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AGING IN PLACE AND CHALLENGES OF THE ELDERLY POPULATION IN URBAN AREAS: EMPIRICAL EVIDENCE FROM THE SPECIAL REGION OF YOGYAKARTA

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ABSTRACT
This study aims to analyse individual, social, physical environmental, and structural factors influencing older adults' ability to age in place in urban areas of the Special Region of Yogyakarta (DIY). The data used in this study are derived from the 2022 National Socio-Economic Survey (Susenas), with individuals aged 60 years and above as the unit of analysis. A binary logistic regression model is employed, with aging in place specified as the dependent variable. The results indicate that older adults' ability to age in place is significantly influenced by functional capacity, poverty status, housing quality, and regional characteristics. Older adults experiencing functional limitations and those living in poverty have substantially lower probabilities of aging in place. In contrast, adequate housing conditions and favourable district-level contexts in DIY increase the likelihood of independent living. These findings confirm that aging in place is a multidimensional phenomenon that depends heavily on the alignment between individual capacity and environmental conditions. The policy implications of this study highlight the importance of strengthening age-friendly cities, expanding community-based healthcare services, improving housing quality, and reinforcing social protection for vulnerable older adults to support healthy, independent, and dignified ageing.

Keywords: aging in place; urbanisation; older adults; Yogyakarta; housing environment

INTRODUCTION

Indonesia is currently entering a critical phase of demographic transition characterised by increasing urbanisation and a growing elderly population. Declining fertility rates and rising life expectancy have significantly accelerated population ageing. Official projections by Statistics Indonesia (BPS, 2024) estimate that by 2045, the proportion of older adults may reach 20 per cent of the total population, placing Indonesia in the category of an ageing society. This demographic transformation has far-reaching implications for healthcare systems, social protection mechanisms, and family dynamics, particularly in urban areas experiencing rapid economic growth and internal migration.

Rapid urbanisation has driven the migration of working-age populations to major cities. At the same time, the proportion of older adults in urban areas has increased alongside longer life expectancy and changes in household structure. BPS (2024) reports that more than 57 per cent of Indonesia's population currently resides in urban areas, a figure projected to rise to approximately 70 per cent by 2045. Concurrently, the number of older adults living in urban

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environments has increased sharply, underscoring the urgency of developing cities that are more adaptive to the needs of ageing populations.

One of the regions that has experienced accelerated population ageing at an early stage is the Special Region of Yogyakarta (DIY). According to BPS data, DIY has the highest proportion of older adults in Indonesia, exceeding 16 per cent in 2023. High life expectancy, the out-migration of younger populations, and distinctive socio-cultural characteristics have positioned DIY as a clear example of an urban region undergoing advanced ageing. This demographic profile makes DIY a strategic setting for examining the challenges of population ageing and the dynamics of aging in place in the Indonesian urban context.

Urbanisation in DIY exhibits unique characteristics. Yogyakarta City and peri-urban areas such as Sleman and Bantul have experienced rapid physical, social, and economic growth, driven by the expansion of higher education institutions, tourism activities, and dense residential development. These changes have attracted working-age populations and students, while simultaneously increasing heterogeneity within urban areas. Amid these dynamics, the number of older adults residing in urban Yogyakarta continues to rise, presenting new challenges for a relatively small yet highly active urban region.

The urban environment in DIY offers both opportunities and constraints for older adults. On the one hand, older adults benefit from better access to healthcare facilities, public transportation, and social services. On the other hand, urban areas in DIY face challenges such as residential density, traffic congestion, rising living costs, and changes in social structures driven by high population mobility. Many older adults live alone or only with an elderly spouse, increasing vulnerability to social isolation and functional decline. These conditions raise a fundamental question: to what extent are older adults in urban Yogyakarta able to maintain independent living, or age in place?

The concept of aging in place has become increasingly important in global ageing studies. Aging in place refers to older adults' ability to remain in their own homes and familiar communities despite changes in health or social circumstances (Wiles et al., 2012). Older adults generally prefer to stay in familiar environments because such settings provide continuity, emotional stability, and social identity (Sixsmith & Sixsmith, 2008). However, the success of aging in place depends heavily on family support, access to social services, physical environmental conditions, and economic security. These challenges are particularly complex in urban contexts, where family structures are shrinking, population mobility is high, and social networks are weakening.

Changes in social and family structures in Indonesian urban areas significantly affect the lives of older adults. The migration of adult children to economic centres has led many older adults to live alone or only with a spouse, weakening traditional intergenerational support systems. Litwin et al. (2015) emphasise that social isolation and the lack of emotional support are among the primary risk factors for declining quality of life among urban older adults. In addition, the fast-paced nature of urban life often reduces opportunities for neighbourhood interaction.

Bronfenbrenner's ecological theory provides a useful framework for understanding how social and physical environments influence older adults' capacity for independent living. From this perspective, older adults are shaped by multiple, interrelated systems, including family, neighbourhoods, public services, urban policies, and broader social structures (Bronfenbrenner, 2009). Similarly, the Person–Environment Fit model emphasises that mismatches between older adults' physical capacities and environmental demands—such as inaccessible sidewalks, limited public spaces, inadequate transportation, or unsafe housing—can constrain their ability to age in place.

Despite the growing urgency of population ageing in urban Indonesia, empirical research examining the relationship between urbanisation, elderly vulnerability, and aging in place remains limited. Although Yogyakarta has frequently been discussed as a province with an ageing population, systematic analyses of aging in place in its urban context are still scarce. Most previous studies have focused on elderly health or institutional care rather than examining how

interactions among individual capacity, social support, housing quality, and urban structure shape older adults' ability to age in place.

Accordingly, this study makes two key contributions. First, it introduces a new empirical approach to measuring aging in place using functional, social, and environmental indicators derived from the 2022 Susenas data. Second, it analyses the multidimensional factors influencing aging in place among older adults in Yogyakarta, thereby providing a more comprehensive perspective than previous studies. This approach generates empirical evidence relevant to the formulation of age-friendly urban policies, public service reform, and the strengthening of social support systems for ageing populations in urban Indonesia.

Based on this context, the objectives of this study are to identify the main challenges faced by urban older adults in maintaining aging in place, to analyse the roles of individual, family, social, physical environmental, and urban structural factors, and to provide policy recommendations for the development of age-friendly cities in Indonesia.

Aging in place has become a central paradigm in gerontological studies and international population policy. The World Health Organization (WHO, 2021) defines aging in place as the ability of older adults to live healthily, safely, comfortably, and independently in their own homes and communities for as long as possible. This concept originates from the strong preference of most older adults to remain in familiar environments that provide a sense of continuity, emotional security, and stable social identity.

