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Factors Associated with the Symptom of Depression among Elderly in Indonesian Urban Areas

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Abstract. Depression is the most common mental disorder among the elderly, affecting approximately 7% of the global elderly population (WHO, 2017). This study aims to analyze factors influencing symptoms of depression among the elderly in urban areas of Indonesia. Adopting a quantitative cross-sectional design, the researchers scrutinized secondary data available publicly from (Indonesian Ministry of Health, 2018)Indonesian Basic Health Research (Riskesdas) 2018. The data were analyzed using logistic regression statistics. We found that there are 11.2% (n=3200) of respondents who experienced symptoms of depression from 28.570 elderly in Indonesia urban areas. The bivariate results showed that gender (95% CI 1.257-1.536), history of chronic diseases (95% CI 1.834-2.242), educational status (95% CI 3.033-5.141), employment status (95% CI 1.434-1.770), marriage status (95% CI 1.134-1.391), and physical activity (95% CI 1.255-1.565) significantly correlated with the symptoms of depression among elderly. Low educational status is the most dominant variable influencing symptoms of depression in urban areas of Indonesia. Education influences individual behavior, the higher the individual's education, the higher the level of knowledge through the ability to receive and rationalize information more easily. Our result might be used in developing the educational programs as a preventive and promotive effort by the government.

Keywords: depression; elderly; mental health; symptom

Life expectancy is an index of the success of a country's development plan (Aryawangsa & Ariastuti, 2016). The increase in life expectancy is influenced by the improvement in public health and welfare which will result in changes of the demographic structure in the form of an increase in the population that is classified as elderly. The Central Statistics Agency predicts the number of elderly people in Indonesia will reach 33.69 million people by 2025. Life expectancy is an index of the success of a country's development plan (Aryawangsa & Ariastuti, 2016). The increase in life expectancy is influenced by the improvement in public health and welfare which will result in changes of the demographic structure in the form of an increase in the population that is classified as elderly. The Central Statistics Agency predicts the number of elderly people in Indonesia will reach 33.69 million people by 2025. As humans grow old, they will experience the aging process which is a natural, inevitable, and continuous process. On the other hand, aging is often associated with many neurological disorders, due to the reduced capacity of the brain to transmit signals and communicate (Ruano et al., 2016). The changing social position, job loss, and the risk of getting disease still have to

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be faced by the elderly. All of these causes of stress can lead to feelings of loneliness or psychological pressure in the elderly and require long-term care so the elderly are more susceptible to experiencing mental problems (Prabhaswari & Ariastuti, 2016).

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Mental health is an integral part of an individual living a productive life entailing the ability to study, work, and form and maintain relationships between individuals (Putri et al., 2015). WHO (2017) confirms that there are more than 20% of elderly people over the age of 60 years with mental or neurological disorders. Depression is a mental disorder that is most often experienced by the elderly, namely 7% of the total population in the world (WHO, 2017).

Depression is often characterized by a depressed mood, loss of interest, decreased energy, feelings of guilt, disturbed sleep or appetite, and poor concentration. Indonesian Basic Health Research 2018 stated that the highest prevalence of depression in Indonesia was experienced by people aged > 75 years old at 8.9% (Indonesian Ministry of Health, 2019). Mental health is an integral part of an individual living a productive life entailing the ability to study, work, and form and maintain relationships between individuals (Putri et al., 2015). WHO (2017) confirms that there are more than 20% of elderly people over the age of 60 years with mental or neurological disorders. Depression is a mental disorder that is most often experienced by the elderly, namely 7% of the total population in the world (WHO, 2017). Depression is often characterized by a depressed mood, loss of interest, decreased energy, feelings of guilt, disturbed sleep or appetite, and poor concentration. Indonesian Ministry of Health (2018) stated that the highest prevalence of depression in Indonesia was experienced by people aged > 75 years old at 8.9% (Indonesian Ministry of Health, 2019). According to the study by Cao and Rammohan (2016), age, gender, and place of residence in urban or rural areas are aspects that can cause depression. Older women experience depression more often than elderly men related to women's emotions and problem-coping abilities that have not been maximized (Popy, 2018). Elderly people with low education are more prone to depression Prabhaswari and Ariastuti (2016).

In addition, the chances of the elderly with chronic diseases are 10.32 times more likely to suffer from depression (Suardana, 2011). According to the study by Cao and Rammohan (2016), age, gender, and place of residence in urban or rural areas are aspects that can cause depression. Older women experience depression more often than elderly men related to women's emotions and problem-coping abilities that have not been maximized (Popy, 2018). Elderly people with low education are more prone to depression Prabhaswari and Ariastuti (2016). In addition, the chances of the elderly with chronic diseases are 10.32 times more likely to suffer from depression (Suardana, 2011). According to Srivastava (2009), urbanization impacts mental health through the effects of stressors increased and

factors including crowded and polluted environments, high levels of violence, and reduced social support. However, the movement of people also increases the demand for healthcare services which not happening in line with population growth. Lack of adequate infrastructure, therefore, increases the risk of poverty and exposure to environmental impacts.

