

# Non-Communicable Diseases among the Elderly in Indonesia in 2018

Rukmini Rukmini<sup>1</sup>, Adianti Handajani<sup>1</sup>, Astridya Paramita<sup>1</sup>, Pramita Andarwati<sup>1</sup>, Agung Dwi Laksono<sup>2</sup>

<sup>1</sup>Researcher, Functional Unit of Health Technology Innovation, Center of Research and Development of Humanities and Health Management Ministry of Health, Surabaya, Indonesia, <sup>2</sup>Researcher, Center of Research and Development of Humanities and Health Management, Ministry of Health, Jakarta, Indonesia

## Abstract

Non-Communicable Disease (NCD) is closely related to the aging process, social development, and increased risk factors. The study aims to analyze the prevalence of NCD among the elderly in Indonesia based on demographic characteristics. The study employed the 2018 Indonesia Basic Health Survey data. The survey used the multi-stage cluster random sampling method; it was a weighted sample of 85,358 elderly. In this analysis, the NCDs prevalence in the elderly includes hypertension, heart disease, bronchial asthma, chronic renal failure, diabetes mellitus (DM), stroke, and cancer determined based on a doctor's diagnosis. The study result shows the prevalence of NCD in the elderly population in Indonesia, most of which are hypertension, mental-emotional disorders, depression, DM, and heart disease. Based on age group, the prevalence of hypertension, mental-health disorders, and depression tends to increase with increasing age, stroke and bronchial asthma are higher in the 70-79. DM and cancer were higher in the 60-69. Heart disease and kidney failure did not differ relatively between age groups. The prevalence of hypertension, mental-emotional disorders, depression, DM, heart disease, and cancer was higher in women. Still, asthma, stroke, and chronic kidney failure tended to be more in men. The study concluded that the most prevalent NCDs among older people in Indonesia were hypertension, mental, emotional disorders, depression, DM, and heart disease. NCDs have demographic characteristics.

**Keywords:** *non-communicable diseases, hypertension, heart disease, diabetes mellitus, stroke, cancer, elderly, community health, public health.*

## Introduction

The aging population is a global trend in the 21st century. WHO data estimates show the increase in people aged 60 and over from 11% in 2006 to 22% in 2050. In five decades, aging in developing countries is much faster than in developed countries; more than 80% of the world's elderly live in developing countries

compared to 2005 as much as 60%<sup>1</sup>. In Indonesia, an older person is someone who has reached the age of 60 (sixty) years and over<sup>2</sup>. In five decades, the elderly in Indonesia has doubled (1971-2020), namely to be 9.92% ( $\pm 26$  million), older women (10.43%) are more than the male elderly (9.42%). In 2020, six provinces in Indonesia had an old population structure, the number of seniors has reached 10%, namely Yogyakarta (14.71%), Central Java (13.81%), East Java (13.38%), Bali. (11.58%), North Sulawesi (11.51%), and West Sumatra (10.07%)<sup>3</sup>.

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**Corresponding Author:**

**Agung Dwi Laksono**

Email: [agung.dwi.laksono-2016@fkm.unair.ac.id](mailto:agung.dwi.laksono-2016@fkm.unair.ac.id)

Increasing age in the elderly is accompanied by a decrease in the body's intrinsic capacity and functional capability, which affects the body's organ systems<sup>4</sup>. NCD is closely related to the aging process and social development. The increase in the burden of NCD is due to a rise in the number of older people and the prevalence of commonly preventable risk factors such as tobacco use, inadequate physical activity, unhealthy diet, and harmful alcohol use. Metabolic risk factors are increased blood pressure, overweight/obesity, hyperglycemia, and hyperlipidemia<sup>5</sup>. Non-communicable diseases, also known as chronic diseases, tend to be long-lasting and result from a combination of genetic, physiological, environmental, and behavioral factors. The main types of NCD are cardiovascular disease, cancer, chronic respiratory disease, and DM<sup>6</sup>.