Wiles et al. (2012) argue that place is not merely a physical setting but also encompasses symbolic meanings, social memories, and psychological attachment. Consequently, aging in place is strongly influenced by how older adults experience their environments emotionally, socially, and functionally. Sixsmith and Sixsmith (2008) emphasise that a sense of "home" is a crucial factor in enhancing older adults' quality of life. In contrast, the loss of this context may trigger stress, confusion, or a decline in overall wellbeing.

Several studies have found that aging in place in urban areas involves a dual set of challenges. On the one hand, cities provide better access to healthcare facilities, social services, and transportation (Scharlach, 2012). On the other hand, urban environments are also characterised by environmental barriers such as pollution, crime, and psychosocial stress, which can undermine older adults' ability to live independently. This indicates that aging in place is not merely a matter of personal preference but also reflects older adults' capacity to adapt to complex environmental demands.

International research indicates that aging in place is influenced by a range of factors grouped into three main dimensions: individual capacity, social support, and the physical–social environment.

a. **Individual Capacity**

Physical and mental health constitute the primary determinants of aging in place. Sixsmith and Sixsmith (2008) emphasise that functional limitations, such as difficulties in walking, visual impairment, and cognitive decline—represent major barriers to aging in place, In addition, chronic illnesses, depression, and disability are associated with increased care needs, which may compel older adults to relocate or enter institutional care settings (Greenfield, 2012).

b. Social Support and Family Structure

Family support plays a central role in the success of aging in place in Asian countries, including Indonesia, due to strong intergenerational norms. However, urbanisation has driven a shift from extended to nuclear families, thereby reducing the intensity of informal support that older adults have traditionally relied on (Aboderin, 2015). Litwin et al. (2015) demonstrate that social isolation is a strong predictor of functional decline and poor mental health among older adults, particularly in urban areas. Beyond the family, community-based social networks—such as neighbours, social groups, and religious activities—also play a significant role in providing a sense of security, emergency assistance, and emotional support (Gardner, 2011).

c. Physical Environment and Housing

Housing accessibility, neighbourhood safety, building quality, and transportation infrastructure are critical determinants of older adults' ability to remain living at home (Oswald et al., 2011). Age-unfriendly environments—such as damaged sidewalks, inadequate lighting, or densely populated and noisy neighbourhoods—can increase the risk of accidents and reduce mobility, thereby constraining aging in place. Bosch-Farré et al. (2020) show that housing quality significantly affects older adults' independence, particularly in densely populated urban areas.

Bronfenbrenner's ecological theory explains that the lives of older adults are shaped by multiple, nested systems, ranging from the microsystem, such as family and neighbours, to the mesosystem, which encompasses interactions among various support networks. Beyond these levels, older adults are also influenced by the exosystem, including access to services and urban policies, as well as the macrosystem, which comprises broader cultural norms and economic structures. This framework is particularly relevant for understanding how social and structural factors operate simultaneously to influence aging in place.

The Person–Environment Fit model proposed by Lawton and Nahemow (1973) further emphasises that older adults' wellbeing is optimised when there is a close alignment between personal capacity and environmental demands. When such alignment is lacking—for example, when older adults with mobility limitations reside in environments that are not physically accessible—their ability to age in place is significantly constrained. This framework provides a conceptual basis for assessing the readiness of urban environments to support the lives of older adults. At the micro level, older adults are influenced by their health conditions and family circumstances; at the meso level, by relationships within communities and social facilities; and at the macro level, by urban policies, economic structures, and patterns of regional development. Accordingly, the capacity of older adults to age in place is shaped not only by individual characteristics but also by wider social and structural contexts.

To strengthen the analytical framework, this study also integrates the Active Ageing Framework introduced by the World Health Organization (WHO, 2002). This framework highlights three interrelated pillars: health, encompassing both physical and mental well-being; participation, referring to engagement in family and community life; and security, which includes income security, environmental safety, and social protection. Aging in place can be understood as a concrete manifestation of these three pillars. Older adults who are healthy, empowered, and adequately protected are more likely to maintain independent living within their homes and communities. In the context of urban Indonesia, this framework is particularly relevant, as economic pressures, high population density, and weakening social networks can hinder active ageing.

In addition, this study draws on the Age-Friendly Cities framework developed by the World Health Organization (WHO, 2007; 2015), which conceptualises age-friendly urban environments through eight key dimensions: transportation systems that are safe, affordable, and accessible; housing that is secure, affordable, and suitable for older adults with mobility limitations; opportunities for social participation; avenues for civic engagement and employment; respect and social inclusion supported by cultural norms; accessible communication and information, particularly for older adults with limited digital literacy; adequate and responsive community support and health services; and safe, comfortable, and inclusive outdoor spaces and buildings. This framework clarifies how cities that fail to provide age-friendly transportation, safe public spaces, or responsive social services can significantly restrict older adults' ability to remain within their communities. In the context of Indonesia's rapid urbanisation, the Age-Friendly Cities concept is especially important, as many urban areas experience rapid physical expansion without sufficient consideration of the needs of ageing populations.

Taken together, the integration of Bronfenbrenner's ecological theory, the Person–Environment Fit model, the Active Ageing Framework, and the Age-Friendly Cities framework provides a comprehensive theoretical foundation for understanding aging in place in Indonesia. The complementarity of these perspectives enables the identification of layered influences,

ranging from individual capacity and family support to the quality of the physical environment and the structure of urban policies. Through this integrated framework, the study is well positioned to evaluate the determinants of aging in place in a multidimensional manner within the context of rapid urbanisation in Indonesia.

Based on theory and existing literature, this study conceptualises aging in place as an outcome influenced by four main groups of factors. First, individual factors include physical health, cognitive functioning, and limitations in activities of daily living. Individual capacity determines older adults' ability to maintain independent living and to meet their basic needs autonomously.