This is also aligned with a meta-analysis conducted by (Reddy & Chandrashekar, 1998) which found that the prevalence of mental disorders consisting of depression and neurosis is higher in urban areas (80.6%) than in rural areas (48.9%). According to Srivastava (2009), urbanization impacts mental health through the effects of stressors increased and factors including crowded and polluted environments, high levels of violence, and reduced social support. However, the movement of people also increases the demand for healthcare services which not happening in line with population growth. Lack of adequate infrastructure, therefore, increases the risk of poverty and exposure to environmental impacts. This is also aligned with a meta-analysis conducted by (Reddy & Chandrashekar, 1998) which found that the prevalence of mental disorders consisting of depression and neurosis is higher in urban areas *(80.6%)* than in rural areas *(48.9%)*. In Indonesia, according to the Indonesian Basic Health Research 2018 data, the prevalence of depression is more common in urban areas. Limited studies explore the factors that influence the symptom of depression among the elderly in urban areas which illustrates a comparison of the rates of depression in the elderly in urban and rural areas, but only covers the areas of Kota Aceh Besar and Kabupaten Aceh Besar with comparative quantitative research.

Comprehensive data is needed to represent the determinants of depression in the elderly in Indonesia. The use of time series data such as Riskesdas will help provide good data for health policy in efforts to prevent and treat depression in the elderly. In Indonesia, according to the Indonesian Basic Health Research 2018 data, the prevalence of depression is more common in urban areas. Limited studies explore the factors that influence the symptom of depression among the elderly in urban area which illustrates a comparison of the rates of depression in the elderly in urban and rural areas, but only covers the areas of Kota Aceh Besar and Kabupaten Aceh Besar with comparative quantitative research. Comprehensive data is needed to represent the determinants of depression in the elderly in Indonesia. The use of time series data such as Riskesdas will help provide good data for health policy in efforts to prevent and treat depression in the elderly.

Method

Study Design

This study is a quantitative study with a cross-sectional design. We scrutinized the secondary data from The Indonesian Basic Health Research (Indonesian Ministry of Health, 2018). Riskesdas is community-based health research conducted by the Agency for Health Research and Development (Badan Penelitian dan Pengembangan Kesehatan) every five years to evaluate the development of public health conditions, risk factors, and the level of development of health development at the state and district/city levels in Indonesia (Indonesian Ministry

of Health, 2018). Researcher got the data from The Agency of Health Research and Development Indonesia and accessed data of by submitting an application to in their website https://www.litbang.kemkes.go.id/layanan-permintaan-data-riset/. This study is a quantitative study with a cross-sectional design. We scrutinized the secondary data from The Indonesian Basic Health Research (Indonesian Ministry of Health, 2018). Riskesdas is community-based health research conducted by the Agency for Health Research and Development (Badan Penelitian dan Pengembangan Kesehatan) every five years to evaluate the development of public health conditions, risk factors, and the level of development of health development at the state and district/city levels in Indonesia (Indonesian Ministry of Health, 2018). Researcher got the data from The Agency of Health Research and Development Indonesia and accessed data of by submitting an application to in their website https://www.litbang.kemkes.go.id/layanan-permintaan-data-riset/.

Dataset

In this study, we used the secondary data from The Basic Health Research (Riskesdas) in 2018. The targeted population are all elderly people of 60 years who live in urban areas of Indonesia who successfully became the respondents of The Basic Health Research (Riskesdas) in 2018 and answered the depression section of the questionnaire. The residence respondents are divided into urban and rural. We choose participants who stay in the urban category based on the questionnaire. The sample was obtained from a population of 38.488 respondents who met the inclusion criteria in this study that were taken from Riskesdas respondents in 2018: be of 60 years or more who lived in urban areas of Indonesia; completed the individual questionnaire depression section. We excluded the missing data of the respondents according to the dataset provided by Badan Penelitian dan Pengembangan Kesehatan through cleaning stage. The cleaning stage is the stage for cleaning the data in order to avoid errors in the data and re-checking each variable used in the study.

In the dataset there were an initial sample of 38,488 respondents, but there were missing data, namely in the history of chronic disease as many as 9,799 respondents and in the employment status variable as many as 119 respondents. After cleaning the sample by considering the inclusive and exclusive criteria, the final sample in this study is 28.570 respondents (e.g. Figure 1). In this study, we used the secondary data from. The Basic Health Research (Riskesdas) in 2018. The targeted population are all elderly people of 60 years who live in urban areas of Indonesia who successfully became the respondents of The Basic Health Research (Riskesdas) in 2018 and answered the depression section of the questionnaire. The residence respondents are divided into urban and rural. We choose participants who stay in the urban category based on the questionnaire. The sample was obtained from a population of 38.488 respondents who met the inclusion criteria in this study that were taken from Riskesdas respondents in 2018: be of 60 years or more who lived in urban areas of Indonesia; completed the individual questionnaire depression section. We excluded the missing data of the respondents according to the dataset provided by Badan Penelitian dan Pengembangan Kesehatan through cleaning stage. The cleaning stage is the stage for cleaning the data in order to avoid errors in the data and re-checking each variable used in the study. In the dataset there were an initial sample of

