FACTOR RELATED TO DEPRESSION AMONG ELDERLY IN URBAN RURAL AREAS IN INDONESIA

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Abstract. The increase in life expectancy is in line with the increase in the elderly population. In line with increasing age, the elderly will experience physical disorders, non-communicable diseases (NCDs), and are associated with mental disorders. This study aimed to analyze the factor related to depression among elderly in urban rural areas in Indonesia. The study analyzed the 2018 Indonesia Basic Health Survey. A total of 82,304 elderly were included in this study. The dependent variable was depression. The independent variables were age, gender, education, occupation, economic status, bronchial asthma, cancer, diabetes mellitus, heart disease, hypertension, stroke, and chronic kidney failure. Binary logistic regression was used for data analysis. The results showed that while elderly aged 80 years in rural areas had a depression risk of 1.232 times (odd ratio (OR) = 1.232; 95% confidence interval (CI): 1.057-1.436, p= 0.007) higher than the 60-69 years age group while depression in elderly living urban areas was not related to age. Women in urban area had a depression risk of 1.253 times higher than men and that of women in rural area was 1.224 times. College students in urban areas had a depression risk of 0.221 times than those who did not attend school. Farmers in urban area had a depression chance of 0.682 times than those who did not work while it was 0.741 times for farmers in rural area. The richest people in urban areas were at a depression risk of 0.702 times than the poorest. Elderly with NCDs had higher depression risk than those with no NCDs and higher in rural areas than urban areas, with stroke contributes 2.929 times, cancer at 2.210 times, diabetes mellitus (DM) at 1.792 times, and heart disease at 1.564 times. In comparison, in urban areas hypertension contributes a depression risk of 1.239, and bronchial asthma at 2.404 times higher than in rural areas. There are differences in sociodemographic factors associated with depression among the elderly in urban and rural areas.

Keywords: depression, characteristic demography, non-communicable disease, elderly, urban, rural

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INTRODUCTION

Indonesia's population continues to increase every year. The results of the 2010 population census showed that Indonesia's population was 237 million people and will increase to 270 million people (14%) in 2020 and to 296 million people (9.8%) by 2030 (Central Bureau of Statistics, 2020a). The increase in life expectancy is in line with the increase in population. Life expectancy in 2010 was recorded at 69.86 years and continues to increase yearly to 71.61 years in 2021 (Central Bureau of Statistics, 2021). The population and life expectancy increase the number of older people. According to Law no. 13 of 1998, the elderly is an individual who has reached the age of 60 years and over (Republic of Indonesia, 1998). According to this definition, Indonesia's elderly population in 2020 was recorded at 26.8 million people, or almost 10% of the total population of Indonesia (Central Bureau of Statistics, 2020b).

Increasing age in the elderly is accompanied by a decrease in functional capability, which affects not only physical diseases such as non-communicable diseases (NCDs), but also mental and emotional health. World Health Organization's data shows that about 15% of adults aged 60 and over suffer from mental and neurological disorders, accounting for 6.6% of disability adjusted life years (DALYs). The most common mental and neurological disorders among elderly worldwide are dementia (5%), depression (7%), and anxiety disorders (3.8%) (WHO, 2017). NCDs, also known as chronic diseases, tend to be long-lasting and result from genetic, physiological, environmental, and behavioral factors. The main types of NCDs are cardiovascular disease, cancer, chronic respiratory disease, and diabetes (WHO, 2022). The increased burden of NCDs is due to an increase in elderly's population and the prevalence of risk factors such as tobacco use, lack of physical activity, unhealthy diet, and alcohol use (Yiengprugsawan *et al*, 2016).