During the past month, about half of the elderly in Indonesia experienced health complaints both physically and psychologically (48.14%), and around 24.35% of the elderly were sick in the last month. However, the morbidity rate for the elderly in Indonesia in 2020 is the lowest point in the previous six years<sup>7</sup>. The majority of the elderly treated their health complaints, either by self-medicating or outpatient (96.12%)<sup>3</sup>.

The elderly are at high risk for suffering from NCD, so the author compiles the article to analyze the prevalence of NCD in the elderly in Indonesia based on demographic characteristics. We expect to provide input for strategic policies for prevention and control of NCD in Indonesia.

### Materials and Methods

The study employed the 2018 Indonesia Basic Health Survey data. The survey was a national-scale survey conducted by the Indonesian Ministry of

Health. The population in this study was the elderly ( $\geq 60$  years old) in Indonesia. The survey used a multi-stage cluster random sampling method, and it was a weighted sample of 85,358 elderly.

The NCDs prevalence in the elderly includes hypertension, heart disease, bronchial asthma, chronic renal failure, diabetes mellitus, stroke, and cancer determined based on a doctor's diagnosis. Cancer in question was any cancer diagnosed by a doctor. Heart disease is any heart disease, including congenital heart defects that doctors diagnose. The prevalence of emotional-mental disorders is the elderly who are currently experiencing emotional-mental conditions. According to the SRQ-20 (Self Reporting Questionnaire), depression prevalence was the elderly who are currently experiencing depressive disorders according to MINI (Mini International Neuropsychiatric Interview).

The study carried out analysis by statistical descriptive by observing the distribution by demographic characteristics of the elderly. The demographic characteristics of the elderly who were involved were age, residence, gender, education, work type, and wealth status.

### Results and Discussion

Table 1 shows an overview of NCDs in the elderly population in Indonesia, most of which are hypertension, mental-emotional disorders, depression, DM, and heart disease. Based on the elderly age group, the higher the age, the higher the prevalence of hypertension, mental health disorders, and depression. The hypertension prevalence, mental-emotional disorders, and depression in women were higher than men's. The hypertension prevalence was higher in urban areas, while mental-emotional disorders and depression were higher in rural areas.

**Table 1. The prevalence of NCD among the elderly in Indonesia**

Demographic Characteristics	Prevalence of Disease		
	% or ‰	95% CI	N (Adjusted)
Hypertension (%)	32.6	32.0 – 33.2	58.666
Emotional mental disorders (%)	12.7	12.3 – 13.1	82.304
Depresi (%)	7.6	7.4 -7.9	
Heart Desease (%)	4.4	4.2 – 4.6	85.358
Asma Bronchaile %	4.2	4.0 -4.5	
Cronic Renal Failure (%)	0.8	0.7 – 0.9	
DM(‰)	56.0	53.8 – 58.4	
Stroke (‰)	43	40 - 45	
Cancer (‰)	4.3	3.8 – 5.0	

Source: The 2018 Indonesia Basic Health Survey

The prevalence of hypertension and mental-emotional disorders had a higher tendency for uneducated elderly and depression at the low education level. The hypertension prevalence and mental-emotional disorders and depression were higher in the group who did not work than the group who worked. Based on wealth status, the hypertension prevalence was higher at the wealthies, whereas most depression and the mental-emotional disorder tended to be higher at the lowest.

The hypertension prevalence based on doctor's diagnosis in Indonesia increases with increasing age and wealth, tends to be higher for women who live in urban areas. Previous research mentions the possibility of a daily dietary diet, adipose activity, and psychosocial stress, which can cause blood pressure to increase with age and increase in wealth<sup>8</sup>. Hypertension in older women is due to the reduced protective effect of the hormone estradiol, which affects the structure and tone of blood vessels and vasodilation of the endothelium of blood vessels<sup>8</sup>.

Previous studies have informed that the prevalence of hypertension is higher due to lifestyle changes such as lack of physical activity and dietary modifications<sup>9</sup>.