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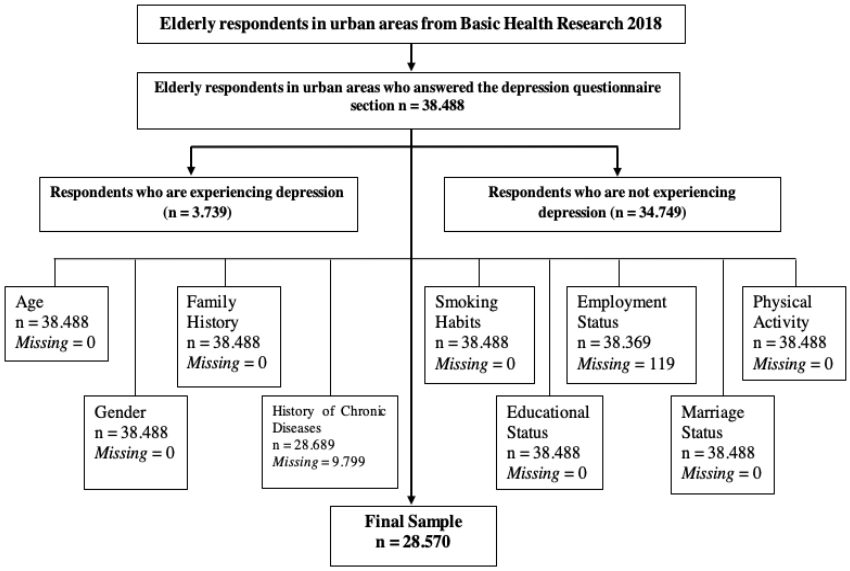
Figure 1
Selection Flowchart



Measures

This study consists of variable-dependent (symptoms of depression) and variable-independent (age, gender, family history, history of chronic disease, smoking habits, educational status, employment status, marital status, and physical activity). This study consists of variable-dependent (symptoms of depression) and variable-independent (age, gender, family history, history of chronic disease, smoking habits, educational status, employment status, marital status, and physical activity).

Symptoms of Depression

The measurement of depression symptoms was carried out using The Mini-International Neuropsychiatric Interview (MINI). We adopted this measurement based on research (Pettersson et al., 2018), the use of MINI interviews has proven to be useful in primary health care as part of the clinical assessment of patients at risk for depression and anxiety. The measurement of depression symptoms was carried out using The Mini-International Neuropsychiatric Interview (MINI). We adopted this measurement based on research (Pettersson et al., 2018), the use of MINI interviews has proven to be useful in primary health care as part of the clinical assessment of patients at risk for depression and anxiety.

This measurement is a short structured interview developed by psychiatrists and physicians in the United States and Europe for DSM-IV and ICD-10 psychiatric disorders. This interview was conducted for about 15 minutes to fulfill the need for a brief and accurate psychiatric interview. The MINI consists of modules for 17 diagnoses of psychiatric disorders including depressive episodes. Questions in this measurement only use "yes" or "no" answers that are available in print or web-based form. MINI helps obtain a complete picture and identify comorbid psychiatric illnesses, including stigmatizing disorders. Measurement of symptoms of depressive episodes was carried out by clinicians by asking questions related to depressive symptoms experienced by respondents in the last 2 (two) weeks. The measurement of the depression variable was obtained from the results of counting 10 answers to the depression section questions with coding 1 = yes and 2 = no. Respondents were categorized as symptom depression if they answered 2 ""yes"" to questions 1 to 3 and answered 2 ""yes"" to questions 4 to 10. If the respondent answers < 2 ""yes"" to questions 1 to 3 and < 2 ""yes"" on questions 4 to 10, the respondent is included in the category of not symptom depressed. The total symptom depression score is obtained by adding up the total score for questions 1 to 3 and the total score for questions 4 to 10.

The minimum total score for this variable is 10, while the maximum total score is 20. The total symptom depression score that has been obtained is then recoded into two categories, namely for a score of 16 for the elderly who are symptom depressed, while a score of 17 for the elderly who is not symptom depressed. This measurement is a short structured interview developed by psychiatrists and physicians in the United States and Europe for DSM-IV and ICD-10 psychiatric disorders. This interview was conducted for about 15 minutes to fulfill the need for a brief and accurate psychiatric interview. The MINI consists of modules for 17 diagnoses of psychiatric disorders including depressive episodes. Questions in this measurement only use "yes" or "no" answers that are available in print or web-based form. MINI helps obtain a complete picture and identify comorbid psychiatric illnesses, including stigmatizing disorders.

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Age

Hawari (2011) states that depression increases with age due to increased life expectancy, increased social and psychological pressure, and various chronic diseases which increase with age. This study divided age into three groups according to the World Health Organization (WHO) which are 60-74 years old, 75-90 years old, and above 90 years. Hawari (2011) states that depression increases with age due to increased life expectancy, increased social and psychological pressure, and various chronic diseases which increase with age. This study divided age into three groups according to the World Health Organization (WHO) which are 60-74 years old, 75-90 years old, and above 90 years.