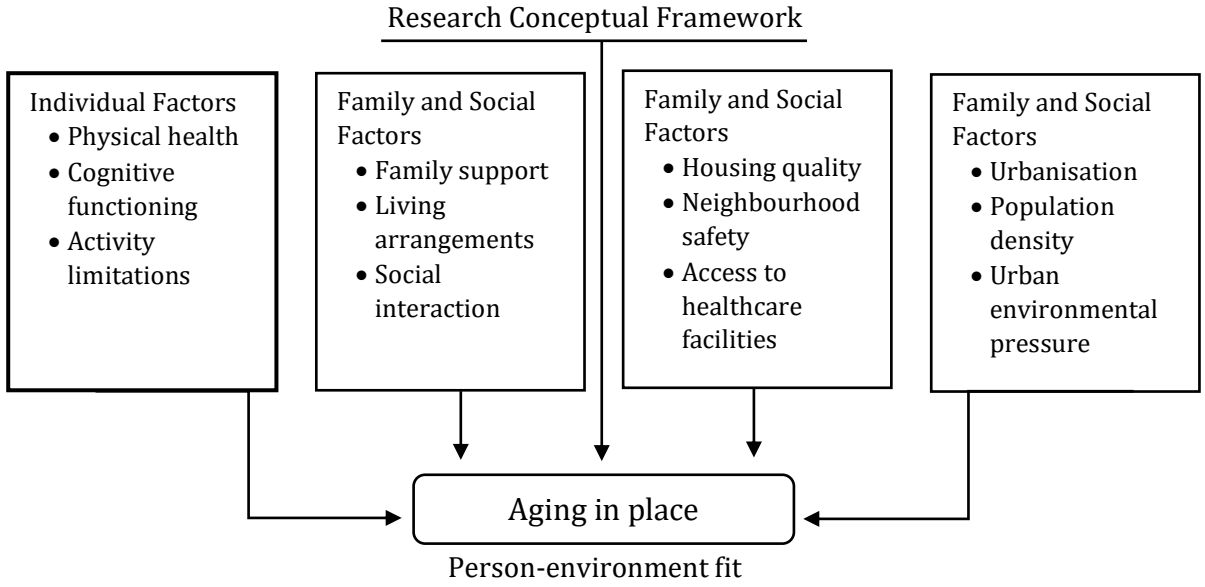
Second, family and social factors include family support, living arrangements, and social interaction. Emotional and instrumental support from family members and the community plays a crucial role in maintaining older adults' well-being, particularly in urban areas characterised by high mobility and weakening social cohesion.

Third, physical environmental factors encompass housing conditions, neighbourhood safety, accessibility, and the availability of healthcare facilities. Urban infrastructure that is friendly to older adults, as emphasised in the Age-Friendly Cities framework, helps them remain safe and comfortable in their communities.

Fourth, structural factors include levels of urbanisation, population density, and city characteristics and policy environments. Urban structure and dynamics shape the environmental demands older adults face and simultaneously determine the availability of supportive services.

These four groups of factors operate through the person-environment fit mechanism, which emphasises the importance of alignment between individual capacities and environmental demands. The better this alignment, the greater the likelihood that older adults can age in place safely and independently.

Figure 1. Conceptual Framework of the Study



METHOD

This study uses data from the 2022 National Socio-Economic Survey (Susenas), conducted by Statistics Indonesia. Susenas is a nationally representative household survey that provides reliable data at the district and municipal levels. The survey collects information on demographic characteristics, health status, socioeconomic conditions, housing characteristics, and other social aspects relevant to the analysis of population ageing.

The unit of analysis in this study consists of older adults aged 60 years and above who are recorded as members of ordinary households. The analysis is restricted to non-institutional

households. As a result, older adults residing in nursing homes or long-term care facilities are not included in the survey coverage.

An individual older adult is classified as aging in place if they meet all of the following three criteria:

1. Residential Stability
   The individual has not changed their place of residence in the past five years, as indicated by mobility-related questions in the Susenas questionnaire.

2. Functional Independence
   The individual does not experience severe functional limitations in basic daily activities, as measured by Susenas indicators of functional difficulties, including problems with walking or climbing stairs, self-care, vision, hearing, or memory.

3. Adequate Living Environment
   The individual resides in a household with housing conditions that enable independent living, such as living in an owner-occupied dwelling that meets minimum standards of habitability.

This proxy-based operationalisation is grounded in established practices in international ageing research that rely on large-scale household surveys to approximate aging in place in the absence of direct attitudinal measures.

The dependent variable in this study is **aging in place**, coded 1 if an individual satisfies all three operational criteria described above and 0 otherwise.

The independent variables are selected based on theoretical relevance and data availability in Susenas 2022 and are grouped into four major categories:

a. Individual Capacity
   Age
   0 = 60–69 years (reference category)
   1 = 70–79 years
   2 = 80 years and above

   Sex
   0 = Female (reference category)
   1 = Male

   Marital Status
   0 = Never married/divorced / widowed (reference category)
   1 = Married

   Health Status (Illness)
   0 = Not ill (reference category)
   1 = Ill or recently hospitalised

   Functional Limitation
   0 = No functional difficulties (reference category)
   1 = Presence of any functional difficulty, even if mild

   Poverty Status
   0 = Non-poor (reference category)
   1 = Poor

b. Family and Community Support
   Living Arrangement
   0 = Living alone (reference category)
   1 = Living with spouse

2 = Living with children or other family members

Access to Internet-Based Communication
0 = No access (reference category)
1 = Has access

Health Insurance Coverage
0 = No health insurance (reference category)
1 = Has health insurance

c. Physical Housing Environment

Asset Ownership
0 = No (reference category)
1 = Yes

Source of Drinking Water
0 = Non-piped or non-bottled sources (reference category)
1 = Piped water or bottled water

Main Wall Material
0 = Non-permanent materials (reference category)
1 = Brick or concrete

Main Floor Material
0 = Non-permanent materials (reference category)
1 = Marble, ceramic, or tiled floor

d. Structural and Regional Characteristics

District/Municipality
0 = Yogyakarta City (reference category)
1 = Kulon Progo
2 = Bantul
3 = Gunungkidul
4 = Sleman

Area Classification
0 = Rural (reference category)
1 = Urban

Binary Logistic Regression Model

To examine the determinants of aging in place among older adults, this study employs a binary logistic regression model, appropriate for estimating the probability of a dichotomous outcome.

The general form of the empirical model is expressed as follows:

$$\ln\left(\frac{P(AIP_i = 1)}{1 - P(AIP_i = 1)}\right) = \beta_0 + \beta_1 \text{Urban}_i + \beta_2 \mathbf{X}_i + \beta_3 \mathbf{F}_i + \beta_4 \mathbf{H}_i + \beta_5 \mathbf{W}_i + \varepsilon_i$$

Where:

- PiP_iPi denotes the probability that the *i*-th older adult can age in place;
- β0\beta_0β0 represents the intercept;

- εi\varepsilon_iεi is the error term;
- XiX_iXi refers to individual capacity variables (age, sex, marital status, health status, functional limitation, education, and poverty);
- SiS_iSi represents family and community support variables (living arrangement, internet access, and health insurance);
- HiH_iHi denotes physical housing environment variables (asset ownership, drinking water source, wall material, and floor material);
- RiR_iRi represents regional and structural variables (urban–rural classification and district/municipality).