The prevalence of mental-emotional disorders and depression is higher among women who live in rural areas, have low education, are higher in the unemployed, and have lower wealth. Globally, around 15% of adults aged 60 and over suffer from mental disorders, mental and neurological disorders that account for 6.6% of total disabilities. The most common mental and neurological disorders in the elderly in the world are dementia (5%) and depression (7%), anxiety disorders (3.8%)<sup>10</sup>.

Kiely's research found that older women generally experience mental disorders such as depression and anxiety, whereas men experience more adverse mental health impacts related to death, including suicide. The gender pattern varies according to country and other social contexts, influenced by cultural and social norms, differentiation of gender roles, disadvantages,

and empowerment throughout life<sup>11-13</sup>. Meanwhile, older people with higher education and positive mental attitudes have better psychological adjustment and better perceptions of changes in aging, both physically, life, and professionally<sup>14-16</sup>.

**Table 2. The prevalence of hypertension and mental health among the elderly by demographic characteristics in Indonesia**

Demographic Characteristics	Hypertension (n = 58.666)	N (adjusted)	Mental Health (n=82.304)		N (adjusted)
			Emotional Mental disorder	Depression	
Age					
· 60-69	30.7%	37,773	11.6%	7.0%	53,719
· 70-79	35.5%	16,267	14.0%	8.6%	22,382
· ≥80	37.4%	4,626	17.1%	9.8%	6,202
Residence					
· Urban	35.2%	31,608	12.1%	7.5%	41,756
· Rural	29.6%	27,058	13.3%	7.8%	40,548
Gender					
· Male	27.1%	25,739	10.0%	6.1%	39,279
· Female	36.9%	32,927	15.2%	9.0%	43,025
Education					
· No education	33.7%	11,091	14.4%	8.3%	16,729
· Didn't graduate from elementary school	32.0%	15,770	14.4%	8.5%	22,962
· Elementary school	32.4%	18,179	12.8%	7.9%	25,862
· Junior high school	33.8%	4,854	10.3%	6.5%	6,268

**Cont... Table 2. The prevalence of hypertension and mental health among the elderly by demographic characteristics in Indonesia**

· Senior high school	31.9%	5,896	7.9%	5.3%	7,205
· College	32.4%	2,877	5.7%	3.4%	3,277
Occupation					
· Not works	39.1%	27,922	16.5%	10.0%	35,518
· Public servant/army/ police	30.6%	792	5.8%	3.5%	972
· Private sector	21.5%	808	7.8%	5.0%	1,114
· Entrepreneur	28.9%	6,114	8.0%	5.3%	8,255
· Farmer	24.0%	15,833	10.7%	5.8%	25,899
· Fisherman	21.4%	249	12.1%	5.4%	433
· Labor/Driver/Maid	26.2%	2,940	10.0%	6.9%	4,864
· Others	34.5%	3,801	8.8%	6.7%	4,987
Wealth					
· Poorest	31.5%	11,995	13.9%	8.1%	18,880
· Poorer	31.4%	11,042	13.8%	8.1%	16,182
· Middle	32.4%	10,788	12.7%	8.2%	15,055
· Richer	32.9%	11,140	12.6%	7.6%	15,313
· Richest	34.4%	13,702	10.3%	6.3%	16,872

Source: The 2018 Indonesia Basic Health Survey

Table 3 shows, based on age group, the prevalence of heart disease and kidney failure is relatively not different, while for asthma bronchiale, it tends to be higher in the 70-79 age group. The heart disease prevalence was higher in women, but asthma and chronic kidney failure tended to be more in men. The

majority of heart disease and chronic renal failure was higher in urban areas, whereas asthma bronchiale was higher in rural areas.

