ORIGINAL ARTICLE

Determinants Activity of Daily Living (ADL) Elderly Tresna Werdha Nursing Home (PSTW) Special Region of Yogyakarta

Rustika Herman* and Herlina Nindi Akhriani

Abstract

Background: Physiological changes affect the independence of the elderly in the activities of daily life. The purpose of this research is to know the determinants of independence of elderly in the activity of daily life.

Methods: The study was designed using cross-sectional analytic study. The study population was elderly above 60 years old who lived in Tresna Werdha Nursing Home (PSTW) in Yogyakarta with a sample size of 147 elderly. Data collection using the Mini-Mental State Examination (MMSE) questionnaire and observation sheet. Multivariate analysis with multiple logistic regression.

Results: The independence of the Basic Activity Daily Living (BadL) is measured by the Katz Index and the Instrumental Activity Daily Living (IADL) with the Lawton-Brody scale. The results are 22.4% of elderly dependence on BadL and 25.2% of elderly dependence on IADL. Elderly who did not perform physical activity 10.48 times the risk of experiencing dependence in BadL Compared to elderly who do physical activity (p-value = 0.000; OR = 10.48; 95% CI: 2.83-38.81). Elderly with a history of chronic disease is at risk of 8.25 times dependent on IADL Compared with the elderly without a history of chronic disease (p = 0.046; OR = 8.25; 95% CI: 1.04-65.57). Conclusion: The conclusion is Physical activity, age, and nutritional status in BadL dependence Affect while the history of chronic diseases, physical activity, and age Affects dependence in IADL. Promotional and Preventive Efforts such as routine physical activity, balanced nutrition fulfillment, clean and healthy lifestyle to Anticipate the aging process and physiological function changes.

Keywords: nutrition, elderly, daily activity

Introduction

Currently, in Indonesia, there are health problems occur such as the high rate of population growth, disparities in health status, the double burden of disease, increasing deaths from accidents and decreased the quality of family's health. Human Development Index (HDI) / Human Development Index (HDI) is an indicator used to describe the achievement of development in a country against the three domains, which is health, education, and economy. Health indicator relating to
the status health community is a comprehensive indicator and specific indicators (Ahmad, 2016). Life expectancy (UHH) is a comprehensive indicator to assess the health status and quality of life. Currently, Life Expectancy (UHH) of Indonesia's population is 69.65 years.

The estimation of the number of elderly population (> 60 years) in the world in 2009 was 500 million people. The number will be estimated to reach 1.2 billion in 2020. Estimates of the increase occurred in the developed countries in the amount of 32% by 2050. Meanwhile, in developing countries, the population 60 years and over will have increased about 20% in 2015-2050. In Asia, Indonesia's elderly population occupies the fourth position in China, India, and Japan. These conditions indicate that the elderly population has increased consistently over time so that the elderly in the demographic structure of Indonesia increasingly higher. Asia and Indonesia from 2015 has entered the era of an aging population (aging population) for the population aged 60 years above (the elderly) exceeding 7%.4

Based on Susenas (2014), the number of households of elderly households as much as 16.08 million or 24.50% of all households in Indonesia is minimal one member of the household aged 60 years and over. The number of elderly people in Indonesia reached 20.24 million, equivalent to 8.03% of the entire population of Indonesia in 2014. The larger number of elderly women than men, i.e. 10.77 million 9.47 million elderly women than elderly men, especially for the elderly who live in rural areas as much as 10.87 million people, more than the elderly who live in urban areas as much as 9.37 million. Elderly dependency ratio value of 11.90 indicates that for every 100 people of productive age population should account for about 12 elder people. Elderly dependency ratios in rural areas is higher than in urban areas is 14.09 compared to 11.40. By sex, more elderly women are born by the population of productive age. Dependence of elderly women was 13.59 higher than in elderly men by at 11.83. The object that deserves attention is that they are staying alone in a house or a single elderly household. A total of 9.66% of elderly live alone and must meet the needs of food, health, and social independence development.