Gender

Females are more likely to experienced unipolar depressive episodes and depressive symptoms than males (Susan & Hilt, 2009). Suardana (2011) also finds the prevalence of depression in women were 42 respondents (43.3%) while men were 26 respondents (39.4%). According to that, in this study gender is to be observed as one of the determinant for depressive symptoms Females are more likely to experienced unipolar depressive episodes and depressive symptoms than males (Susan & Hilt, 2009). Suardana (2011) also finds the prevalence of depression in women were 42 respondents (43.3%) while men were 26 respondents (39.4%). According to that, in this study gender is to be observed as one of the determinant for depressive symptoms.

Family History

In this study, the family history variable divided into two group which is the respondents who answered "yes" and "no" on family history who suffered from mental illness. Family members who have suffered from depression are more susceptible to influencing other family members (Duckworth & Quinn, 2009). In this study, the family history variable divided into two group which is the respondents who answered "yes" and "no" on family history who suffered from mental illness. Family members who have suffered from depression are more susceptible to influencing other family members (Duckworth & Quinn, 2009).

The chronic diseases

In this study the chronic diseases consist of asthma, cancer, diabetes mellitus, heart disease, hypertension, stroke, kidney failure, and joint disease or rheumatism. In this study, respondents were categorized as suffering from a history of chronic disease if they had 1 chronic disease, while respondents who did not suffer had no chronic disease at all. According to WHO (2017), elderly people with heart disease have a higher risk of depression than healthy elderly people. Research conducted by Huang et al. (2010) states that some chronic diseases are aspects of increasing depression such as stroke, decreased hearing and vision function, heart disease, and chronic lung disease. In this study the chronic diseases consist of asthma, cancer, diabetes mellitus, heart disease, hypertension, stroke, kidney failure, and joint disease or rheumatism. In this study, respondents were categorized as suffering from a history of chronic disease if they had 1 chronic disease, while respondents who did

not suffer had no chronic disease at all. According to WHO (2017), elderly people with heart disease have a higher risk of depression than healthy elderly people. Research conducted by Huang et al. (2010) states that some chronic diseases are aspects of increasing depression such as stroke, decreased hearing and vision function, heart disease, and chronic lung disease.

Smoking behavior

Smoking behavior includes the respondent's smoking habit every day or sometimes in the past month, while never smoking, that is, the respondent has never tried smoking until the time of data collection. Elderly with smoking behavior tend to experience higher depression. Other research also shows that smokers who are >10 years are at risk of experiencing depression 1.202 times greater than smokers <10 years (Hussein et al., 2017). Smoking behavior includes the respondent's smoking habit every day or sometimes in the past month, while never smoking, that is, the respondent has never tried smoking until the time of data collection. Elderly with smoking behavior tend to experience higher depression. Other research also shows that smokers who are >10 years are at risk of experiencing depression 1.202 times greater than smokers <10 years (Hussein et al., 2017).

Education Status

Elderly with higher education have a lower incidence of depression than the elderly with low education (Prabhaswari & Ariastuti, 2016). According to that, in this study education status is one of the determinant for depressive symptoms to be observed. This study divides education status into 3 (three) categories, namely low (no/never been to school, not graduated from SD/MI, and graduated from SD/MI), medium (junior high school/MTS and high school/MA), and high (graduated D1/D2/D3 and graduated from college). Elderly with higher education have a lower incidence of depression than the elderly with low education (Prabhaswari & Ariastuti, 2016). According to that, in this study education status is one of the determinant for depressive symptoms to be observed. This study divides education status into 3 (three) categories, namely low (no/never been to school, not graduated from SD/MI, and graduated from SD/MI), medium (junior high school/MTS and high school/MA), and high (graduated D1/D2/D3 and graduated from college).

Employment Status

According to the data from The Basic Health Research (Riskesdas), the employment status categorized by Not working, Student, PNS/TNI/Polri/BUMN/BUMD, Private employee, Entrepreneur, Farmer/farm laborer, Fisherman Laborer/Driver/housemaid, and Others. In this study, participants are divided into 2 (two) categories, namely not working (respondents who do not work) and working (respondents whose status is other than not working). This variable considered because based on research of Prabhaswari and Ariastuti (2016), employment status has a relationship with the level of depression in the elderly. In that study, the incidence of depression was twice as high in the elderly who did not work. According to the data from The Basic Health Research (Riskesdas), the employment status categorized by Not working, Student, PNS/TNI/Polri/BUMN/BUMD, Private employee, Entrepreneur, Farmer/farm laborer, Fisherman Laborer/Driver/housemaid, and Others. In

this study, participants are divided into 2 (two) categories, namely not working (respondents who do not work) and working (respondents whose status is other than not working). This variable considered because based on research of Prabhaswari and Ariastuti (2016), employment status has a relationship with the level of depression in the elderly. In that study, the incidence of depression was twice as high in the elderly who did not work.

