neighbourhood conditions and environmental resilience. The framework thus moves away from physical sufficiency as the sole focus of housing assessment toward a more holistic view of how housing is an active factor in health, well-being and ageing results.

From a theoretical perspective the framework contributes to the field of environmental gerontology/person environment interaction by shifting the focus from housing adequacy as a state to a process (Lawton & Nahemow, 1973; Wahl & Weisman, 2003). As per the environmental gerontology, the results show that congruence between person's functional capacity and the environmental demands is not the only factor that affects housing outcomes; in addition, the ability of housing systems to cope with economic pressure, environmental stress, and demographic ageing also shape housing outcomes. The framework further elaborates on the notion of housing research by linking housing affordability, environmental exposure and housing adaptive capability as interconnected factors on multidimensional vulnerability among older persons (Bentley et al., 2025; Bhat et al., 2025). The synthesis also reveals that existing housing research is still too weak to meet the need for understanding how to respond to housing issues related to climate change, especially in the context of rapid urbanisation, socio-economic inequality, and multiple and growing environmental risks among those who are ageing and poverty.

The results underscore the need for integrated housing interventions from a policy standpoint, namely the isolation of energy efficiency and neighbourhood support systems from housing provision. The Integrated Sustainable Housing Condition Framework will be able to assess integrated housing governance based on a multidimensional approach, allowing an integrated assessment of the structural condition, the affordability stress and environmental resilience of houses, and hence also provide a basis for integrated housing governance. Thus, policy interventions should focus on integrated actions including housing retrofit programmes, energy poverty reduction and age-friendly neighbourhood infrastructure to reinforce ageing in place under urban inequality and climate vulnerability (Han et al., 2024; Kim et al., 2022; Lima et al., 2022). The framework can also help local authorities consider other factors, such as those relating to adaptability and sustainability, to assess the quality of housing beyond physical measurements. These findings taken together confirm housing as a major social determinant of healthy ageing and the necessity of more comprehensive urban housing policies that are connected with long-term sustainable urban agendas and urban resilience. (United Nations 2015).

Conclusion

This is a systematic literature review that integrated the available empirical studies on housing conditions amongst low-income older persons in urban areas. The results show that the vulnerability of housing among the elderly population is multidimensional and is determined by the interplay between physical attributes of housing, socioeconomic conditions and neighbourhood characteristics, and adaptive capacity in relation to sustainability. The physical environment, specifically structural safety, accessibility, and thermal comfort were found to be primary factors affecting health, independence, and ageing-in-place in all studies reviewed. Meanwhile, economic barriers, neighbourhood disadvantage and the lack of environmental resilience exacerbated housing insecurity in economically disadvantaged older persons.

The review also indicated that while sustainability-related aspects such as energy efficiency, climate-resilience and adaptive housing capacity are relatively under-researched in current ageing and housing research. This imbalance is an indicator of the necessity to promote more integrated and interdisciplinary approaches to tackle the complex interaction between housing, ageing and sustainability in rapidly urbanising societies.

To address this unmet need, this study created the Integrated Sustainable Housing Condition Framework that merges information on physical housing quality, socio-economic and neighbourhood environments into a single analytical framework with appropriate sustainability-related adaptive capacity. It is a framework that offers a multi-dimensional approach to understanding the vulnerability of low-income older persons when it comes to housing and it aids in the much-discussed notion of sustainable ageing in place. The framework also has practical applications for policy makers, urban planners and housing practitioners, focusing on the need for integrated housing strategies which at the same time will tackle housing adequacy, affordability, accessibility and environmental sustainability.

The study also contributes to the United Nations Sustainable Development Goals, including SDG 11 (Sustainable Cities and Communities), which seeks to ensure inclusive, safe, and resilient and sustainable urban and human settlements for all, focusing on an ageing population. The findings also support SDGs 3 (Good Health and Well-Being) and SDG7 (Affordable and Clean Energy) by highlighting the importance of healthy living environments, energy efficiency, and housing protection for vulnerable elderly populations.

The key recommendations that arise from this review for policy makers and housing authorities are to implement more integrated housing policies that take into account the structural quality, affordability, accessibility, support and sustainability of the housing environment for ageing populations. Age friendly and climate resilient housing environments should be considered a priority for urban planning and housing policies in relation to age-friendly and sustainable in place among low-income older persons. Moreover, there is a need for interdisciplinary collaboration among housing planners, public health practitioners, social welfare organizations, and sustainability practitioners to design more comprehensive housing interventions that can help to address multidimensional housing vulnerabilities in later life.

Limitation of Study

Several limitations should be acknowledged in this review. First, a final analytical sample of 19 empirical studies was obtained by limiting the literature search to articles indexed in Scopus

and Web of Science. This figure may seem little at first, but it offers crucial information on the state of multidisciplinary research in this area. More precisely, there is a substantial gap at the intersection of environmental gerontology, urban sustainability transitions, and housing adequacy due to the comparatively small number of qualified research. The infrastructure of urban dwelling in general or particular accessibility problems impacting older persons are typically the focus of existing research. Fewer studies take into account ecological resilience, economic inequality, and physical housing quality from a single, integrated analytical approach. As a result, this targeted sample contributes to the development of an Integrated Sustainable Housing Conditions Framework by laying the theoretical groundwork required for further multifaceted studies in this little-studied field. Second, the findings are relatively limited in generalizing to the experiences of older persons in non-metropolitan or semi-urban communities, due to the focus of the analysis on housing in metropolitan areas. Third, the results of the included research differ from one another, which can limit the ability to directly compare results, given differences in housing measuring indicators and methodological approaches.

The proposed Integrated Sustainable Housing Condition Framework needs to be tested empirically in various geographical, socioeconomic and cultural contexts in the future. Longitudinal and comparative analysis of housing vulnerability of ageing populations is especially required. Future research should also examine other aspects of sustainability, such as climate resistance, energy poverty, smart home technologies and adaptive housing systems, which have not yet been sufficiently explored in the literature related to housing and ageing. In the context of rapid urbanisation, sustainable integrated solutions to the issue of housing vulnerability are more and more vital for low-income older persons to be able to age in place safely, independently and with dignity.

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