Yazdanyar's (2009) study found that the prevalence of heart disease increases with age, almost

the same for men and women at the age of 60-79, but more in women at >80<sup>17</sup>. A previous study reported that the high prevalence of heart disease in urban areas is mainly due to the high prevalence of lipid profile disorders in urban communities in China. The situation is possible due to a more sedentary urban lifestyle and a diet high in fat<sup>18</sup>. The factor that affects

the cardiovascular risk of the elderly in Malaysia is a lack of physical activity<sup>19</sup>. The asthma prevalence in males is higher likely to be influenced by smoking behavior in men<sup>20</sup>. The asthma prevalence is high among the elderly who live in rural areas, did not complete primary school, and work as fishermen<sup>21</sup>.

**Table 3. The prevalence of heart disease, asthma bronchiale, and chronic renal failure among the elderly by demographic characteristics in Indonesia (n=85,358)**

Demographic Characteristics	Heart Disease	Asthma Bronchiale	Chronic Renal Failure	N (adjusted)
Age				
· 60-69	4.3%	3.8%	0.7%	54,487
· 70-79	4.5%	5.2%	0.8%	23,588
· ≥80	4.3%	4.4%	0.8%	7,284
Residence				
· Urban	5.5%	4.1%	0.9%	43,373
· Rural	3.1%	4.4%	0.7%	41,985
Gender				
· Male	4.2%	5.2%	0.9%	40,375
· Female	4.4%	3.4%	0.7%	44,983
Education				
· No education	2.9%	4.4%	0.6%	17,943
· Didn't graduate from elementary school	3.4%	4.6%	0.7%	23,763
· Elementary school	4.3%	4.3%	0.7%	26,589
· Junior high school	5.9%	3.6%	1.1%	6,381
· Senior high school	7.6%	3.9%	1.1%	7,342
· College	8.9%	3.2%	1.5%	3,340
Occupation				
· Not works	5.4%	4.8%	0.9%	38,090

**Cont... Table 2. The prevalence of hypertension and mental health among the elderly by demographic characteristics in Indonesia**

Public servant/army/ police	7.7%	2.4%	2.3%	981
Private sector	5.6%	3.6%	0.2%	1,121
Entrepreneur	4.8%	3.9%	0.7%	8,301
Farmer	2.4%	3.9%	0.7%	26,178
Fisherman	1.8%	5.8%	0.2%	438
Labor/Driver/Maid	3.1%	3.4%	0.5%	4,897
Others	6.4%	3.9%	0.7%	5,067
Wealth				
Poorest	2.8%	4.2%	0.6%	19,869
Poorer	3.3%	4.3%	0.8%	16,814
Middle	3.6%	4.4%	0.6%	15,586
Richer	5.0%	4.3%	0.8%	15,733
Richest	7.2%	4.1%	1.1%	17,357

Source: The 2018 Indonesia Basic Health Survey

The prevalence of chronic kidney failure among the elderly tends to be almost the same in all groups of the elderly, higher in men, living in urban areas, increasing along with the higher education level and the wealthies. A previous study stated that the highest prevalence of chronic kidney failure was 70-79 years,

then 80-89 years, and 60-69 years, respectively. The progression of chronic renal failure in men occurs more rapidly than in women because of the hormone testosterone<sup>22</sup>. The hormone testosterone, which is the primary steroid hormone in men, affects increasing renal tubular apoptosis and accelerating the severity of chronic kidney failure in men<sup>23</sup>.

**Table 4. The prevalence of DM, stroke, and cancer among the elderly by demographic characteristics in Indonesia (n=85,358).**

Demographic Characteristics	Diabetes Mellitus (0/00)	Stroke (0/00)	Cancer (0/00)	N (adjusted)
Age				
60-69	64.1	39	4.6	54,487
70-79	47.4	49	4.0	23,588
≥80	23.2	47	3.7	7,284
Place of residence				

**Cont... Table 4. The prevalence of DM, stroke, and cancer among the elderly by demographic characteristics in Indonesia (n=85,358).**