In general, the elderly will be decreased biological functions, physiological and psychosocial. This condition will affect the dependence on physical activity in daily life. Elderly's health assessed by the independence of physical activity in daily life (ADL). From all province in Indonesia, Special Region of Yogyakarta (DIY)
stands in the first rank with the largest percentage of elderly is 13.46%, followed by 11.67% in Central Java, and East Java was amount to 11.46%. Meanwhile, the occupation of elderly dependency ratio in the province amounted to 20.73% higher than the national rate that is equal to 13.28%. This condition means that the burden of productive age population in the province to the highest elderly population compared to other province.7

In 2013, Central Bureau of Statistics predicts that DIY is a province with an average percentage of the highest elderly population in 2010-2035 with the percentage of 15.83%, and an average projection of as much as 624.290 people of elderly population.5 In addition, DIY is a province with the percentage of elderly displaced by 5%.7

DIY there are 6 homes of Werdha where three of them are managed and organized by the government. The current condition of some homes is quite alarming because of divergence about the assignment by the provider care system. As a result, the service quality and degree of health become lower, and causing the elderly become not independent. To determine what factors that led to the independence of the elderly in nursing home of Werdha, a research of "Determinants Activity Daily Living (ADL) Elderly in Tresna Werdha Nursing Home (PSTW) Special Region of Yogyakarta (DIY) on 2017" was conducted.

**Method**

This study is a cross-sectional. The population in this research was all elderly in a nursing home in Yogyakarta. There are 147 people as a sample in this research using proportions hypothesis test on two told single population and non-response factor of 10%. Sample criteria are the elderly aged ≥ 60 years were able to communicate, not being cared for, lived in a nursing home over 3 months, signed an approval sheet (PSP), and did not have mental disorders. The sampling technique was used a proportional sampling in three branches of Tresna Werdha Nursing Home (PSTW) which is PSTW Abiyoso Sleman with 59 people, PSTW Bantul Budi Luhur with 59 people, and PSTW Budi Dharma Yogyakarta with 29 people. Data were collected through observation with Barthel index instruments to measure the Activity of Daily Living (ADL), and the scale of the Mini-Mental State Examination (MMSE) to measure cognitive function. Data were analyzed using SPSS software.
Results

Activity Daily Living (ADL) status of the elderly will be described in Table 1 below:

Table 1. Distribution of ADL in the Elderly in Tresna Werdha Nursing Home (PTSW), Special Region of Yogyakarta, 2017

<table>
<thead>
<tr>
<th>ADL</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independency</td>
<td>110</td>
<td>74.8</td>
</tr>
<tr>
<td>Dependency</td>
<td>37</td>
<td>25.2</td>
</tr>
<tr>
<td>Total</td>
<td>147</td>
<td>100</td>
</tr>
</tbody>
</table>

Based on Table 1 noted that from 147 respondents, 110 of elderly were independent in ADL while 37 of elderly have a dependency in ADL. Table 2 shows

Table 2. The relationship between Sociodemographic Characteristics of Elderly and the ADL in Tresna Werdha Nursing Home (PTSW) Special Region of Yogyakarta, from September to December 2017

<table>
<thead>
<tr>
<th>Variabel</th>
<th>ADL Independence (n=110)</th>
<th>ADL Dependent (n=37)</th>
<th>OR</th>
<th>Confidence Interval 95%</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Man</td>
<td>32 (76.2)</td>
<td>10 (3.8)</td>
<td>1.000</td>
<td>Reference</td>
</tr>
<tr>
<td></td>
<td>Women</td>
<td>78 (74.3)</td>
<td>27 (5.7)</td>
<td>1.108</td>
<td>0.481-2.551</td>
</tr>
<tr>
<td>Age</td>
<td>60-69 Years</td>
<td>78 (83.0)</td>
<td>16 (7.0)</td>
<td>1.000</td>
<td>Reference</td>
</tr>
<tr>
<td></td>
<td>&gt; 70 Years</td>
<td>32 (60.4)</td>
<td>21 (9.6)</td>
<td>3.199</td>
<td>1.482-6.907</td>
</tr>
<tr>
<td>Education Background</td>
<td>Junior</td>
<td>56 (86.2)</td>
<td>9 (3.8)</td>
<td>1.000</td>
<td>Reference</td>
</tr>
<tr>
<td></td>
<td>High School</td>
<td>54 (65.9)</td>
<td>28 (4.1)</td>
<td>3.226</td>
<td>1.394-7.465</td>
</tr>
<tr>
<td>Job Status</td>
<td>Work</td>
<td>5 (83.3)</td>
<td>1 (7.7)</td>
<td>1.000</td>
<td>Reference</td>
</tr>
<tr>
<td></td>
<td>Does not Work</td>
<td>105 (73.9)</td>
<td>36 (6.1)</td>
<td>1.352</td>
<td>1.227-1.491</td>
</tr>
<tr>
<td>Marital Status</td>
<td>Married</td>
<td>43 (78.2)</td>
<td>12 (1.8)</td>
<td>1.000</td>
<td>Reference</td>
</tr>
<tr>
<td></td>
<td>Not Married/Widower/Widow</td>
<td>67 (72.8)</td>
<td>25 (7.2)</td>
<td>1.337</td>
<td>0.608-2.939</td>
</tr>
</tbody>
</table>