In the elderly, depression is the most common mental health problems and a significant factor in disability and death (Zenebe *et al*, 2021). Depression is a collection of symptoms and signs that tend to occur together, which are considered to reflect common pathophysiology but have multiple causes in different cases (Paykel, 2008). Depression is the third leading cause of disability worldwide (Anwar *et al*, 2017). Depression is caused by many internal and external factors and adverse life events. Symptoms of depression are depressed mood and loss of interest. Other symptoms include sleep disturbances, guilt, hopelessness, decreased concentration, appetite disturbances, psychomotor retardation, and suicidal ideation (Maurer *et al*, 2018).

Data from 2018 Basic Health Research (Riskesdas) showed that the prevalence of depression increases with age; 5.4% in 25-34 years, then 8.0% in 65-74 years and 8.9% in >75 years (Ministery of Health, 2019). Factors that influence depression among the elderly are physical illnesses such as malignancy, finances, sexual dysfunction, and social factors (Obuobi-Donkor *et al*, 2021). Depression and NCDs cause low quality of life, low medication adherence, and increased mortality in the elderly (Turana *et al*, 2021). Previous studies have shown that sociodemographic factors related to the risk of depression among the elderly are low education and economic levels, while physical disease factors are stroke and a history of injury (Idaiani and Indrawati, 2021). Research found that the proportion of elderly people who are at risk of depression is higher in rural areas (32.6%) than in urban areas (30.4%), while social and psychological factors that influence, namely illiteracy, not having someone to trust and feel financially insecure (Akila *et al*, 2019). The prevalence of the elderly in rural areas is 1.52 times greater than the elderly living in urban areas (Liu *et al*, 2021).

Considering that many elderly experience depressions associated with NCDs and the increasing burden of depression in specific sub-populations, it is essential to understand the broader consequences of depression among the elderly in rural and urban areas to create appropriate planning and intervention services for the elderly based on their characteristics. This study was conducted to determine factor related to depression among the elderly in urban and rural areas.

MATERIALS AND METHODS

Data source

This study used secondary data from Riskesdas in 2018. The 2018 Riskesdas is a national-scale survey conducted by the Indonesian Ministry of Health, using a cross-sectional research design according the National Socio-Economic Survey (Susesnas) Census Block sample frame in March 2018 from Central Statistics Agency (BPS). The population in this study is the elderly (≥60 years) living in rural areas in Indonesia (34 provinces, 416 districts, and 98 cities). The sample size for the elderly is 83,304 (33,347 in urban and 48,957 in rural areas). This research was approved by the National Ethical Committee (Ethical Approval Number: LB.02.01/2/KE.378/2019) to use Riskesdas 2018 data.

Variables and instruments

The dependent variable studied was depression among elderly. Depression disorder is one of the mood disorders consisting of a set of symptoms that are primarily characterized by the presence of: (a) feeling sad/depressed, empty, depressed or crying a lot (including based on other people's observations), (b) loss of interest and joy in things which are usually prioritized include interest in work, daily activities, taking care of the household and hobbies, (c) no energy and tired easily; can interfere with activity for at least 2 weeks (Ministery of Health, 2019). The instrument used was the Mini International Neuropsychiatric Interview (MINI) questionnaire which consisted of 10 questions to help identify periods of depression. Interviews were conducted by Riskesdas 2018 enumerators who had been recruited and trained to collect data. The answers obtained from the questionnaire were scored to determine the status of depression. Each question must be answered by the respondent himself and may not be represented by another person. The respondent was categorized as depression if he provided the minimum of 2 "yes" answers for the first three questions and 2 "yes" answers for question numbers 4 to 10.