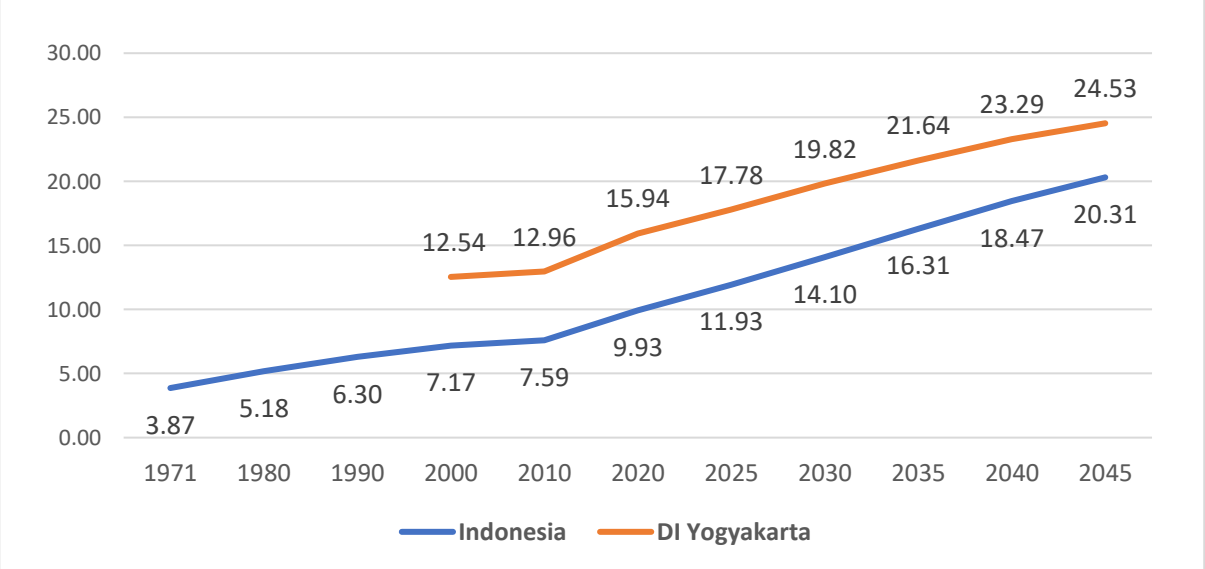
The model estimates odds ratios to facilitate the interpretation of the effects of each independent variable on the likelihood of aging in place. Statistical significance is assessed using standard confidence levels (10 per cent, 5 per cent, and 1 per cent).

RESULTS AND DISCUSSION

Trends in Population Ageing

The proportion of older adults in Indonesia has shown a consistent upward trend since 1971, increasing from approximately 3.87 per cent and projected to exceed 20 per cent by 2045 (Figure 1). This trend reflects Indonesia's demographic transition towards an ageing society, driven by declining fertility and increasing life expectancy. Although the increase is substantial, changes in Indonesia's age structure have occurred gradually due to the country's large population size and socio-economic heterogeneity across regions. Nevertheless, the steady rise in the proportion of older adults poses significant challenges for healthcare systems, social protection, and public infrastructure in accommodating the needs of an ageing population.

Figure 1. Percentage of Older Adults in the Special Region of Yogyakarta and Indonesia



Source: Statistics Indonesia (BPS), *Population Censuses (various years), and Population Projections 2020–2050*

In contrast to the national pattern, the Special Region of Yogyakarta (DIY) entered the ageing phase much earlier and more rapidly. The proportion of older adults in DIY has consistently exceeded the national average. It is projected to reach 24.53 per cent by 2045, placing the region within the category of a super-aged society. This accelerated ageing process is shaped by low fertility rates, high life expectancy, and selective migration, characterised by the out-migration of younger populations and the in-migration or retention of older adults. Consequently, Yogyakarta serves as a demographic laboratory for Indonesia, where the challenges of population ageing emerge earlier while simultaneously offering opportunities to assess best practices in

healthcare provision, community readiness, family support systems, and environmental design conducive to aging in place.