Marriage Status

Strawbridge (2012) states that individuals who are divorced or single are more prone to suffer from depression than those who are married. In this study marriage status divided into two categories which is "divorced/not married" and "married".

Physical Activity

The measurement used in this variable is the Metabolic Equivalent of Tasks (METs) which is a measurement of the ratio of the amount of energy needed to body mass when doing physical activity. The measurement used in this variable is the Metabolic Equivalent of Tasks (METs) which is a measurement of the ratio of the amount of energy needed to body mass when doing physical activity. The data provided by Riskesdas 2018 consists of data on heavy physical activity and moderate physical activity, therefore the total METs calculated by adding up the METs of heavy physical activity with the METs of moderate physical activity. METs on heavy and moderate physical activity were obtained by calculating step by step from Riskesdas 2018 questionnaire. The total METs for heavy physical activity (<3000 METs) and METs for moderate physical activity (3000 METs) (Abadini & Wuryaningsih, 2018). The data provided by Riskesdas 2018 consists of data on heavy physical activity and moderate physical activity, therefore the total METs calculated by adding up the METs of heavy physical activity with the METs of moderate physical activity. METs on heavy and moderate physical activity were obtained by calculating step by step from Riskesdas 2018 questionnaire. The total METs for heavy physical activity (<3000 METs) and METs for moderate physical activity (3000 METs) (Abadini & Wuryaningsih, 2018).

Further Variables

Data analysis

This study used univariate analysis, bivariate analysis, and multivariate analysis using the SPSS version 25 statistical tool with the complex sample method. The statistical tests used in this study are the chi-square test was used in the bivariate analysis, while the multiple logistic regression of the predictive factor models was used in the multivariate analysis. The denominator in this study was elderly respondents aged 60 years in the 2018 Riskesdas data. This study used univariate analysis, bivariate analysis, and multivariate analysis using the SPSS version 25 statistical tool with the complex sample method. The statistical tests used in this study are the chi-square test was used in the bivariate analysis, while the multiple logistic regression of the predictive factor models was used in the multivariate analysis. The denominator in this study was elderly respondents aged 60 years in the 2018 Riskesdas data.

Result

There are 11.2 % of respondents (*n*= 3200) who experienced the depression symptom from 28.570 elderly in Indonesia urban areas. The majority were the age of 60-74 years (83.1%), women (55%), did not have a family history of mental disorders (98.7%), suffer from chronic diseases (55,4%), low educational status (64.0%), not working (54.2%), married (62.4%), and have less physical activity (63.3%). The rest of the characteristics are described in Table 1.

Table 1
Sample Characteristics (n=28,570)

Characteristics	*n* (%)
Depression symptom	
Depress	3,200 (11.2%)
Do Not Depress	25,370 (88.8%)
Age (Years)	
>90 Years Old	155 (0.5%)
75-90 Years Old	4,682 (16.4%)
60-74 Years Old	23,733 (83.1%)
Gender	
Female	15,692 (55%)
Male	12,878 (45%)
Family History	
Yes	385 (1.3%)
No	28,185 (98.7%)
History of Chronic Diseases	
Suffer	15,838 (55.4%)
Do Not Suffer	12,732 (44.6%)
Smoking Habit	
Yes	9,869 (34.5%)
No	18,701 (65.5%)
Educational Status	
Low	18,276 (64.0%)
Middle	7,925 (27.7%)
High	2369 (8.3%)
Employment Status	
Unemployed	15,484 (54.2%)
Employed	13,086 (45.8%)
Marriage Status	
Divorced/Unmarried	10,733 (37.6%)
Married	17,837 (62.4%)
Physical Activities	
Less	18,074 (63.3%)
Sufficient	10,496 (36.7%)

In bivariate analysis, gender, history of chronic disease, educational status, employment status, marital status, and physical activity there is a significant relationship with symptom depression in the elderly in urban areas of Indonesia. Elderly women had a higher risk of symptoms of depression than men (p<0.001), and elderly who suffer from chronic diseases are more likely to experience symptoms of depression (p<0.001). Moreover, the elderly with low educational status had a higher possibility to experience depression than the elderly with higher educational status (p<0.001). Respondents who are unemployed had a higher chance to experience depression than respondents who were still working (p<0.001). Furthermore, the elderly who are divorced/unmarried are more likely to experience depression than respondents with married status (p<0.001) and the elderly who were physically active were less depressed (p<0.001). On the other hand, according to the bivariate analysis, there is no relationship between the variables of age, family history, and smoking habits with depression in the elderly. Further associations can be found in Table 2.