The independent variables were demographic characteristics, namely

age (60-69, 70-79 and ≥80 years); gender (male, female); education (no education, do not graduate from elementary school, elementary school, junior high school, senior high school, associate degree and college); occupation (unemployment, public servant/army/police, private sector, entrepreneur, farmer, fisherman, labor/driver/maid and others) and wealth status (Quintile 1 = poorest, Quintile 2 = poorer, Quintile 3 = middle, Quintile 4 = richer, and Quintile 5 = richest). Meanwhile, wealth status data were obtained from the National Socio-Economic Survey (Health Research and Development Agency, 2018) containing household expenditures data. The criteria used are based on the criteria of the Central Statistics Agency (Ministry of National Development Planning, 2022), namely the grouping of wealth status into five equal groups after being sorted from the smallest to the largest expenditures. The quintiles are from the first to the fifth quintile. The higher the quintile group, the higher the expenditure (Ministery of Health, 2019). In addition, another independent variable is NCDs. The NCDs include bronchial asthma, heart disease, diabetes mellitus, hypertension, stroke, cancer, and chronic kidney disease. The information was obtained from the interviews with elderly living in households not in social institutions such as nursing home and a structured questionnaire. Information about NCDs was obtained from the interviews with elderly suffering from the disease based on doctor's diagnosis and was divided into 2 categories: yes and no.

Data analysis

Data analysis was conducted to describe the prevalence of depression among elderly living in urban and rural areas in Indonesia based on demographic characteristics and NCDS. Furthermore, bivariate analysis with simple logistic regression was carried out to select candidate variables, provided that if the p-value <0.25, it would be included in the multivariate analysis. The study used multiple logistic regression to predict the determinants of demographic characteristics and NCDs associated with depression among elderly in urban and rural areas. There is a relationship between depression in the elderly with demographic characteristics and NCDs if the statistical test results show a value of $p<0.05$.

RESULTS

Table 1 shows that the demographic characteristic of depression among elderly in Indonesia based on domicile both in urban and rural areas with the highest prevalence of depression in the >80-year age group in which 9.6% in urban and 10.1% in rural areas. The result shows that depression is experienced more by women with the calculation of 9.1% in urban areas and 9.0% in rural areas; elderly who do not graduate from elementary schools in urban areas as much as 9.4% and elderly who are uneducated in rural areas as much as 8.1%; elderly who are unemployed with the calculation of 9.4% in urban areas and 10.7% in rural areas, and elderly with a poorer wealth status in urban areas as much as 9.2% and elderly with a middle wealth status in rural areas as much as 8.2%.

The prevalence of depression among elderly in Indonesia based on NCDs (Table 2) shows that the prevalence is higher among elderly who suffer from the disease than those who do not and higher in rural areas than urban areas. The prevalence of depression among elderly is higher in rural areas than in urban areas, with stroke contributes 24.4%, cancer at 20.5%, diabetes mellitus at 16.2%, chronic kidney disease at 15.7%, cardiovascular disease at 14.3%, and rural hypertension at 11.8%. In comparison, in urban areas bronchial asthma contributes 16.5% to the prevalence of depression which is higher than in rural areas.

Multivariate regression analysis

Table 3 shows that elderly aged 80 years in rural areas have depression risk 1.232 times higher than elderly aged 60-69 years. The prevalence of depression in urban areas is not related to age. Women are at depression risk 1.253 times higher in urban areas, and 1.224 times higher in rural areas than men. Elderly who are graduated from college in urban areas have depression risk 0.221 times than elderly with no education. Elderly who work as farmers have depression risk 0.682 times in urban areas and 0.741 times in rural areas than those who are unemployed. Richest elderly in

Table 1

Prevalence of depression among elderly in urban rural areas in Indonesia based on Demographic characteristics