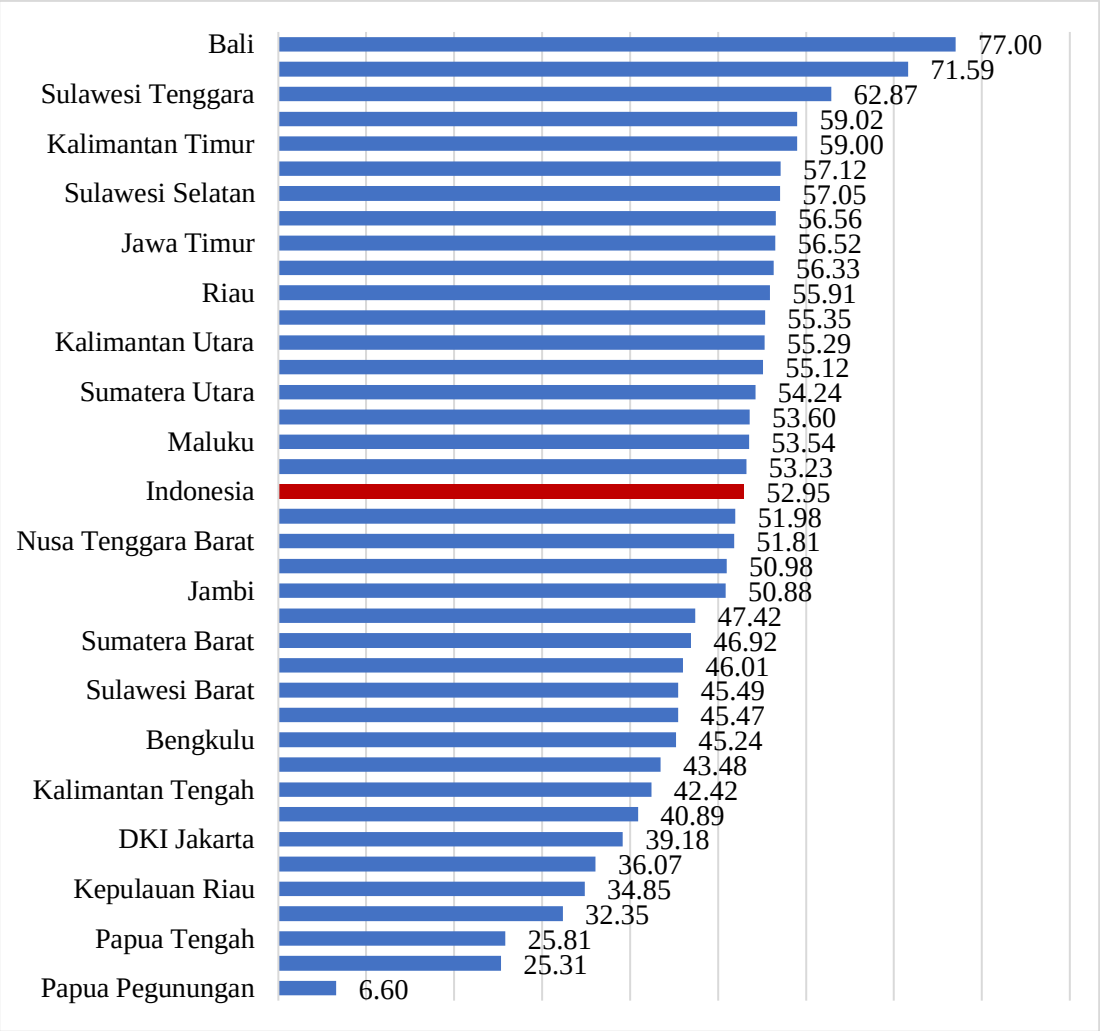
Patterns of Aging in Place

By applying the three operational criteria of aging in place to the 2022 Susenas data as described above, the findings indicate that older adults' ability to maintain independent living within their homes and communities varies considerably across provinces in Indonesia. The results show that the Special Region of Yogyakarta is among the provinces with the highest levels of aging in place, reflecting a combination of individual, social, and environmental factors that are more conducive than those in other regions.

The Special Region of Yogyakarta ranks second nationally, with an aging-in-place rate of 71.59 per cent, following Bali at 77.0 per cent and substantially exceeding the national average of 52.95 per cent. This proportion is also considerably higher than that observed in densely populated provinces such as Central Java (56.56 per cent), East Java (56.52 per cent), West Java (46.01 per cent), and the Special Capital Region of Jakarta (39.18 per cent). The relatively high capacity for aging in place among older adults in Yogyakarta is likely associated with the persistence of communal social characteristics, relatively equitable access to healthcare services, and physical environments that are more supportive of older adults' mobility. With this level of achievement, Yogyakarta has the potential to serve as a national reference and best practice for developing age-friendly urban policies and strategies to improve the quality of life of older populations.

The 2022 Susenas data further demonstrate that the Special Region of Yogyakarta consistently exhibits higher levels of aging in place than the national average across nearly all categories. This disparity suggests that both the physical and social environments in Yogyakarta are more supportive of sustained independent living among older adults. This finding is consistent with the concept of person-environment fit, which posits that older adults' well-being improves when their capacities align with environmental demands. National reports published by Statistics Indonesia in 2023 also indicate that Yogyakarta is among the provinces with the most stable healthcare infrastructure and access to social services, enabling older adults to maintain daily activities more effectively than in densely populated metropolitan regions such as Jakarta.

Figure 2. Percentage of Aging in Place by Province



Differences in the capacity for aging in place between older adults in the Special Region of Yogyakarta and the national population become more pronounced when examined by demographic characteristics. Among individuals aged 60 to 69 years, the proportion of older adults aging in place in Yogyakarta reaches 77 per cent, while the corresponding national figure is only around 55 per cent. This pattern indicates better initial health conditions among the older population in Yogyakarta.

Educational attainment also reveals a noteworthy pattern. Older adults with tertiary education in Yogyakarta achieve an aging-in-place rate of 77.79 per cent, which is slightly higher than the national rate of 69.25 per cent. This finding is consistent with the study by Sixsmith and Sixsmith, which found that higher levels of education are associated with better functional health and more active social participation.

Stronger health support in Yogyakarta is further reflected in the significant difference between older adults who reported no illness, with an aging-in-place rate of 72.92 per cent, compared to the national average of 54.40 per cent. This disparity suggests a more effective primary healthcare infrastructure in the region.

Table 1. Percentage of Aging in Place by Category: Special Region of Yogyakarta and Indonesia

Category	Special Region of Yogyakarta	Indonesia	Category	Special Region of Yogyakarta	Indonesia
Area Classification: Urban	71.86	54.85	Ever ill or hospitalised: Yes	68.72	49.77
Area Classification: Rural	71.00	50.54	Ever ill or hospitalised: No	72.92	54.40
District: Kulon Progo	60.50		Internet access: Yes	76.32	64.10
District: Bantul	74.78		Internet access: No	70.16	50.27
District: Gunungkidul	77.19		Health insurance: Yes	71.12	53.72
District: Sleman	73.81		Health insurance: No	75.77	50.76
District: Yogyakarta City	57.82		Functional limitation: Yes	46.65	
Age group: 60 to 69	78.89		Functional limitation: None	84.46	
Age group: 70 to 79	69.97		Asset ownership: Yes	71.82	54.21
Age group: 80 and above	53.83		Asset ownership: No	51.58	19.49
Sex: Male	72.74	54.40	Main wall material: Brick or concrete	73.72	58.56
Sex: Female	70.61	51.61	Main wall material: Other materials	34.51	32.44
Marital status: Married	76.68	56.06	Main floor material: Tile or ceramic	75.40	60.51
Marital status: Not married or divorced	62.08	47.28	Main floor material: Other materials	62.60	39.72
Education: Below senior secondary school	72.93	52.43	Source of drinking water: Piped or bottled water	72.25	61.48
Education: Senior secondary school	70.81	58.91	Source of drinking water: Other sources	71.41	50.96
Education: Tertiary education	77.79	69.25	Poverty status: Poor	58.49	38.09
Living arrangement: Living alone	63.13	41.07	Poverty status: Non-poor	73.75	54.63
Living arrangement: Living with spouse	72.94	54.31			
Living arrangement: Living with children or family	71.64	53.54			

Source: Processed from Susenas 2022

From a social and family perspective, older adults in the Special Region of Yogyakarta demonstrate higher levels of independence not only among those living with a spouse but also among those living alone. This pattern indicates that older adults in Yogyakarta possess strong functional capacity and robust community support even in the absence of co-resident family members. Yogyakarta is recognised as one of the provinces with the highest family development index in Indonesia. At the international level, this finding is consistent with the study by Litwin et al., which emphasises the importance of informal social support for successful aging in place. The communal social structure of Yogyakarta society and the strength of neighbourhood-based social ties are likely to function as protective factors that enable older adults to carry out daily activities.

