

## Regional disparity in age-related disability: toward healthy aging in Indonesia

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### Abstract

**Purpose:** Maintaining functional ability and minimizing age-related disability of older adults are required to promote healthy aging. A supportive physical and social environment, in addition to individual variables, has a role in reducing the risk of age-related disability. Infrastructure development differs between Java-Bali and outer Java-Bali regions. This study aims to determine the extent to which the disability of older adults in Java-Bali and outer Java-Bali regions.

**Methods:** This study is cross-sectional, using data from the 2020 National Socio-Economic Survey (SUSENAS) with 122.344 Indonesian older adults aged 60 and over. Disability is the outcome variable. The explanatory variable is regional disparity (Java-Bali and outer Java-Bali regions), which refers to where the older adults live. In addition, the control variables include age, sex, marital status, educational level, employment status, leisure activity, household wealth status, and self-rated health status (SRHS). A multivariate logistic regression statistical analysis is performed. **Results:** The outer Java-Bali region has a slightly greater prevalence of older adults with age-related disability than the Java-Bali region, with 28.8 and 22.9 percent, respectively. However, older adults living in the outer Java-Bali region are 1.63 times more likely (OR 1.63; 95% CI (1.58-1.68)) to have disability than those living in the Java-Bali region. Other socio-demographic variables are significantly associated with age-related disability. **Conclusion:** Living in the Java-Bali region increases the risk of age-related disability. Infrastructure development in the outer Java-Bali region needs to be improved so that older adults can experience healthy aging.

**Keywords:** age-related disability; functional ability; healthy aging; older adults; region

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## INTRODUCTION

In recent years, Indonesia's fertility rate has steadily declined, while life expectancy has increased. As for life expectancy, it has increased from 69.81 to 71.57 years between 2010 and 2021 [1]. With an increase in life expectancy, Indonesia can benefit from the second demographic dividend. However, the second demographic dividend can be achieved only if policymakers respond effectively to the coming demographic transition by enacting an effective policy fostering an old-age support system that substitutes capital originating from wealth accumulation throughout the lifecycle.

The proportion of the Indonesian population aged 60 and over gradually increased from 7.59 percent in 2010 to 10.82 percent in 2021 [1]. With more than 7 percent of the population aged 60 and over, Indonesia has been designated as an "aging society." Given that aging is frequently associated with health degradation and age-related disability, the extent of the gains from the second demographic dividend will be heavily determined by "health."

Unfortunately, data from the Basic Health Research (RISKESDAS) revealed that the prevalence of non-communicable diseases (NCD), such as cancer, stroke, chronic kidney disease (CKD), diabetes, and hypertension increased among Indonesian older adults between 2013 and 2018 [2]. Indonesia, like the rest of the Asia-Pacific region, also must deal with the issue of age-related disability [3,4]. According to the 2019 Global Burden of Disease (GBD) study, Indonesia has a double burden of communicable (e.g. respiratory infections) and noncommunicable diseases (e.g. high systolic blood pressure and high fasting plasma glucose), which are the primary causes of health loss measured in Disability-Adjusted Life Year (DALY) noncommunicable diseases from 1990 to 2019 [5].

The World Health Organization (WHO) defines healthy aging as "the process of developing and maintaining the functional ability that enables wellbeing in older age.". Functional ability refers to the abilities that allow older adults to be and accomplish what they value. It does not have to be free of illness, injury, or disease, but it does have to do with improving functional ability that allows older adults to participate in meaningful activities. Therefore, functional ability is essential for healthy aging.

Disability, on the other hand, is defined by the International Classification of Functioning, Disability,

and Health (ICF) as an umbrella word that encompasses impairments, activity limitations, and participation restrictions. Age-related disability can be mitigated or delayed by engaging older adults in healthy lives and providing them with a supportive physical and social environment. Previous research has demonstrated the importance of individual factors, such as employment status [6,7], living arrangement [7,8], physical exercise [7,9], and leisure activities [7,10,11] in lowering the risk of age-related disability. Living in deprived areas, on the other hand, poses a threat to functional ability [12–16].