Demographic characteristic	Prevalence of depression among elderly					
	Urban area (N = 33,347)			Rural area (N = 48,957)		
	n (%)	95% CI	*p*-value	*n* (%)	95% CI	*p*-value
Age			0.0001			0.0001
60-69 years (Reference)	1524 (6.9)	6.4-7.5		2230 (7.1)	6.7-7.5	
70-79 years	771 (8.6)	7.6-9.7		1155 (8.6)	8.0-9.3	
≥80 years	217 (9.6)	7.9-11.4		408 (10.1)	8.9-11.4	
Gender			0.0001			0.0001
Male (Reference)	930 (5.9)	5.3-6.5		1497 (6.4)	6.0-6.8	
Female	1583 (9.1)	8.4-9.8		2297 (9.0)	8.5-9.5	
Education						
No education (Reference)	434 (8.7)	7.6-10.1	0.0001	1022 (8.1)	7.4-8.8	0.0001
Do not graduate from elementary school	738 (9.4)	8.3-10.5		1234 (7.8)	7.3-8.4	
Elementary school	832 (8.3)	7.4-9.2		1218 (7.6)	7.1-8.2	
Junior high school	207 (6.0)	4.9-7.2		180 (7.9)	6.6-9.4	
Senior high school	235 (4.9)	4.1-5.9		101 (6.8)	5.4-8.6	
Associate degree	33 (3.7)	2.4-5.7		24 (6.6)	3.3-12.7	
College	31 (2.5)	1.5-4.2		11 (3.6)	1.9-9.7	

Table 1 (cont)

Demographic characteristic	Prevalence of depression among elderly					
	Urban area (N = 33,347)			Rural area (N = 48,957)		
	n (%)	95% CI	*p*-value	*n* (%)	95% CI	*p*-value
Occupation			0.0001			0.0001
Unemployment (Reference)	1591 (9.4)	8.7-10.2		1861 (10.7)	10.1-11.4	
Public servant/army/police	20 (3.6)	2.0-6.4		9 (3.4)	1.5-7.3	
Private sector	8 (4.7)	3.0-10.2		15 (6.0)	3.4-10.6	
Entrepreneur	252 (5.2)	4.4-6.2		150 (5.6)	4.4-7.0	
Farmer	273 (5.7)	4.7-6.9		1411 (5.9)	5.3-6.3	
Fisherman	5 (4.0)	1.9-8.1		20 (6.5)	3.8-11.0	
Labor/Driver/Maid	163 (6.3)	4.6-8.5		157 (8.0)	6.3-10.1	
Others	122 (6.2)	4.9-7.9		154 (7.8)	6.4-9.5	
Wealth status*			0.0001			0.0001
Poorest (Reference)	502 (8.8)	7.7-10.1		1091 (7.7)	7.1-8.3	
Poorer	540 (9.2)	7.8-10.7		770 (7.2)	6.6-7.9	
Middle	471 (8.1)	7.1-9.3		773 (8.2)	7.5-9.0	
Richer	423 (7.1)	6.3-8.1		756 (7.9)	7.2-8.7	
Richest	576 (5.7)	5.1-6.5		403 (7.8)	6.8-8.9	
Total	2513 (7.5)	7.1-8.0		3794 (7.8)	7.4-8.1	

*Wealth status is categorized following Ministery of Health (2019) where Quintile 1 = poorest; Quintile 2 = poorer; Quintile 3 = middle; Quintile 4 = richer and Quintile 5 = richest

CI: confidence interval

urban areas are at depression risk 0.702 times than poorest elderly. Elderly with NCDs have more depression risk than those who do not suffer from the disease. Stroke have depression risk 2.815 times in urban and 2.929 times in rural; cancer have depression risk 2.042 times in urban and 2.210 times in rural; bronchial asthma have depression risk 2.404 times in urban and 1.861 times in rural; DM have depression risk 1.421 times in urban and 1.792 times in rural; heart disease have depression risk 1.379 times in urban and 1.564 times in rural; and hypertension have depression risk 1.239 times in urban and 1.220 times in rural. Stroke contributes highest depression possibility for elderly.

DISCUSSION

The results show that the depression among elderly is influenced by demographic characteristics. In rural areas, the age factor affects depression among elderly, while in urban areas, it does not. Previous studies show that the depression among elderly increases with age, elderly in the age group 60-69 years (7.0%), the 70-79 years (8.6%), the 80 years (9.8%) (Rukmini *et al*, 2022).