According to the Table 2, it can be seen there is a significant relationship between Age Group and Level of Education with ADL (p ≤ 0.05).
Respondents aged ≥ 70 years old risks 3.1 times in dependency of ADL than the respondents aged below 70 years old with p = 0.005 (95% CI: 1.482 - 6.907). The education variable shows elderly people with Elementary School background risks 3.2 times in dependency of ADL than the respondents with Junior High School background with p = 0.009 (95% CI: 1.394 - 7.465). However, Sex Variables (p = 0.976), Job Status (p = 0.331) and Marital Status (p = 0.598) no significant relationship with ADL (p > 0.05).

In Table 3 describes the relationship between characteristics of health (medical history, regular and acute medications, cognitive function, nutritional status and physical activity) and social activity (existing of the nuclear family, family support, and religious activities) with the ADL. There are seven variables that show a significant relationship with ADL (p ≤ 0.05), while regular and acute medications variable did not have a significant association with ADL. Seniors who have medical history risks by 3.6 times in dependency of ADL than the elderly with no medical history with p = 0.004 (95% CI: 1.555 - 8.331). The elderly who have damage in cognitive function risk 5.3 times in dependency of ADL than the elderly with normal cognitive function with p = 0.008 (95% CI: 1.520 - 18.401). Elderly with poor nutritional status risks 2.4 times in dependency of ADL than the elderly with good nutritional status p = 0.037 (95% CI: 1.119- 5.731). Elderly who have no nuclear family risks 2.7 times in dependency of ADL than the elderly who have one with p = 0.019 (95% CI: 1.234 - 5.646). Elderly who has no support from families risk by 2.5 times in dependency of ADL than the elderly who get family support with p = 0.032 (95% CI: 1.144 - 5.646). Elderly who are not involved in religious activity risks 2.7 times in dependency of ADL than the elderly who involve, with p = 0.041 (95% CI: 1.110 - 6.816). The elderly who lacks in physical activity risks 4.3 times in dependency of ADL than the elderly who active physical activity with p = 0.000 (95% CI: 1.922 - 9.634). However, regular and acute medications showed no relationship to dependency in ADL (p = 0.737).

Table 3. Health and social factors with ADL Independence in the Elderly in Tresna Nursing Home (PTSW) Special Region of Yogyakarta, in the year of 2017

<table>
<thead>
<tr>
<th>Variable</th>
<th>ADL</th>
<th>OR</th>
<th>Confidence Interval 95%</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Independent (n=110)</td>
<td></td>
<td>Dependent (n=37)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Medical History</td>
<td>25</td>
<td>22.7</td>
<td>7</td>
<td>18.9</td>
</tr>
</tbody>
</table>
Table 4 shows the analysis of ADL factors of Tresna Werda Nursing Home (PSTW) Special Region of Yogyakarta (DIY) in 2017.

