Logistic Regression on Physical Activities Analysis Related to Depression in Elderly

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Abstract

Background: The risk of depression in the elderly is currently exacerbated by the health situation of the Coronavirus Disease 2019 (COVID-19) pandemic that has reached the entire world, including Indonesia. The imposition of physical distancing and restrictions on activities outside the home will have an impact on discomfort for all individuals, including the elderly. The elderly are forced to stay in their respective homes that causes reduced physical activity. If this condition continues, it can reduce endurance, cause discomfort, boredom, anxiety, and depression in the elderly.

Objective: This study aimed to identify the effect of physical activity on of depression in the elderly at Integrated Health Center (Posyandu), Kasin Sub-District, Working Area of Puskesmas Bareng, Malang City.

Methods: This type of analytic correlative research was categorized as a quantitative survey type with cross sectional design. The sample was 54 elderly aged 60 years taken by random sampling. The instruments used were the Geriatric Depression Scale for screening depression incidents and the questionnaire for assessing demographic data and physical activity. Data were analyzed using multivariate logistic regression method.

Results: Exercising, doing outwork had a significant effect on the occurrence of depression in the elderly, with a sig value of exercising 0.004 and doing homework at 0.047. exercise can reduce the risk of depression by 99% and doing homework can reduce the risk of depression by 10%.

Conclusion: Elderly should keep doing homework every day and keep in exercising regularly every week to reduce the risk of depression during the Covid-19 period.

***Key words**: Physical activity, depression, elderly*.

Introduction

The aging process in the elderly is signed by physical changes accompanied and the decrease of various body functions. Physical changes and decreased body function are normal conditions that occur with increasing age in the elderly[1]. Physical changes and decreased bodily functions can also appear as health problemsphysical and psychological aspects of the elderly[2]. Physical health problems are closely related to the ability of the elderly to carry out daily physical activities (Activity Daily Living)[2]. The literature study showed that there is a tendency for the elderly to limit their activities due to decreased health[3,4]. Physical activity is defined as every movement of the body produced by the musculoskeletal system that requires energy as input in carrying out physical activities, including daily activities such as performing household chores, traveling, work activities, sports, recreational and playing activities[5]. Regular physical activity, both light and moderate has been found to be effective in delaying the body functions that begin

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to appear in late adulthood to old age. The benefits that can be obtained from regular physical activity include increased body coordination, flexibility, improved sleep quality, decreased depression and anxiety, and increased overall psychological condition[5,6].

Depression means emotional disturbance that is shown through the emergence of feelings of depression, unhappiness, sadness, feeling worthless, lack of enthusiasm, meaningless and pessimistic about the life that is being lived. In the elderly, depression can occur because of many things including economic that is not guaranteed by the family so that the elderly still have to work, fear of being alienated from the family, fear of being ignored by their children. The risk of depression increases in the elderly who experience chronic diseases and long periods of care[7].

The risk of depression in the elderly is currently exacerbated by the health situation of the Coronavirus Disease 2019 (COVID-19) pandemic which has reached the entire world, including Indonesia. Efforts to prevent the transmission of COVID-19 that have been implemented for all levels of society including the elderly, including physical distancing, maintaining hand hygiene, implementing cough / sneezing ethics, using masks, limiting outdoor activities, ensuring access to public hygiene in public facilities[8]. The imposition of physical distancing and restrictions on activities outside the home will have an impact on discomfort for all individuals, including the elderly. The elderly are forced to be in their respective homes which causes reduced physical activity, especially reduced interactions and social activities that are routinely carried out by the elderly. Reduced long-lasting physical activity in the elderly can reduce endurance, cause discomfort, boredom, anxiety, depression and reduce cognitive function in the elderly[9].

Data from WHO Asia Pacific region (WHO SEARO) in 2017 showed that the number of cases of depressive disorders in Indonesia was 9,162,886 cases or 7.7% of the population. Riskesdas 2018 data showed the prevalence of mental emotional disorders that indicate symptoms of depression and anxiety reaching 6.1% for those aged 15 years and over of the total population of Indonesia. The ability to carry out physical activity of the elderly in Indonesia is shown through the 2018 Riskesdas data, namely 80.30% of the elderly in the 60-69 year group active independently, 68.09% in the 70-79 year age group and 50.04% in the over 80 years group.

The results of research conducted by previous researchers in 2019 regarding the Relationship between Physical Activity and Cognitive Function in the Elderly in one of the Posyandu in the working area of the Puskesmas Bareng, Malang City, obtained data on the physical activity of the elderly. as follows from 51 elderly a number of 35 elderly (68 6%) rarely exercised, 38 elderly (74.5%) performed light work, 28 elderly (54.9%) performed heavy work, 38 elderly (74.5%) used stairs, 38 elderly (74, 5%) did not participate in social activities, 12.67% of the elderly were at risk of experiencing depression and a number of 4.92% of the elderly experienced depression. This study aimed to analyze the relationship between physical activity and depression in the elderly.