The older women in both urban and rural areas are at higher risk of depression than men. Prevalence of depression in older women is more significant than in older men (Cho *et al*, 2021) while older women are more at risk for depression, anxiety, and stress than older men (Correa *et al*, 2020; Lin *et al*, 2021). Kiely *et al* (2019) showed that older women generally experience mental disorders, such as depression and anxiety, while men are more likely to experience adverse mental health effects related to death, including suicide. Women are more exposed to risk factors for depression, such as financial difficulties, widowhood, social isolation, low education, and functional disabilities, so they are more prone to depression than men (El Kady and Ibrahim, 2013). A research reported the high prevalence of depression in elderly women (36.9%) is influenced by factors, such as having comorbidities, body mass index (BMI) <21.3 kg/m^2, eye disorders, and not having a partner to consult about depression personal matters (Cho *et al*, 2021).

Table 2

Prevalence of depression among elderly in urban rural areas in Indonesia based on NCDs

NCDs	Prevalence of depression among elderly					
	Urban area (N = 33,347)			Rural area (N = 48,957)		
	n (%)	95% CI	*p*-value	*n* (%)	95% CI	*p*-value
Bronchial asthma			0.0001			0.0001
No (Reference)	2288 (7.2)	6.7-7.6		3458 (7.4)	7.1-7.7	
Yes	225 (16.5)	13.5-19.9		336 (15.7)	13.6-18.1	
Cancer			0.001			0.0001
No (Reference)	4489 (7.5)	7.0-8.0		3763 (7.7)	7.4-8.1	
Yes	24 (13.8)	7.8-23.3		30 (20.5)	12.4-31.9	
Diabetes mellitus			0.0001			0.0001
No (Reference)	2234 (7.3)	6.8-7.6		3536 (7.5)	7.1-7.8	
Yes	278 (10.7)	9.0-12.6		257 (16.2)	13.8-18.9	
Heart disease			0.0001			0.0001
No (Reference)	2306 (7.3)	6.8-7.8		3575 (7.5)	7.2-7.9	
Yes	207 (11.4)	9.4-13.8		219 (14.3)	12.0-17.0	
Hypertension			0.0001			0.0001
No (Reference)	1112 (7.1)	6.5-7.7		1757 (7.9)	7.4-8.4	
Yes	899 (10.7)	9.7-11.8		077 (11.8)	11.0-12.8	

Table 2 (cont)

NCDs	Prevalence of depression among elderly					
	Urban area (N = 33,347)			Rural area (N = 48,957)		
	n (%)	95% CI	*p*-value	*n* (%)	95% CI	*p*-value
Stroke			0.0001			0.0001
No (Reference)	2190 (6.9)	6.4-7.4		3461 (7.3)	6.9-7.6	
Yes	323 (21.1)	17.9-24.6		333 (24.4)	21.4-27.7	
Chronic renal failure			0.370			0.0001
No (Reference)	2489 (7.5)	7.1-8.0		3741 (7.7)	7.4-8.0	
Yes	24 (8.8)	5.1-14.8		34 (15.7)	11.3-21.5	
Total	2513 (7.5)	7.1-8.0		3794 (7.8)	7.4-8.1	

CI: confidence interval; NCDs: non-communicable diseases

Table 3
Binary logistic regression of depression among elderly in urban rural areas in Indonesia

Predictors	Depression							
	Urban area				Rural area			
	B	*p*-value	OR	95% CI	B	*p*-value	OR	95% CI
Age group								
70-79 years					0.044	0.381	1.045	0.947-1.155
≥80 years					0.209	0.007	1.232	1.057-1.436
Gender								
Female	0.226	0.0001	1.253	1.140-1.378	0.202	0.0001	1.224	1.112-1.347
Education level		0.0001						
Do not graduate from elementary school	0.138	0.042	1.148	1.005-1.311				
Elementary school	0.071	0.278	1.074	0.944-1.221				
Junior high school	-0.277	0.002	0.758	0.635-0.904				
Senior high school	-0.480	0.0001	0.619	0.518-0.740				
Associate degree	-0.887	0.0001	0.412	0.286-0.593				
College	-1.508	0.0001	0.221	0.146-0.336				