<table>
<thead>
<tr>
<th>Variables</th>
<th>( \beta )</th>
<th>SE</th>
<th>P</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical activity</td>
<td>1.754</td>
<td>0.577</td>
<td>0.002</td>
<td>5.779</td>
<td>1.864 - 17.917</td>
</tr>
<tr>
<td>Medical history</td>
<td>2.110</td>
<td>1.058</td>
<td>0.046</td>
<td>8.246</td>
<td>1.037 - 35.566</td>
</tr>
<tr>
<td>Age</td>
<td>1.303</td>
<td>0.503</td>
<td>0.010</td>
<td>3.680</td>
<td>1.374 - 9.856</td>
</tr>
<tr>
<td>constants</td>
<td>-8.825</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The result of table 4 by using multivariate analysis showed that 88% of determined by physical activity, medical history, and age on the independence of the elderly by ADL. Seniors who did not involve in physical activity risks 5.7 times in dependency of ADL than the elderly who active physical activity with \( p = 0.0002 \) (95% CI: 1.864 - 17.917). Elderly who have a medical history risk 8.2 times in dependency of ADL \( p = 0.046 \) (95% CI: 1.037 - 35.566). Respondents were age more than 60 years was 3.6 times...
at risk of experiencing a dependency in ADL $p = 0.01$ (95% CI: 1.374 - 9.856).

**Discussion**

There is a connection between age and development status showed by their reaction to an inability to implement Activity of Daily Living (ADL). The research showed that there is a significant relationship between age group and independency on ADL ($p$-value $\leq 0.05$). This research is supported by the previous study about the risk of elderly $\geq 70$ years are 3.51 times compared more dependent than elderly aged below 60 years. The age factor indeed had a significant relationship with quality of life as well as the ADL, 60 - 70 years old elderly person has the possibility to live a good quality is greater than the elderly with more than 70 years of age.11

The condition where the person becomes older there will be decreasing of physical activity and mental changes that are shown by appearance, perception and psychomotor skills.5 There is a study reported that independence in daily activities have a positive relationship with age and ADL, while independence of physical activity is affected by age.12 Increasingly, a person's age will result in a functional decline that affects the independence of the elderly in the fulfillment of his life needs as this condition might increase the dependences of assistance by others.13 In other studies, it also obtained the result that 64.1% of elderly are independent in their daily activities due to the characteristics of the respondents are mostly aged 60-70 years (45%) where at this age the elderly are still able to tolerate daily activities that can be done alone. However, when they become older, they will need additional help from other to fulfill their daily needs.14

There is a correlation between educational level and ADL with $p$-value $\leq 0.05$. Most of the respondents in this study are not completed primary school. This condition affects the poor understanding of the health-related information informed by health professionals or other information media. This would undermine the ability of the elderly to perform self-care and adherence to health interventions that must be endured, and interfere access to health services because of the relationship with low education. There is a significant relationship between education and independence in ADL with $p < 0.05$. The results are consistent with former studies that prove that there is relationship between the level of education and independence of the ADL.15,16

Medical history in this study conducted by giving questions through interviews and medical records in Tresna
Werdha Nursing Home (PSTW). The results showed that a history of illness associated with independence in ADL (p-value ≤ 0.05). Quality of life and independence of a person with a chronic illness is the perception of well-being in the field of psychological, social, physical and environmental relationship. Similarly, other studies prove that the history of the disease related to independence in ADL. In this study, the questions related to the illness or experienced by the respondent and the disease diagnosed by health professionals during the past 12 months had a history of (the disease or more) is 53.7%. This condition will affect the physical abilities of elderly in the activities of daily life. This health condition is obtained based on the usual complaints of elderly perceived by the respondents. The study found that the majority of respondent (53.7%) that recorded by medical staff on having a medical history for the last 12 months, and particularly having a disease, could affects physical ability on their daily activity. The most common complaints perceived by respondents includes: vision disturbances (78.8%), pain in the joints and hips (70%), back pain or waist pain (67.8%), fatigue (66.6%), feeling cold and tingling in the limbs (57.7%), insomnia (52.2%). In another study, also showed significant effect on the independent by health factor of elderly (p <0.05). In the independent group, the majority respondents have a good health condition (86.8%) while the dependent group (13.2%) has a poor health condition. Respondents who have good health are be able to perform without seeking the help of others. Similarly to other studies that support this research states that the incidence of stroke significantly influences the independence of ADL.