The physical environmental and economic dimensions further explain Yogyakarta's relative advantage. Older adults living in houses with brick or concrete walls are more likely to age in place, as are those with access to safe drinking water, such as piped or bottled water. The most pronounced difference is observed among economically disadvantaged groups. Poor older adults in Yogyakarta demonstrate an aging-in-place rate of 58.49 per cent, which is substantially higher than the national average of 38.09 per cent. This pattern suggests that Yogyakarta's social environment mitigates the adverse effects of economic vulnerability among older adults. These results are consistent with the Active Ageing framework proposed by the World Health Organization in 2002, which highlights environmental security, social participation, and access to basic services as foundational elements of independent ageing.

Overall, the combination of functional health, strong community-based social support, and more humane physical environments positions Yogyakarta as a model of more advanced ageing preparedness compared to other provinces. Nevertheless, significant challenges remain, particularly among the oldest old (aged 80 years and above), who experience a marked decline in their capacity to age in place, both in Yogyakarta and nationwide. This finding underscores the need for risk-based policy interventions that specifically target the most vulnerable older age groups.

Determinants of Aging in Place and Challenges in Urban Areas

This study aims to identify the factors influencing older adults' ability to age in place in the Special Region of Yogyakarta using a binary logistic regression. The regression results indicate that aging in place among older adults in Yogyakarta is a multidimensional phenomenon shaped by the interaction between individual capacity, socioeconomic conditions, physical environmental quality, and regional context. These findings confirm that older adults' ability to remain living independently in their homes and communities is not determined solely by individual preferences, but is strongly influenced by social structures and public policies that shape their living environments, as emphasised by Lawton and Nahemow and by Wiles et al.

Before interpreting the estimation results, diagnostic tests and model checks were conducted to ensure that the binary logistic regression model met basic statistical assumptions and had adequate explanatory power. These checks are essential given that the model seeks to identify multidimensional determinants of aging in place with direct policy implications. The overall goodness-of-fit of the logistic regression model was assessed using the Likelihood Ratio test, which indicates that the model is statistically significant at the 1% level. This result suggests that the independent variables jointly explain older adults' likelihood of aging in place in the Special Region of Yogyakarta, as presented in Table 2. The model's explanatory power, as measured by the McFadden pseudo-R-squared, is acceptable.

Table 2. Binary Logistic Regression Results for Aging in Place

Category	Odds Ratio	Std. Error	z value	P value
Area classification: Urban	1.333	0.209	1.83	0.067
Sex: Male	0.939	0.104	-0.57	0.568
Marital status: Married	1.335	0.207	1.86	0.063
Health insurance: Yes	0.746	0.135	-1.62	0.105
Asset ownership: Yes	1.982	0.727	1.87	0.062
Poverty status: Poor	0.593	0.089	-3.48	0.001
Living with spouse	0.894	0.205	-0.49	0.624
Living with children	0.979	0.185	-0.11	0.911
Drinking water source: Piped or bottled	1.287	0.166	1.95	0.051
Main wall material: Brick or concrete	5.001	1.027	7.84	0.000
Main floor material: Marble, ceramic, or tile	1.844	0.218	5.19	0.000
Age group: 70 to 79	0.952	0.118	-0.40	0.691
Age group: 80 and above	0.611	0.101	-2.97	0.003

Education: Senior secondary school	1.041	0.183	0.23	0.820
Education: Tertiary education	1.428	0.311	1.64	0.102
Functional limitation: Yes	0.210	0.024	-13.78	0.000
District: Kulon Progo	1.836	0.392	2.85	0.004
District: Bantul	2.455	0.468	4.71	0.000
District: Gunungkidul	3.978	0.872	6.30	0.000
District: Sleman	2.086	0.381	4.03	0.000
Illness: Yes	0.974	0.105	-0.24	0.810
Internet access: Yes	0.868	0.128	-0.95	0.340
Constant	0.160	0.077	-3.79	0.000

Note: The Dependent variable is aging in place. Statistical significance at 10 per cent, 5 per cent, and 1 per cent levels.
Source: Processed from Susenas 2022

The regression results presented in Table 2 indicate that older adults residing in urban areas are more likely to age in place than those living in rural areas, with an odds ratio of 1.333 and statistical significance at the 10% level. This finding suggests that urban environments in the Special Region of Yogyakarta provide relatively stronger structural prerequisites for independent living in later life. Urbanisation in Yogyakarta does not appear to be entirely exclusionary or marginalising for older adults. Unlike many large cities in developing countries that experience social fragmentation and extreme environmental pressures, urban areas in Yogyakarta continue to offer relatively accessible healthcare services, transportation, and public facilities for older populations.

This result is consistent with studies indicating that urbanisation does not necessarily have negative consequences for older adults, provided that cities create inclusive, age-friendly environments, as noted by the World Health Organization and Beard et al. In the context of Yogyakarta, urbanisation seems to be accompanied by sufficient institutional and social capacity, thereby reducing the risk of social exclusion among older adults. However, the relatively modest level of statistical significance indicates that urban advantages are not automatic, but are highly dependent on environmental quality and local policy arrangements. The regression results also reveal substantial spatial variation across districts and municipalities. All districts, namely Kulon Progo, Bantul, Gunungkidul, and Sleman, exhibit significantly higher probabilities of aging in place compared to Yogyakarta City as the reference category.

These findings reflect an urbanisation paradox in later life. High population density and the commercialisation of urban space in city centres may reduce environmental quality for older adults. At the same time, semi-urban areas tend to offer a more favourable combination of service accessibility and stronger social cohesion. National studies show that district-level areas in Yogyakarta continue to maintain practices of mutual assistance, close social relationships, and a strong sense of neighbourhood safety, all of which are critical factors supporting aging in place.

The policy implication of these findings is the need for a place-based approach. The development of age-friendly cities cannot rely on uniform strategies, but must take into account local social and spatial characteristics. Yogyakarta City, as an urban core experiencing high density and spatial commercialisation, requires more intensive environmental interventions than the surrounding districts.

Individual capacity factors play a particularly strong role in determining the likelihood of aging in place. Functional limitation emerges as the most influential variable, with a highly significant effect at the one percent level and an odds ratio of only 0.210. This indicates that older adults with functional limitations, even mild ones, have a substantially lower likelihood of aging in place. This finding confirms that functional independence is a fundamental prerequisite for aging in place, as emphasised in the World Health Organization's active ageing framework and supported by extensive empirical evidence from both developed and developing countries. The result is also consistent with international studies demonstrating that limitations in activities of daily living are a primary predictor of dependency and institutionalisation in later life.