·	Urban	78.8	52	5.5	43,373
·	Rural	32.5	32	3.2	41,985
	Gender				
·	Male	48.3	46	3.0	40,375
·	Female	62.9	40	5.6	44,983
	Education				
·	No education	30.4	32	3.0	17,943
·	Didn't graduate from elementary school	43.4	38	3.2	23,763
·	Elementary school	51.0	42	5.0	26,589
·	Junior high school	81.7	58	5.8	6,381
·	Senior high school	109.8	64	5.6	7,342
·	College	156.3	61	9.1	3,340
	Occupation				
·	Not works	74.8	68	5.9	38,090
·	Public servant/army/ police	117.3	50	7.3	981
·	Private sector	73.3	24	0.4	1,121
·	Entrepreneur	69.8	31	4.8	8,301
·	Farmer	20.6	15	2.2	26,178
·	Fisherman	19.9	18	1.2	438
·	Labor/Driver/Maid	28.8	15	3.4	4,897
·	Others	88.7	46	4.1	5,067
	Wealth				
·	Poorest	26.6	35	3.4	19,869
·	Poorer	37.7	37	3.3	16,814
·	Middle	46.7	41	3.2	15,586
·	Richer	60.8	45	4.8	15,733
·	Richest	111.5	56	7.0	17,357

Source: The 2018 Indonesia Basic Health Survey

Table 4 shows the highest prevalence of DM in the 60-69 age group, living in urban areas, females tend to be high in education and government employees' occupation, according to several studies. Kirkman reported that the incidence of DM increases

with increasing age until 65 years and after 65 years, both the incidence and prevalence rates decrease<sup>24</sup>. A previous study says that the DM prevalence tends to be high in the elderly because there is a degeneration process that decreases the function of pancreatic



$\beta$  cells in producing insulin. Older women have a higher chance of increasing the body mass index to become obese and post-menopause. It is easier for fat accumulation to occur so that the translocation of glucose transporter to the plasma membrane will decrease, resulting in insulin resistance in muscle and adipose tissue<sup>25</sup>.

The stroke prevalence tends to be higher in the 70-79 age group, in urban areas, higher in men, increases with education levels and wealth status. The prevalence of cancer was higher in the 60-69 age group. The situation is different from the previous research that stated the higher the age, the greater the cancer risk because increasing age will decrease resistance to cancer<sup>26</sup>. The prevalence of cancer was higher among older women and living in urban areas. The 2013 Indonesia Basic Health Survey reports that the highest majority of primary malignancies are cervical cancer and breast cancer. Previous research has found that lifestyle factors in urban areas, including smoking, diet, alcohol consumption, reproduction (pregnancy, breastfeeding, age at first menstruation, menopause), obesity, and lack of physical activity, are thought to be the main contributors to cancer growth<sup>27</sup>. The cancer prevalence in the elderly is increasing with the higher education level and wealth status.

### Conclusions

The most NCDs prevalence among the elderly in Indonesia was hypertension, mental-emotional disorders, depression, DM, and heart disease. Based on demographic characteristics, the higher the elderly, the higher the prevalence of hypertension, mental health disorders, and depression. Meanwhile, stroke and bronchial asthma tend to be higher in the 70-79 elderly age group, DM and cancer were higher in the 60-69 age group, however, the prevalence of heart disease and kidney failure did not differ relatively between age groups.

The prevalence of hypertension, mental-emotional disorders, depression, DM, heart disease, and cancer was higher in older women. Still, asthma, stroke,

and chronic kidney failure tend to be more in men. The prevalence of hypertension, DM, heart disease, chronic kidney failure, stroke, and cancer in the elderly was higher in urban areas. It tends to increase with increasing levels of education and expenditure levels. At the same time, mental-emotional disorders, depression, and bronchial asthma were higher in rural areas and tended to be higher at low education and low wealth.

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**Ethical Clearance:** The research had an ethical clearance that the national ethical committee approved (Ethic Number: LB.02.01/2/KE.378/2019). The survey used informed consent during data collection, which considered aspects of the data collection procedure, voluntary, and confidentiality.

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