Unfortunately, the report of the 2021 Village Potential Data Census Collection (PODES) reveals that infrastructure development in Indonesia is imbalanced, particularly between the Java-Bali and outer Java-Bali regions. For example, the Java-Bali region has a higher percentage of villages with robust internet connections and asphalt road infrastructure than the outer Java-Bali region [17].

A prior study in Indonesia found that numerous services, systems, and policies provided in the community are required to lower the incidence of age-related disability [14]. However, because the previous aforementioned study does not distinguish between the situation of age-related disability in Java-Bali and the outer Java-Bali regions in terms of disparities in infrastructure development, it is necessary to determine the extent to which the disability of older adults in Java-Bali and the outer Java-Bali regions.

## METHODS

This cross-sectional analysis uses existing dataset from the 2020 National Socio-Economic Survey (SUSENAS) – March round. A two-stage stratified sampling design with 320,000 households is used for the 2020 SUSENAS-Core. The sample size is 122,344 older adults aged 60 and over (unweighted).

The outcome variable is disability. In this study, disability is defined as a functional limitation using the ICF. The Washington Group of six short (WGSS) questions employed in SUSENAS is used to examine disability. The WGSS addresses 6 functional domains: seeing, hearing, walking or climbing steps, remembering or concentrating, self-care, and communicating. Each domain is graded as follows: no difficulty, some difficulty, a lot of difficulty, and cannot do at all. Older adults with disability are those with 'some difficulty' in at least two of the six domains, or 'a

lot of difficulty' or 'cannot do at all' in at least one domain [7,14,18].

As this study defined disability in accordance with the ICF, both individual and environmental variables will be considered. The main explanatory variable (environmental variable) of the outcome variable is specified as the place of residence of the older adults. Thus, the environmental variable of this study is regional disparity (Java-Bali and outer Java-Bali regions).

In addition, the individual variables serve as the control variable. They are: age groups [7,19,20] (60-64, 65-69, 70-74, 75-79, 80+); sex [7,20] (male, female); marital status [7] (currently married/living together, others); educational level [7,21] (low, intermediate, high); employment status [6,7] (employed, unemployed); leisure activity [7,10,11] (yes, no); household wealth status [22,23] (which is measured by household expenditure); self-rated health status (SRHS) [24,25] (which is measured by medical symptoms, such as fever, cough, colds, diarrhea, recurrent headaches, or other illnesses, followed by the inability to perform daily activities). Study shows that SRHS can predict disability status [24].

Others in marital status are those who have never been married, divorced, or widowed. Furthermore, the educational level is determined by the mean years of schooling in 2020, which is 8.48 years [26]. Thus, primary school or lower is classified as low, high school is classified as intermediate (equal to the range of the mean years of schooling in 2020), and university is classified as high.

The statistical analysis takes into account the survey design and sample weight of the SUSENAS-core. The socio-demographics of older adults aged 60 and over with disability are shown using descriptive analysis. The weighted data is presented as a percentage. Finally, logistic regression analysis is employed to ascertain the relationship between regional disparity and outcome variable while controlling for other socio-demographic variables. The adjusted odds ratios have a 95% confidence interval ( $p < 0.05$ ).

A letter of understanding (No. 48/LADU/0000/12/2020) between BKKBN and BPS makes the 2020 SUSENAS-core dataset available. The agreement imposed legal restrictions that prevented the general public from acquiring raw data. Since BPS does not provide personal data identifying, such as name and address, no ethical approval is required for this study.