In the Indonesian context, this result aligns with findings reported by Priebe and Howell and by Statistics Indonesia, which show that disability among older adults is closely associated with poverty, social isolation, and reduced quality of life. Consequently, aging-in-place policies cannot be separated from strengthening primary healthcare services and functional rehabilitation. Without early intervention to address functional decline, aging in place risks becoming a normative concept without empirical substance.

Age group also displays a consistent pattern. Older adults aged 80 years and above have a significantly lower probability of aging in place than those aged 60 to 69, with an odds ratio of 0.611. This reflects the process of functional decline, which intensifies with advancing age and increases dependence on others and supportive environments. This finding is consistent with national evidence showing that the oldest old in Indonesia are more vulnerable to disability and limitations in daily activities.

The significantly lower probability of aging in place among the oldest old also highlights the limitations of one-size-fits-all policy approaches for older populations. International literature emphasises that the oldest old require a different combination of health support, social services, and long-term care compared to younger older adults.

In contrast, sex and self-reported illness do not show statistically significant effects. The lack of significance for illness suggests that episodic health conditions do not necessarily hinder aging in place unless they are accompanied by functional impairment. This reinforces the argument that function-based health measures are more relevant than illness-based indicators in studies of aging in place.

Interestingly, living arrangements, whether living with a spouse or with children, do not significantly affect the likelihood of aging in place. This finding suggests that the physical presence of family members does not automatically guarantee independence in later life. In Yogyakarta, some older adults living alone may still benefit from strong social networks and supportive neighbourhood environments. In contrast, those living with family members may not necessarily receive effective functional support. This result challenges policy assumptions in Indonesia that remain heavily oriented towards family-based care as the primary source of support for older adults.

International literature clearly distinguishes between co-residence and effective social support. In urban contexts, family members are often occupied with employment responsibilities and are unable to provide daily care, leaving older adults vulnerable even when they do not live alone. In urban and semi-urban societies such as Yogyakarta, family relationships may be co-resident but lack emotional or practical intensity. As a result, this finding challenges the conventional assumption that living with family members always enhances older adults' wellbeing. The policy implication is clear. Strengthening community-based care systems is as important as reinforcing support from the nuclear family.

Internet access and health insurance coverage also do not show statistically significant effects. This suggests that digital access and insurance enrolment have not yet been fully translated into tangible support for aging in place, particularly when they are not accompanied by adequate digital literacy and responsive healthcare services tailored to older adults' needs.

Poverty emerges as one of the most consistent and significant determinants of aging in place. Older adults living in poverty have a substantially lower likelihood of aging in place, with an odds ratio of 0.593 and significance at the one percent level. This finding confirms that aging in place is not only a health or environmental issue, but also a matter of socioeconomic inequality. Poorer older adults are more likely to reside in substandard housing, face limited access to services, and experience economic pressures that constrain their ability to live independently. This result is consistent with national studies by Priebe and Howell and international research by Barrientos et al., which emphasise that elderly poverty directly affects housing quality, access to healthcare, and overall security in later life. Within the active ageing framework, economic security is recognised as a core pillar alongside health and social participation.

Other national studies indicate that poverty among older adults in Indonesia is multidimensional, shaped by low asset ownership, limited access to social protection, and the cumulative effects of vulnerability across the life course, all of which ultimately restrict older

adults' capacity to maintain independence in later life. Consequently, aging-in-place policies that are not integrated with social protection measures, such as social assistance for older adults, housing subsidies, and health insurance, risk exacerbating inequalities among older populations.

The regression results further demonstrate that physical housing characteristics are particularly strong determinants of aging in place. Older adults living in houses with brick or concrete walls are five times more likely to age in place, with an odds ratio of 5.001 and high statistical significance. Similarly, permanent floor materials such as marble, ceramic, or tile significantly increase the likelihood of aging in place, with an odds ratio of 1.844. Access to safe drinking water also shows a positive association, with an odds ratio of 1.287 and marginal statistical significance. These findings emphasise that housing quality is not merely an indicator of welfare, but a direct factor influencing safety, comfort, and mobility in later life. They also reinforce evidence that housing conditions are a central determinant of the ability to remain living at home in old age. Studies in developing countries further demonstrate that relatively simple interventions, such as improvements in flooring, lighting, and sanitation, can substantially reduce the risk of falls and illness among older adults.

A healthy housing environment supports older adults' functional capacity. It reduces the risk of illness, in line with the World Health Organization's Age-Friendly Cities approach, introduced in 2007, which identifies adequate housing as a central pillar of age-friendly urban development. International studies also demonstrate that home modification interventions are highly effective and relatively low-cost strategies for supporting aging in place. In the context of the Special Region of Yogyakarta, these findings indicate that policies promoting adequate, age-appropriate housing can yield substantial improvements in older adults' quality of life.

Another important finding is the presence of strong spatial variation across districts and municipalities within the Special Region of Yogyakarta. Compared to Yogyakarta City as the reference category, all districts, namely Kulon Progo, Bantul, Gunungkidul, and Sleman, exhibit significantly higher probabilities of aging in place, with Gunungkidul showing an odds ratio of nearly four. This result challenges the common assumption that urban cores are invariably more age-friendly. In the urban context of Yogyakarta, residential density, the commercialisation of space, heavy traffic, and the reduction of public social spaces may, in turn, increase environmental pressures on older adults, particularly those with mobility limitations.

By contrast, district-level areas in Yogyakarta tend to offer calmer physical environments, lower population density, and more cohesive and sustainable patterns of social relations. These conditions enable older adults to remain socially engaged within their communities, maintain a sense of safety, and access everyday informal support, all of which are essential prerequisites for aging in place. This pattern is consistent with international literature, which emphasises that social cohesion, a sense of place attachment, and the quality of community-level social interactions are often more decisive for successful aging in place than the mere availability of urban physical facilities. Accordingly, the experience of Yogyakarta demonstrates that challenges related to aging in place in urban settings are not determined solely by the degree of urbanisation, but also by how urban spaces are managed to remain inclusive and supportive of older adults' long-term wellbeing.