Materials and Methods

Study design

The type of research used was correlative analytic categorical quantitative survey type with cross sectional design. Survey research was research that took samples from many respondents to answer the same questions, measure many variables, formulate hypotheses, and draw conclusions based on the events from questions about beliefs, opinions, experiences, and characteristics in the past[10]. The study examined the dependent and independent variables at the same time. Each respondent will be assessed their daily physical activity and identified possible depressive events.

Research subject

This study involved elderly who were over 60 years old and had lived at least 1 year in their residence and were willing to become respondents with the exclusion criteria being elderly who did not understand Indonesian language and experienced mental disorders (psychosis).

Instrument

The instrument used in the study consisted of the Geriatric Depression Scale (GDS) that was used to screen for depression in the elderly. The questionnaire was used to assess the physical activity routinely carried out by the elderly every day including exercise habits, homework activities and involvement in social activities, as well as a questionnaire on demographic data for the elderly.

Data collection

The data used in this study were primary data obtained directly from the elderly in January 2021. Researchers obtained random respondents based on the opportunities. Researchers and health cadres collected data one by one using Google Form media and using video call media on mobile phone applications to study data related to physical activity and depression incidence in the elderly.

Ethical considerations

This research was conducted by concerning the legal aspects of ethics for the elderly, namely by maintaining the confidentiality of the data on the data of each research subject (anonymity), providing information concentrations as evidence of the respondent willingness to be involved in research, as well as conveying the aims and objectives of the study, asking about the health conditions of the elderly. whether at the time the data collection will be carried out by the elderly under possible conditions.

Data Analysis

Data analysis was carried out based on the following research framework:

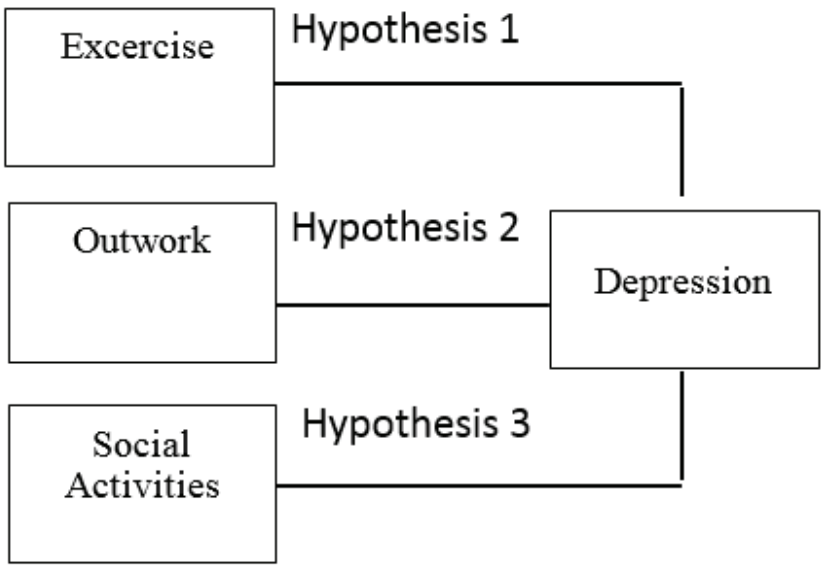

Figure 1. Hypothesis Framework

Based on the framework of the research hypothesis, the hypothesis is that each activity, namely exercising, performing outwork and participating in social activities, is thought to influence the incidence of depression. Logistic regression analysis was performed by multicollinearity test, regression model feasibility test, overall fit model, Hypothesis test, and Wald test.

Results

The results of elderly charateristics assesment showed that 37.04% of elederly aged 66-70 years and 59.26% were female; 75.93% was elementary education; 42.59 % was still working; 70.37% suffering from disease; 90.74% did not use device . Characteristics

of physical activity obtained that 48.15% performed excercise more than 3 times per week; 25.93% performed heavy outwork ; 55.56% did not participate in social activities. The results of logistic regression analysis showed the following results:

1. Multicollinearity test

Correlation matrix results showed that all correlation coefficient values were less than 0.8, so it can be concluded that the model did not contain multicollinearity (exercise -0.755; outwork -0.388 and -0.676 social activities.

2. Feasibility test of the regression model

Hosmer and Lemeshow test table showed the significance value of the feasibility of the model of 0.164 with a significance value> 0.05, it indicated that the regression model formed was able to predict the observed value well and match the observation data.