Table 3 (cont)

Predictors	Depression							
	Urban area				Rural area			
	B	*p*-value	OR	95% CI	B	*p*-value	OR	95% CI
Occupation		0.0001				0.0001		
Public servant/army/police	-0.621	0.129	0.538	0.241-1.199	0.300	0.366	1.349	0.705-2.584
Private sector	0.031	0.856	1.031	0.739-1.440	-0.027	0.928	0.973	0.541-1.752
Entrepreneur	-0.346	0.0001	0.708	0.617-0.812	-0.534	0.0001	0.586	0.469-0.732
Farmer	-0.382	0.0001	0.682	0.588-0.792	-0.300	0.0001	0.741	0.668-0.822
Fisherman	-0.535	0.243	0.585	0.238-1.437	-0.487	0.191	0.615	0.296-1.275
Labor/Driver/Maid	-0.171	0.064	0.843	0.703-1.010	-0.107	0.386	0.899	0.706-1.144
Others	-0.105	0.232	0.900	0.757-1.070	-0.223	0.043	0.800	0.644-0.993
Wealth status*†		0.0001				0,012		
Poorer	0.064	0.355	1.066	0.931-1.221	-0.126	0.055	0.882	0.776-1.003
Middle	-0.008	0.915	0.993	0.865-1.139	0.114	0.072	1.121	0.990-1.270
Richer	-0.166	0.022	0.847	0.734-0.977	-0.014	0.826	0.986	0.868-1.120
Richest	-0.354	0.0001	0.702	0.611-0.807	-0.059	0.452	0.943	0.809-1.099

Table 3 (cont)

Predictors	Depression							
	Urban area				Rural area			
	B	*p*-value	OR	95% CI	B	*p*-value	OR	95% CI
Bronchial asthma	0.877	0.0001	2.404	2.067-2.797	0.621	0.0001	1.861	1.590-2.179
Cancer	0.714	0.0001	2.042	1.367-3.051	0.793	0.001	2.210	1.378-3.546
Diabetes mellitus	0.351	0.0001	1.421	1.248-1.618	0.584	0.0001	1.792	1.516-2.119
Heart disease	0.322	0.0001	1.379	1.187-1.603	0.447	0.0001	1.564	1.308-1.871
Hypertension	0.214	0.0001	1.239	1.135-1.352	0.199	0.0001	1.220	1.111-1.340
Stroke	1.035	0.0001	2.815	2.463-3.217	1.075	0.0001	2.929	2.493-3.440

*Wealth status is categorized following Ministery of Health (2019) where Quintile 1 = poorest; Quintile 2 = poorer; Quintile 3 = middle; Quintile 4 = richer and Quintile 5 = richest

†Poorest group as the reference

B: coefficient value; CI: confidence interval; OR: odds ratio

Educational factors affect the incidence of depression among elderly in urban areas but do not affect in rural areas. This condition is due to the elderly living in urban areas have a better level of education than those in rural areas. As many as 22.97 percent of the elderly in urban areas obtained high school education/equivalent and above, while in rural areas only accounts for 6.08 percent (Girsang *et al*, 2021) which might due to a minimal access to education in rural areas. The results show that the elderly in urban areas who graduated from college are less likely to suffer from depression than those who did not attend school. These results are similar to previous research that the higher of education level, the lower the prevalence of depression in the elderly (Liu *et al*, 2021) and the elderly with higher education and positive mental attitudes have better psychological adjustments and perceptions about changes in aging both physically, in life, and the profession (Belo *et al*, 2020) and is a significant factor that explains inequality related to socioeconomic status in the prevalence of depression in older women (Kumar *et al*, 2021b).