To support immediate medical treatment, the polyclinic that located in Tresna Werdha Nursing Home (PSTW) are open every day and has 24-hour service. Elderly with good health status showed when they can perform any activity in daily life such as taking care of themselves, work and recreation. Independence for the elderly can be seen from the quality of healthcare that could do ADL by themselves. The cognitive function associated with independence in ADL (p-value ≤ 0.05) that is in line with other studies that revealed an increasing risk of declining cognitive function are effects to independence of ADL. The changes in cognitive function occured in the elderly are inability to improve intellectual function, reduced efficiency of nerve transmission in the brain (causing a slow update process and a lot of information is lost during transmission),
reduced ability to accumulate new information and retrieve information from memory, and the ability to remember past events better than the ability to remember recent events. The overall decline in the function of the central nervous system is believed to be a major contributor to negative changes in cognitive ability in information processing. Processes of changing the anatomy and physiology of the central nervous system will undergo many changes in the elderly aged more than 75 years. This has an impact on the ability of the elderly to the transformation of cognitive function and memory it has.

In this study, the nutritional status is done by measuring the weight and height of the elderly, then calculated the Body Mass Index (BMI). Anthropometry has a correlation with various measures of body dimension and composition from various level of age and nutrition. Anthropometry is very commonly used to measure the nutritional status of the various imbalance between the intake of protein and energy. This imbalance effect is usually seen from the pattern of physical growth and proportion of body tissues, such as fat, muscle, and the amount of water in body.

The provision of food is usually given 3 times for meals, and 2 times for snack in daily. This study shows that the results the relation between nutritional status and independence of ADL (p-value ≤ 0.05). Results of other studies also show that there is a significant association between nutritional status and independence of elderly ADL. Elderly with over nutritional status (overweight) potentially 4.75 times against the significant risk of dependence in ADL (p-value = 0.025; 95% CI: 1.22 to 18.51). And the elderly with poor nutrition (underweight) also has significantly affect to the dependency in ADL (p-value = 0.188; 95% CI: 0.76 to 3.99).

Family support is associated with independence in ADL (p-value ≤ 0.05). Based on former research, it proves that there is a significant relationship between family support to the independence of the elderly (p <0.05). In another study also explains that for the elderly, the family is a source of satisfaction. Generally, they want to stay in the middle of the family, they do not want to stay at the center of the nursing home. In order to meet the needs of family support, Tresna Werdha Nursing Home (PSTW) provide a time for the family to visit every day and this condition is not interfering daily activities of the elderly.

Religious activities are related to the independence in ADL where religious activities at elderly houses performed two times in a week both for Muslims and non-Muslims and resulted in a significant
relationship (p-value ≤ 0.05). Similarly, the results of studies that prove that the social conditions relating to the independence of the elderly. However, the elderly who not participating in religious activities this activity is significantly at risk about 6.54 times of dependency in ADL compared to the elderly who participated (p-value = 0.025; 95% CI: 1.26 to 33.99).²⁸

In this study, physical activity resulted in the association between physical activity and independence in ADL (p-value ≤ 0.05). According to the research that has been done, the elderly who do physical activity have the state in all activities in meeting the daily life conducted entirely independently and without the need of aid. However, the mobility of dependent elderly will make the elderly are not independent in the conduct their activities. Results of other studies have also proved that physical activity is linked to independence in ADL (p-value = 0.001).²⁹ The elderly who do not do physical activity (mild physical activity) significantly 3.89 times at risk to be dependent in ADL compared to the elderly who usually do physical activity (p-value = 0.001; 95% CI: 2.03 - 7.39)²⁸. In contrast to other studies that prove that exercise (mild physical activity) is not related to the independence of the elderly. Physical activity is essential for health, but there are physical limitations due to age and changes, and also a decrease in physiological functions. Those conditions may result in a disruption during the event to meet their daily needs, hence it can cause dependency in activities of daily life (ADL).²⁶ There is a daily activity that holds in Tresna Werdha Nursing Home (PSTW) namely gymnastics elderly for all member in every morning at 08:00 to 9:00 AM.

**Conclusion**

The percentage of elderly in Tresna Werdha Nursing Home (PTSW) who independent in ADL is 74.8% while the elderly who have dependence is 25.2%. Characteristics of the age group, education level, medical history, cognitive function, nutritional status, the existing of the nuclear family, family support religious activity and physical activity showed there is a significant association with the dependency of ADL (p ≤ 0.05). Independency deciding factor in the ADL in Tresna Werdha Nursing Home (PSTW) Special Region of Yogyakarta (DIY) are a physical activity, medical history, and age group.

**Conflict of Interest**

None declared.
References


16. Pinto AH et al. 2015. Functional capacity to perform activities of daily