## RESULTS

**Table 1. Sociodemographic characteristics of older adults aged 60 and over with disability, Indonesia, 2020**

Variables	Disability (%)		p-value*
	Yes (26.6)	No (73.4)	
Age-groups (years)	60-64	13.8	0.000
	65-69	21.2	
	70-74	31.4	
	75-79	42.4	
	80+	58.1	
Sex	Male	28.2	0.000
	Female	21.5	
Marital status	Currently married/ living together	19.8	0.000
	Others	34.5	
Educational level	Low	27.1	0.000
	Intermediate	20.4	
	High	15.5	
Employment status	Employed	13.9	0.000
	Unemployed	33.8	
Leisure activities	Yes	19.2	0.000
	No	27.0	
SRHS	Worse	30.7	0.000
	Better	20.8	
Household expenditure	Bottom 40%	27.3	0.000
	Mid 40%	24.1	
	Top 20%	20.9	
Region	Java-Bali	22.9	0.000
	Outer Java-Bali	28.8	

\*Significant at  $\alpha=0.05$

**Table 2. Logistic regression models for the predictors of disability among older adults aged 60 and over, Indonesia, 2020**

	Variables	OR (95% CI)	p-value*	Adj OR (95% CI)	p-value*
Age-groups (years)	60-64	1.00		1.00	
	65-69	1.59 (1.54 - 1.65)	0.00	1.47 (1.42 - 1.53)	0.00
	70-74	2.78 (2.67 - 2.88)	0.00	2.33 (2.23 - 2.42)	0.00
	75-79	4.45 (4.25 - 4.65)	0.00	3.32 (3.17 - 3.48)	0.00
	80+	8.15 (7.76 - 8.55)	0.00	5.43 (5.16 - 5.72)	0.00
Sex	Male	1.00		1.00	
	Female	1.22 (1.19 - 1.24)	0.00	1.17 (1.15 - 1.19)	0.00
Marital status	Currently married/ living together	1.00		1.00	
	Others	2.07 (2.01 - 2.12)	0.00	1.31 (1.27 - 1.35)	0.00
Educational level	Low	1.00		1.00	
	Intermediate	0.69 (0.67 - 0.72)	0.00	0.76 (0.74 - 0.79)	0.00
	High	0.48 (0.45 - 0.52)	0.00	0.57 (0.53 - 0.61)	0.00
Employment status	Employed	1.00		1.00	
	Unemployed	3.01 (2.92 - 3.08)	0.00	2.41 (2.33 - 2.48)	0.00
Leisure activities	Yes	1.00		1.00	
	No	1.21 (1.17 - 1.25)	0.00	1.35 (1.30 - 1.39)	0.00
SRHS	Worse	1.00		1.00	
	Better	0.58 (0.56 - 0.59)	0.00	0.59 (0.58 - 0.61)	0.00
Household expenditure	Bottom 40%	1.00		1.00	
	Mid 40%	0.86 (0.84 - 0.88)	0.00	0.94 (0.91 - 0.96)	0.01
	Top 20%	0.75 (0.72 - 0.78)	0.00	0.89 (0.86 - 0.93)	0.00
Region	Java-Bali	1.00		1.00	
	Outer Java-Bali	1.43 (1.39 - 1.47)	0.00	1.63 (1.58 - 1.68)	0.00

\*Significant at  $\alpha=0.05$

The sociodemographic characteristics of respondents based-on age-related disability are presented in **Table 1**. The data has been weighted. About 26.6 percent of respondents are age-related disability. The prevalence of respondents with age-related disability is slightly higher in the outer Java-Bali region than in the Java-Bali region, with 28.8 and 22.9 percent, respectively.

**Table 2** presents the results of logistic regression analysis (Adj OR). Older adults living in the outer Java-Bali region are 1.63 times (OR 1.63; 95% CI (1.58-1.68)) more likely to have disability than those residing in Java-Bali region. When compared to employed older adults, those who are unemployed have a higher risk of disability (OR 2.41; 95% CI (2.33-2.48)). In comparison to those who participate in leisure activities, older adults who do not participate in leisure activities are more likely to have a risk of disability (OR 1.35; 95% CI (1.30-1.39)). Age (getting older), sex (female), marital status (living alone by being single, or divorced, or widowed) are all risk factors for disability. On the other hand, education (higher education level), better SRHS, household wealth (higher household expenditure) are protective factors.