Table 2
Bivariate Association between Variables and Depressive Symptoms (n=28,570)

Characteristics	Depression Symptoms		*P* Value
	Yes (%)	No (%)	
Age (years)			
>90 years old	27 (17.8%)	127 (82.2%)	0.130
75-90 years old	559 (11.9%)	4123 (88.1%)	0.130
60-74 years old	2614 (11%)	21119 (89%)	ref
Gender			
Female	2012 (12.8%)	13680 (87.2%)	<0.001
Male	1188 (9.2%)	11690 (90.8%)	
Family History			
Yes	54 (14%)	3146 (11.2%)	0.169
No	331 (86%)	25039 (88.8%)	
History of Chronic Diseases			
Suffer	2258 (14.3%)	13580 (85.7%)	<0.001
Do Not Suffer	942 (7.4%)	11789 (92.6%)	
Smoking Habit			
Yes	1089 (11%)	8780 (89%)	0.675
No	2111 (11.3%)	16590 (88.7%)	
Educational Status			
Low	2451 (13.4%)	15825 (86.6%)	<0.001
Middle	660 (8.3%)	7265 (91.7%)	<0.001
High	89 (3.8%)	2279 (96.2%)	ref
Employment Status			

Tabel 2 (Continued)
Bivariate Association between Variables and Depressive Symptoms

Characteristics	Depression Symptoms		*P* Value
	Yes (%)	No (%)	
Unemployed	2091 (13.5%)	13392 (86.5%)	<0.001
Employed	1109 (8.5%)	11977 (91.5%)	
Marriage Status			
Divorced/Unmarried	1377 (12.8%)	16014 (89.8%)	<0.001
Married	1823 (10.2%)	9356 (87.2%)	
Physical Activities			
Less	2262 (12.5%)	15811 (87.5%)	<0.001
Sufficient	938 (8.9%)	9559 (91.1%)	

According to the multivariate analysis (in Table 3), low educational status is significantly correlated with depression in the elderly in urban areas of Indonesia. The elderly with low education were 3.972 times more likely to suffer from symptom depression than the elderly with higher education status ($p<$ 0.001; *PR* 3.972; 95% *CI* 3.047-5.177).

Table 3
Final Model of Multivariate Analysis

Variable	B	Std. Error	*P* value	PR Adjusted	Exp (B)	95% CI
History of Chronic Diseases	0.683	0.060	<0.0001	1.980	1.980	1.759-2.228
Educational Status Low	1.379	0.135	<0.0001	3.972 2.319	3.972 2.319	3.047-5.177
Middle High	0.841	0.140	<0.0001			1.763-3.051
Employment Status	0.325	0.062	<0.0001	1.384	1.384	1.226-1.562
Physical Activities	0.259	0.065	<0.0001	1.295	1.295	1.140-1.471

Discussion

The study aims to analyze the risk factors (age, gender, family history, history of chronic disease, smoking habits, educational status, employment status, marital status, and physical activity) that affect symptoms of depression among elderly in the urban area in Indonesia. Based on the findings, gender, history of chronic disease, educational status, employment status, marital status, and physical activity have significantly related to the symptoms of depression in elder people (p-value <0.001). On the other hand, age (p-value 0,130), family history (p-value 0.169), and smoking habits (p-value 0.675) are not significantly affecting symptoms of depression. The study aims to analyze the risk factors (age, gender, family history, history of chronic disease, smoking habits, educational status,

employment status, marital status, and physical activity) that affect symptoms of depression among elderly in the urban area in Indonesia. Based on the findings, gender, history of chronic disease, educational status, employment status, marital status, and physical activity have significantly related to the symptoms of depression in elder people (p-value <0.001). On the other hand, age (p-value 0,130), family history (p-value 0.169), and smoking habits (p-value 0.675) are not significantly affecting symptoms of depression.

This study found that elderly women have a risk of experiencing symptom depression 1,389 times greater than elderly men. These findings are in line with the previous study from Sisi and Ismahmudi (2020) which mentioned that depression in women elderly is related to post-menopause that affects the alteration of feelings, emotions, and physicals. Physical changes during menopause can be in the form of reproductive system problems, joint pain, and hair loss, causing respondents in this study to feel anxious, especially in relation to their life partner which can easily trigger vulnerability to depression (Indrias et al., 2015). This study found that elderly women have a risk of experiencing symptom depression 1,389 times greater than elderly men. These findings are in line with the previous study from Sisi and Ismahmudi (2020) which mentioned that depression in women elderly is related to post-menopause that affects the alteration of feelings, emotions, and physicals. Physical changes during menopause can be in the form of reproductive system problems, joint pain, and hair loss, causing respondents in this study to feel anxious, especially in relation to their life partner which can easily trigger vulnerability to depression (Indrias et al., 2015).