Occupational status affects the incidence of depression among elderly, both in urban and rural areas. Older people who do not work are at more risk of suffering from depression than those who work. These results align with research in India which reports that unemployment factors for children and financial problems are associated with depression among elderly (Kumar *et al*, 2021a). Those are in addition to other factors, such as female gender, educational status, family type, history of depression, smoking, medical factors as well as conflict within the family. Some research shows that the elderly in urban areas who are uneducated and do not work are at more risk for depression while, in rural areas, employment and marital status are the factors that put people who do not work and people who are not married/divorced at more risk for depression (Akila *et al*, 2019). The study finds that the elderly who work and have their own income tend to improve their welfare (Kartini and Kartika, 2020), thus their physical, spiritual, and social needs are met.

Results of this study show that the elderly with the richest wealth status in urban areas have smaller risk of suffering from depression than the poorest. These results are consistent with previous studies which state that

the lowest annual income is significantly associated with more depressive symptoms (Fang *et al*, 2019). The average monthly income of the elderly who work in urban areas is Indonesian Rupiah (IDR) 1.575 million, higher than that of the elderly in rural areas, which is only IDR 1.048 million (Girsang *et al*, 2022). This condition, evidently, demonstrates that the elderly in urban areas are financially safer than in rural areas, thus able to protect themselves from anxiety in fulfilling their daily needs.

Based on the NCDs, both in urban and rural areas, the elderly who suffer from NCDs are at more risk of suffering from depression than those who do not. This supports the results of previous studies which state that people with NCDs, such as cancer, diabetes mellitus, stroke, or cardiovascular disease are 2-4 times more likely to experience depression than those without (Anwar *et al*, 2017). Research on Malaysian elderly living in rural areas showed that elderly with poor general health status are at greater risk for depression than those with better health conditions (Abdul Manaf *et al*, 2016). There are also the results showing that the elderly with chronic or multi-morbid illnesses are more likely to experience depression than those without (Jiang *et al*, 2020; Ansari *et al*, 2022). Analysis of study outcomes, it was found that marital status, BMI, number of comorbidities, and duration of diabetes were positively correlated with the occurrence of depressive symptoms in elderly population (Dziedzic *et al*, 2020). A study of patients with asthma and chronic obstructive pulmonary disease shows that 30.7% of patients during the past month reported major depressive disorder and medical comorbidities (Caballero-Domínguez *et al*, 2021).

The study shows that the incidence of depression among elderly is higher in rural areas (7.8%) compared to urban areas (7.5%). It was previously found that the high proportion of elderly depression in rural areas is influenced by female gender, continuous drug use, chronic disease, body mass index, and poor health perceptions (Correa *et al*, 2020). Besides, the elderly with hypertension in rural areas have a higher incidence of depression than those in urban areas, in addition to factors, such as illiteracy, living without a partner, experiencing stressful life events, and poor functional status and cognitive function (Ma *et al*, 2015).

The results of this study show that various sociodemographic factors and NCDs are relatively similarly distributed between urban and rural areas. However, the prevalence of depression among elderly is higher in rural areas than in urban areas. This understanding is important for health workers in first-level health facilities to plan and implement services specifically for urban and rural residents. The Government's efforts to prevent depression among elderly population must be an integral part of public health, especially in primary health care which has a wider reach to rural communities.

In summary, this study concludes that the factors associated with depression among elderly in urban and rural areas are gender, occupation, wealth status, and NCDs. In addition the difference between urban and rural is that the education level factor also specifically contributes to depression among elderly in urban areas, while age groups does in rural areas.

ACKNOWLEDGMENTS

The author would like to thank the National Institute of Research and Development, the Ministry of Health of the Republic of Indonesia, who allowed the Riskesdas 2018 data to be analyzed in this article.

CONFLICT OF INTEREST DISCLOSURE

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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