3. Overall fit models

The initial -2LL value was 50,802 and after the addition of the independent variable the final -2LL value was 49,212, indicating a decrease in the -2LL value of 1.59. It showed that the hypothesized regression model fit with the data.

4. Partial test (T)

By using a significance level of 5% obtained the sig variable exercise value 0.047 <0.05; outwork variable sig value 0.004 <0.05; and the sig variable value in performing social activities 0.183> 0.05. The variable exercising and doing outwork can significantly affected the incidence of depression in the elderly.

5. F-Test

The chi Square model value was 25,648 with a significant value of 0.000. A significant value of 0.000 <0.05 showed that the exercise, performing outwork k and performing social activities simultaneously had a significant effect on the incidence of depression.

6. Coefficient of determination

The Cox & Snell R Square value of 0.378 showed the amount of effective contribution given by the exercising, peforming outwork, and social activities to the incidence of depression that was 37.8%. The Negelkerke R Square value in the regression model was 0.504, indicating the variance of the depression variable which can be explained by the variables of exercising, doing homework and social activities, the remaining 50.4% was influenced by other factors outside the model.

7. Wald test

The coefficient value of the Wald test variable in performing the outwok, exercising and participating in social activities was positive, it means that the three variables had a positive effect on the incidence of depression.

8. Model

Ln (Depression) = 3,556 - 0,998 Activity - 1,059 Exercise + 1,007 SOS Activity + e

Discussions

1. Effect of Exercise on Depression

Based on the results of hypothesis 1 from the logistic regression analysis , it is known that there is a relationship between exercise and the incidence of depression in the elderly. The Wald test value was 0.047 (p <0.05) showed that exercise had a significant effect on depression incidence. Exercising such as doing yoga and meditation is a form of lifestyle modification that needs to be done by the elderly[11]. A study conducted by Wipfli and Landers states that exercise has the potential to facilitate neurogenesis in the hippocampal mechanism. Exercise can also increase B-endorphins, vascular endothelial growth factor, Brain Derived Neurothrophic Factor (BDNF) and serotonin, so it can be said that exercise has the potential to be an effective approach to healing and as a preventive measure for depression[12].

2. Effects of Performing Outwork on Depression

Based on the results of hypothesis 2 from the ordinal logistic regression analysis, it is known that there is a relationship between performing outwork and the depression. The Wald test value was 0.004 (p <0.05), showed that performing outwork had a significant effect

on the incidence of depression.

Doing light and heavy outwork at home such as cleaning the room, shopping, sweeping the house and even gardening is a form of physical activity that can accelerate the metabolic process of neurotransmitters, where the basic ingredients of neurotransmitters are amino acids which are one of the nutrients for the brain and have an important function in increasing alertness, reduce mistakes and promote thinking. This neurotransmitter process will stimulate the neurogenesis process and maintain brain plasticity (the brain's ability to make new interconnections to nerves), where this process plays an important role in inhibiting hypertrophy of brain tissue which can cause neural degeneration which has an impact on cognitive[13,14]. Studies show that depressive symptoms are closely related to poor cognitive abilities in the elderly, therefore it has been agreed that successful strategies to reduce depression will automatically improve cognitive function[14].

3. The Effect of Participating in Social Activities on the Depression

Based on the results of hypothesis 3 from the multivariate logistic regression analysis, there was no relationship between participating in social activities and depression in the elderly. The resulting Wald test value was 0.183 ($p > 0.05$) that indicates the following social activities had no effect on the incidence of depression in the elderly.

The results of a study conducted by the University of California Los Angeles (UCLA) western state showed that the estimated prevalence of long-standing loneliness in the elderly using the Loneliness Scale (LS) showed a range of 11.5% -43%. As the elderly get older, they often tend to lose the active role they did before and at this stage the elderly enter a passive role that makes them feel they are not quite like their previous condition. These conditions include being stopped from work, financial instability, and the surrounding situation, such as whether there is family support or not, tends to trigger loneliness in the elderly.

In this study, it is also stated that being old is not the only factor responsible for the occurrence of a person feeling lonely, there are several other factors such as marital status, education, work status, finance and the environment where the elderly live also play a role in feelings of loneliness in the elderly. Interaction with the environment is different from feelings of loneliness which directly contribute to depression in the elderly[15].

Conclusions

Elderly is expected to participate in preventing depression by maintaining the achievement of physical activity that has been done every day. The family as a support system for the elderly provides support and facilitates the elderly to be able to maintain their daily activities and exercise routinely according to the conditions and abilities of each person.

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Conflict of Interest: The authors declare no conflict of interest.

Ethical Clearance: Informed consent was obtained from the Clinical Administrators, the confidentiality and anonymity of the subjects and information gathered.

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