From a policy perspective, these findings imply the need for a spatially informed approach to developing age-friendly cities. This approach should prioritise more inclusive residential environment planning, the management of population density in urban cores, the provision of accessible public spaces for older adults, and the strengthening of neighbourhood-based planning strategies. Urban spatial planning policies in Yogyakarta should explicitly integrate older adults' needs into housing development, transportation systems, and the design of public open spaces, so that urbanisation processes do not undermine older adults' ability to remain living independently in familiar environments.

Overall, the regression results provide strong empirical support for the person-environment fit theory, which posits that aging in place arises from the alignment between individual capacity and environmental demands. Functional limitations and poverty weaken individual capacity, while housing quality and favourable regional environments enhance adaptive potential. These findings are also consistent with the World Health Organization's Active

Ageing Framework, introduced in 2002, which emphasises the interplay among health, participation, and security. Interventions aimed at promoting aging in place cannot focus solely on healthcare services. However, they must also encompass housing improvements, poverty reduction among older adults, and the strengthening of community environments. The experience of Yogyakarta illustrates that successful aging in place can be achieved through a combination of adequate physical environments and strong social capital.

CONCLUSION

This study demonstrates that older adults' ability to age in place in the Special Region of Yogyakarta results from a complex interaction between individual capacity, socioeconomic conditions, the quality of the physical housing environment, and regional context. Aging in place cannot be understood merely as an individual preference to remain at home, but rather as an outcome of the alignment between older adults' functional capacities and the characteristics of their living environments. These findings reinforce the relevance of person-environment fit theory and the active ageing framework in explaining ageing dynamics in the urban context of Indonesia.

The logistic regression results confirm that functional limitations and poverty represent the strongest barriers to aging in place. Older adults with functional impairments and low economic status have a substantially lower likelihood of maintaining independent living within their homes and communities. In contrast, the physical quality of housing, particularly adequate building structures and access to safe drinking water, emerges as a significant protective determinant. This finding indicates that the sustainability of living at home in later life depends heavily on safe, supportive housing that supports older adults' mobility and health.

Spatial variation across areas within the Special Region of Yogyakarta reveals that aging in place is not necessarily easier to achieve in urban cores. District-level areas in Yogyakarta exhibit higher probabilities of aging in place than Yogyakarta City, highlighting the importance of social cohesion, lower population density, and living environments that are relatively more supportive of older adults. Thus, urbanisation does not automatically enhance older adults' quality of life; rather, it depends critically on how urban spaces are managed and oriented towards the needs of an ageing population.

Overall, this study emphasises that effective aging-in-place strategies must go beyond sectoral approaches and family-based solutions alone. Without adequate public policy support, particularly in providing suitable physical environments, function-oriented healthcare services, and social protection for vulnerable older adults, aging in place risks remaining a normative ideal rather than a substantive reality. The Special Region of Yogyakarta demonstrates potential as a policy laboratory for aging in place in Indonesia, yet the sustainability of this success requires integrated and evidence-based interventions.

The findings of this study have significant policy implications for the development of aging-in-place strategies in Indonesia, particularly in urban and semi-urban contexts. First, strengthening age-friendly urban and residential infrastructure should be a top priority. Local governments need to adopt the World Health Organization Age-Friendly Cities framework more comprehensively, with a focus on providing safe, adequate housing for older adults, improving floor quality and building structures, ensuring access to safe drinking water, and creating residential environments that support mobility and safety. Small and medium-scale home improvement interventions can represent effective and relatively cost-efficient strategies for enhancing aging in place, especially among poor older adults.

Second, elderly health policy should shift from a predominantly curative approach to a function-based, disability-prevention-oriented approach. The strong evidence regarding the role of functional limitations indicates that primary healthcare services should place greater emphasis on early screening for activity limitations, functional rehabilitation, and the development of home care and community-based care services. Strengthening the role of primary health centres, community health workers, and community-based health services is essential to maintaining older adults' independence before more severe functional decline occurs.

Third, the findings underscore the importance of integrating aging-in-place policies with social protection and poverty-reduction strategies for older adults. Poorer older adults represent the group most vulnerable to losing the capacity for independent living. Therefore, social assistance programmes for older adults, housing subsidies, and other social protection schemes must be designed with greater sensitivity to the specific needs of older populations, not only as instruments for poverty alleviation, but also as prerequisites for sustaining aging in place.

Fourth, the finding that living arrangements are not statistically significant challenges the assumption that families are always the primary source of support for older adults. This result indicates the need to strengthen community-based support systems and to develop integrated long-term care models at the village or neighbourhood level. This approach is increasingly relevant given the growing proportion of the oldest old population and ongoing changes in family structures in Indonesia. The Special Region of Yogyakarta can play a strategic role as a pilot area for developing community-based long-term care models that combine family support, community participation, and state involvement.

Overall, the policy implications of this study highlight that successful aging in place requires a cross-sectoral approach that integrates housing policy, healthcare services, social protection, and spatial governance. Without such integration, policy responses to population ageing risk will remain fragmented and unsustainable. This study is expected to provide an empirical foundation for formulating more inclusive urban and regional policies responsive to the needs of older adults in Indonesia.

The findings also offer a strong policy argument that the development of age-friendly cities in Indonesia does not have to rely on large metropolitan areas, but may be more effective when based on medium-sized cities. The experience of the Special Region of Yogyakarta demonstrates that a more human scale of urban development, relatively controlled spatial planning, and the presence of strong social capital and community cohesion constitute essential conditions for the success of aging in place. Accordingly, national policy should encourage a differentiated approach to urban development, providing greater opportunities for medium-sized cities and peri-urban areas to serve as policy laboratories for age-friendly urban development. At the same time, large cities need to implement corrective measures through population density management, protection of public spaces, and improvements to residential environments to prevent them from becoming increasingly exclusionary for older adults. In this way, urban development strategies oriented towards aging in place can function not only as social policies, but also as instruments of spatial planning and sustainable development that ensure older adults' wellbeing amid ongoing urbanisation processes.

This study has several limitations that should be considered when interpreting the findings. The use of cross-sectional Susenas data means the results reflect associative relationships and cannot establish causal links among variables in the aging-in-place process, which is inherently dynamic and unfolds over time. In addition, the measurement of aging in place in this study relies on operational indicators available in Susenas, which do not fully capture subjective dimensions such as perceived safety, emotional attachment to place, and older adults' satisfaction with their living environments. Another limitation concerns the availability of urban environmental variables in Susenas, which does not allow for more detailed measurement of public space quality, age-friendly transportation accessibility, and broader urban environmental characteristics. Therefore, future research employing longitudinal approaches and enriched environmental and psychosocial indicators is strongly needed to deepen understanding of aging in place in Indonesia.

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