Chronic disease has a significant relationship elderly with depression. Elders, who had a chronic disease, were 2.207 times more likely to suffer from depression than the elderly without a history of chronic disease (PR = 2.207; 95% CI = 1.834- 2.242). Limitation on the physical ability of the elderly causes them to be unable to carry out daily activities and feelings of helplessness and happiness which triggered depression (Priyoto, 2017). Patients with chronic diseases may suffer pain and even physical dysfunction for years, resulting in a lower-than-normal quality of life and impaired social and role coordination, then comes a denial of self-worth, a feeling of powerlessness to live, and the onset of depression (dos Santos et al., 2017). Research from (Jahnavi et al., 2014) also mentioned that comorbidities along with depression, increase disability, poor compliance, and increased utilization of health services, reduce the quality of life and further complicate depression management. Depressed patients are more likely to suffer from hypertension and diabetes mellitus. Chronic disease has a significant relationship elderly with depression. Elders, who had a chronic disease, were 2.207 times more likely to suffer from depression than the elderly without a history of chronic disease PR = 2.207; 95% CI = 1.834- 2.242). Limitation on the physical ability of the elderly causes them to be unable to carry out daily activities and feelings of helplessness and happiness which triggered depression (Priyoto, 2017). Patients with chronic diseases may suffer pain and even physical dysfunction for years, resulting in a lower-than-normal quality of life and impaired social and role coordination, then comes a denial of self-worth, a feeling of powerlessness to live, and the onset of depression (dos Santos et al., 2017). Research from Jahnavi et al. (2014) also mentioned that comorbidities along with depression, increase disability, poor compliance, and increased utilization of health services, reduce the quality of

life and further complicate depression management. Depressed patients are more likely to suffer from hypertension and diabetes mellitus.

On the other hand, the elderly who are unemployed are at risk about 1.594 times more likely to suffer from depression than the elderly who are employed. The existence of physical decline in the elderly causes them to be unable to carry out work activities so they lose their source of income which makes the elderly have low income and are vulnerable to depression (Febriani & Ismahmudi, 2020). Older people who are still working are more likely to have social relationships and a sense of belonging in society which is associated with a reduced prevalence of depression. In addition, it is common for depressed seniors to lose their jobs. Economic stress and unemployment are important factors in identifying depression in older adults (Abe et al., 2012). On the other hand, the elderly who are unemployed are at risk about 1.594 times more likely to suffer from depression than the elderly who are employed. The existence of physical decline in the elderly causes them to be unable to carry out work activities so they lose their source of income which makes the elderly have low income and are vulnerable to depression (Febriani & Ismahmudi, 2020). Older people who are still working are more likely to have social relationships and a sense of belonging in society which is associated with a reduced prevalence of depression. In addition, it is common for depressed seniors to lose their jobs. Economic stress and unemployment are important factors in identifying depression in older adults (Abe et al., 2012).

Marriage also had a correlation influencing the depression in elderly which elderly who are divorced/unmarried had 1,256 times more risk than the elderly who are married. The presence of a life partner is able to affect the emotional condition of the elderly considering the function of a life perspective, one of which is as a supporter in emotional control, problem-solving, finance, and mobilization support (Papalia et al., 2009). Unmarried older adults may be more lonely, have less social support, be less confident, and live more alone, and are commonly considered risk factors for depression in the elderly (Prince et al., 1997). The research conducted by Yan et al. (2011) mentioned that women losing their husbands are more likely to have negative events in life and older people experience significant changes in their lifestyle after losing a husband. This may be one reason why older widowers are at a higher risk of depression compared to married and unmarried people. Marriage also had a correlation influencing the depression in elderly which elderly who are divorced/unmarried had 1,256 times more risk than the elderly who are married. The presence of a life partner is able to affect the emotional condition of the elderly considering the function of a life perspective, one of which is as a supporter in emotional control, problem-solving, finance, and mobilization support (Papalia et al., 2009). Unmarried older adults may be more lonely, have less social support, be less confident, and live more alone, and are commonly considered risk factors for depression in the elderly (Prince et al., 1997). The research conducted by Yan et al. (2011) mentioned that women losing their husbands are more likely to have negative events in life and older people experience significant changes in their lifestyle after losing a husband. This may be one reason why older widowers are at a higher risk of depression compared to married and unmarried people.

Physical activity affects depression in the elderly and if the elderly have high physical activity

then the level of depression will be lower and vice versa. It is known that physical activity can increase physical strength and improve mood the study by Byeon (2019) mentioned that physical activity can help improve the quality of life of the elderly considering that elderly people with physical activity are able to make the heart stronger so that it can pump more blood. On the other hand, Silva et al. (2012) described that regular Physical Exercise (PE) was associated with a lower likelihood of depressive symptoms. However, in reverse analysis, participants with symptoms of anxiety or depression were more likely to fail to achieve recommended PE values. However, there are mechanisms that could explain the effect of physical education on mood. Physical activity affects depression in the elderly and if the elderly have high physical activity then the level of depression will be lower and vice versa. It is known that physical activity can increase physical strength and improve mood the study by Byeon (2019) mentioned that physical activity can help improve the quality of life of the elderly considering that elderly people with physical activity are able to make the heart stronger so that it can pump more blood. On the other hand, Silva et al. (2012) described that regular physical exercise (PE) was associated with a lower likelihood of depressive symptoms. However, in reverse analysis, participants with symptoms of anxiety or depression were more likely to fail to achieve recommended PE values. However, there are mechanisms that could explain the effect of physical education on mood.