## DISCUSSION

The findings of this study support a previous Indonesian study [14] that regional disparities to be associated with disability among Indonesian older adults aged 60 and over. Even after controlling for other socio-demographic characteristics, including SRHS, our study found that older adults residing in the Java-Bali region have a reduced risk of age-related disability than those living in the outer Java-Bali region. Although our study cannot determine which specific aspects of the environment in the Java-Bali region promote older adults' wellbeing more than those in the outer Java-Bali region, it does confirm the importance of the environment in reducing the incidence of age-related disability.

In addition, the percentage of older adults residing in the outer Java-Bali region is slightly greater than in the Java-Bali region, accounting for 28.8 percent and 22.9 percent, respectively. This study's findings necessitate environmental improvement in the outside Java-Bali region due to less advanced infrastructural development.

Infrastructure development can have a positive social impact on the quality of life of older adults.

Improved internet infrastructure can facilitate social activities and communication among older adults [27]. Maintaining relationships and remaining socially engaged with the community are important components of healthy aging because they allow older adults to share their knowledge, expertise, and experience with others [28]. Furthermore, proper road infrastructure may enhance older adults' mobility [29]. Therefore, infrastructure development may benefit older adults' physical and mental wellbeing while also lowering the risk of developing age-related disability.

As intrinsic capacity (e.g., physical and mental capability) fades with age, older adults require care and assistance from the environment to retain functional ability. The finding of this study shows that age is the most important factor associated with age-related disability. The more people who get older, the more likely it is that they will develop an age-related disability.

In addition, our study finds that SRHS is not the first, but the fourth most important factor associated with age-related disability. This finding lends support to the idea that healthy aging does not have to be devoid of injury, disease, and illness. Healthy aging is about optimizing functional ability by creating the opportunities and environment that enable older adults to be and do what they value throughout their lives. Although older adults may require support from their surroundings at times, they should be considered as both recipients of community services and contributors to the well-being of the community [30,31].

In the WHO concept of healthy aging, functional ability involves satisfying basic needs, learning, growing, and making decisions, being mobile, building and maintaining relationships, and contributing to society [32]. The findings of our study support this argument. Aside from the environment and SRHS, other factors such as job, education, and leisure activities are crucial in allowing older adults to be and do what they value throughout their lives.

The second most factor associated with a lower risk of age-related disability is employment status. Employment status can help older adults obtain basic needs such as proper housing and nutrition. Older adults should meet basic needs, and initiatives should be taken to reduce inequities in opportunity [33]. People with disability (PwD) often have poorer functioning due to unfair conditions that may be tied to broader socioeconomic concerns [34]. Furthermore, around 43.36% of Indonesian households aged 60 and above

were in the bottom 40 percent of household purchasing power [35], requiring them to continue working for a living. Aside from addressing basic necessities, employment status is an important component of healthy aging because it encourages the establishment of age-friendly work environment that allows older adults to continue working and contribute to society [33].

Education is the third most important factor in lowering the likelihood of age-related disability. Previous research has found an association between education and cognitive functioning [36]. In the end, cognitive functioning may assist older adults in learning, growing, and making decisions. Furthermore, leisure activities promote the maintenance of physical and mental health [37,38] while also supporting cognitive performance.

### Limitations

The large, nationally representative dataset used in this study allows the results to be generalized to the national level. The data on disability status, on the other hand, was self-reported, which could be a source of bias. A causal relationship is also difficult to establish due to the cross-section design analysis.

### CONCLUSION

In order to achieve healthy aging, as designated by WHO, age-related disability should be postponed. The environment in which older adults live is crucial in lowering the risk of age-related disability, particularly because the intrinsic capacity of older adults declines with age, necessitating care and assistance from the environment.

The outer Java-Bali region's infrastructure development is further behind that of the Java-Bali region. Living in the outer Java-Bali region increases the likelihood of developing an age-related disability. Therefore, infrastructure development has a positive social impact on older adults' quality of life, so that development should also now be oriented toward the outer Java-Bali region to promote healthy aging.

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