This study finds that the factors which the highest contribution or correlation coefficient to the symptoms of depression among the elderly is low educational status. The elderly with low education were 3.972 times more likely to suffer from depression than the elderly with higher education status. The knowledge to cope and find help from an expert as a basic need to prevent depression are yet to be possessed by people with low education. This is related to education that influences individual behavior, the higher the individual's education, the higher the level of knowledge through the ability to receive information more easily (Sutinah & Maulani, 2017). This study finds that the factors which the highest contribution or correlation coefficient to the symptoms of depression among the elderly is low educational status. The elderly with low education were 3.972 times more likely to suffer from depression than the elderly with higher education status. The knowledge to cope and find help from an expert as a basic need to prevent depression are yet to be possessed by people with low education. This is related to education that influences individual behavior, the higher the individual's education, the higher the level of knowledge through the ability to receive information more easily (Sutinah & Maulani, 2017).

The elderly with low education are unable to face and overcome the psychological burden of the problems along with increasing age, the decline in intellectual function experienced by the elderly, including cognitive function, can affect the incidence of depression. According to Bauldry (2015), people with educated backgrounds tend to have healthy lifestyles and resources that provide intellectual support that promotes mental health. Higher education can help achieve more fulfilling careers and higher wages, and can also be seen as lowering the risk of depression. This can link to a work environment that supports a healthy lifestyle and promotes mental health.The elderly with low education are unable to face and overcome the psychological burden of the problems along with increasing age, the decline in intellectual function experienced by the elderly, including cognitive

function, can affect the incidence of depression. According to Bauldry (2015), people with educated backgrounds tend to have healthy lifestyles and resources that provide intellectual support that promotes mental health. Higher education can help achieve more fulfilling careers and higher wages, and can also be seen as lowering the risk of depression. This can link to a work environment that supports a healthy lifestyle and promotes mental health.

Conclusion

The identification on risk factors of depressive symptom in elderly is an important topic to be observed since depression is the disease that commonly suffered by this age group. From this study, it can be concluded that gender, chronic disease history, educational status, employment status, marital status, and physical activity are the factors contributing to the incidence of depression in the elderly in urban areas of Indonesia. There were no significant relationship between age, family history, and smoking habits with the incidence of depression in the elderly. Low educational status are the most contributing variable to increasing the risk of depression. By focusing on longitudinal studies that used multivariate analysis, we were able to gain a better understanding of risk factors that contribute the most on increasing depression symptom. According to the study, educational status is the factor that affecting the most on depression symptom. Elderly with low educational status are 3.985 times more likely to suffer from depression than those with higher education (*PR* = 3.985; 95% *CI* = 3.060-5.188). These factors can help to develop screening tools and intervention program to improve mental health degree for elder people in urban areas Indonesia. The identification on risk factors of depressive symptom in elderly is an important topic to be observed since depression is the disease that commonly suffered by this age group. From this study, it can be concluded that gender, chronic disease history, educational status, employment status, marital status, and physical activity are the factors contributing to the incidence of depression in the elderly in urban areas of Indonesia. There were no significant relationship between age, family history, and smoking habits with the incidence of depression in the elderly. Low educational status are the most contributing variable to increasing the risk of depression. By focusing on longitudinal studies that used multivariate analysis, we were able to gain a better understanding of risk factors that contribute the most on increasing depression symptom. According to the study, educational status is the factor that affecting the most on depression symptom. Elderly with low educational status are 3.985 times more likely to suffer from depression than those with higher education (*PR* = 3.985; 95% *CI* = 3.060-5.188). These factors can help to develop screening tools and intervention program to improve mental health degree for elder people in urban areas Indonesia.

Recommendation

To begin with, factors that modifiable such as physical activity, may be targets for preventive intervention. Primary healthcare plays pivotal role for promoting mental health through Posyandu Lansia in order to maximize the educational program. Health promotion included promoting *Gerakan Masyarakat* (Germas), exercise program routinely for elder, and mental health education

on the household and nursing home level. Second, non-modifiable factors like gender, history of chronic diseases and employment status could be used to identify subgroups where preventive interventions are cost effective. Ministry of Health and Dinas Kesehatan highly encouraged to evaluate the intervention on mental health promotion mainly elderly empowerment activities that focus on educational activities, especially regarding factors that can influence depression. Thus, our findings highlight the importance of additional research on risk factors for depression in older people, with a focus on longitudinal studies using multivariate analysis and refined, more comparable assessment tools. To begin with, factors that modifiable such as physical activity, may be targets for preventive intervention. Primary healthcare plays pivotal role for promoting mental health through Posyandu Lansia in order to maximize the educational program. Health promotion included promoting Gerakan Masyarakat (Germas), exercise program routinely for elder, and mental health education on the household and nursing home level. Second, non-modifiable factors like gender, history of chronic diseases and employment status could be used to identify subgroups where preventive interventions are cost effective. Ministry of Health and Dinas Kesehatan highly encouraged to evaluate the intervention on mental health promotion mainly elderly empowerment activities that focus on educational activities, especially regarding factors that can influence depression. Thus, our findings highlight the importance of additional research on risk factors for depression in older people, with a focus on longitudinal studies using multivariate analysis and refined, more comparable assessment tools.

Declaration

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Author's Contribution,

SNH conceptualized the study design and acquired the raw data for analysis HI conceptualized for the article and prepared the original draft of the manuscript

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