Age, Intellectual Functions and Activity Contributions to Elderly Nutritional Status

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| **Article Info** |  | **ABSTRACT** |
| ***Article history:***  Received Jun 12th, 201x  Revised Aug 20th, 201x  Accepted Aug 26th, 201x |  | Everyone has a need for life, the elderly have the same needs in order to live prosperous. Elderly needs include nutritious meals, health screening, decent living, social needs in their intellectual functions health conditions. In order to support the nutritional needs of good intelectula function condition, it can conduct a day activity and not depend on family or others. Objectives of knowing how much contribution to age, intellectual functions and activity to elderly nutritional status. Method This type of research is quantitative with a cross sectional approach, determination of sampling with purposive random sampling, 70 respondents. Self-reliance level assessments use the Activity of Daily Living. Its intellectual functions uses Short Portable Mental Status Quesioner and nutritional status with the Body Mass Index. Data analysis using Path Analysis with linear regression rate of significance is 0,05. The results of contributions to the age, intellectual functions and simultaneous activities that directly affect the nutritional status of R2square = 0.821 = 0.674 or 67% while the remaining 33% are contributed from other variables. The amount of simultaneous age and intellectual functions contributions that directly affect elderly activities is R2 square = 0.0327 or 3.27%, the remaining 96.73% is influenced by other factors. Conclusion. Indirect contributions of age through activity to the status of elderly nutrition and there is direct contribution of elderly intellectual functions condition through activity to the status of elderly nutrition. |
| ***Keyword:***  Age  Intellectual  Activity  Nutritional  Status |
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1. **INTRODUCTION**

Living creatures need food to defend their lives, because there are nutrients in the food that the body needs to perform metabolism activities. Fulfilling the nutritional needs for the elderly who are well-administered can help the process of adapting or adjusting to the changes they have, in addition it can replace the body cells to extend the age. Elderly have the same necessities of life in order to live prosperous, the needs of the elderly include nutritious eating needs, health screening, decent housing, social welfare needs in a healthy intellectual functios condition.

The number of elderly in Indonesia in 2019 based on data from BPS is 25.66 million (9.60%) A distributed young elderly (60-69 years) 63.82%, senior elderly 70-79 (27.68%) and elderly Seniors 80 + (8.50%) [1] . There are 9.6% elderly in Indondonesia. The elderly dependence ratio of the productive population (15-59) increased to 15.01%. In 2019, the elderly percentage reached 9.6% or about 25.64 million, this condition indicates that Indonesia is transitioning to the age-aging Kea, because the percentage of population aged in 60 daiats reach 7% [1]

Increasing age, physiological function has decreased due to the aging process so that the disease is not contagious often occurs in the elderly the main problem in the elderly is only associated with neurological diseases is a decrease in mental function. Memory impairment, changes in perception, communication, loss of focus and attention, barriers in carrying out daily assignments are symptoms of mental disorders [2] . The decline of mental function further affects the pattern of their interactions with the environment of residence, family members, also the pattern of social activity [3]

Health problems that often occur in the elderly are different from adults, called geriatric syndrome, which is a collection of symptoms that are about health and complained of by the elderly one of them is intellectual function. Dementia is a disorder of intellectual function and memory acquired caused by diseases of the brain, which is not related to impaired levels of consciousness, thereby affecting the work and social activities meaningfully. Dementia is not only a problem in memory. Dementia includes reduced ability to know, think, save or recall past experiences and also loss of touch patterns, patients become a taste, and disruption of activity [4] .

Physical activity is the movement of body members that leads to the energy expenditure that is important for the maintenance of physical and mental health and maintains the quality of life to stay healthy and fit every day, but due to physical limitations possessed by age and changes in physiological function, eating elderly requires some adjustments in conducting daily physical activity. This physical activity affects elderly independence, one of which prepares their food needs. The level of elderly independence in fulfilling its daily needs is one of the factors that can affect the status of elderly nutrition. Increased reliability is caused by physical, psychological and social decline [5] . The decline experienced by the elderly resulted in disruptions in fulfilling the daily needs that could increase the help of others.

The results of the census data conducted by the BPS RI in measuring the elderly independence is obtained data that the ratio of elderly people to show that each year increased, year 2012 of 11.90 means that every 100 oarng productive should bear 12 olderly [2] . The assessment of independence in conducting daily activities is necessary to learn the level of further age to establish a life relief effort for the elderly and to conduct long-term care planning [6]

The level of elderly independence using the Kartz index in hospital Karyadi Semarang pointed out that 17.91% have independence in all categories are assessed. This research shows that the level of elderly independence in every aspect assessed is still very low [7] . One of the risk factors of impaired nutritional needs in the elderly is dependence, whether it is family reliability, as well as care personnel, this condition is caused by decreased body function, muscle weakness and mobility ability that affects the status of elderly nutrients. The determination of elderly nutritional status is required by the Body's Mass Index (BMI) through measuring body height and weight.

Jelok Village, Cepogo Boyolali in 2019 with a population of about 4 million people, consisting of 4 RW, the location of research in RW I Dusun Sidosari with an elderly population of about 87 people. The elderly lives in Jelok with various activities such as farmers, merchants and entrepreneurs. The caller aims to know the large and indirect contributions of causal relationships between age, gender, mental status of elderly activities and their impact on elderly nutritional status.

1. **RESEARCH METHOD**

This type of research is quantitative with a cross sectional approach. Data collection using questionnaire that has been conducted validity test with Perason Product Moment and reliability by using Cronbach Alpha formula. Popuasi is the whole elderly in Sidosari Hamlet Jelok Village, Cepogo, Boyolali with an elderly population of 87. Sampling techniques using simple random sampling, i.e. sampling techniques using the formula Slovin obtained 70 respondents based on subjective and practical criteria or consideration, the elderly can provide information and cooperative in answering questions. Sample Inclusion Kreteria is an elderly age > 60 years old, willing to be a respondent, can be a complement and cooperative. The independent variables of this study are age, intellectual function and day-to-night activities, while the dependencies variable is elderly nutritional status. The elderly self-reliance rate assessment is measured using the Activity of Daily Living (ADL) index with independent categories, partial and dependent dependence [8] , intellectual function uses Short Portable Mental Status Quesioner (SPMSQ) with an intellectual function category, minor, moderate and severe damages [9] and measurement of nutritional Status assessed by the Body Mass Index (BMI) with the category of good nutrition, insufficient and less. Data analysis using the path analysis technique to test the amount of direct or indirect contributions manifested by the line coefficient on each diagrampath of the causal relationship between the X1 and X2 variables against the Y and its impact on X. With linear regression with a significance rate of 5%.

1. **RESULTS AND ANALYSIS**

Based on the results of the study conducted in December 2019 SD February 2020 in get the number of elderly in Sidosari village, Jelok, Cepogo Boyolali in RW I, 87 people, who fulfill the inclusion criteria in this study amounted to 70 people.

**3.1. Characteristics of respondents**

The following table illustrates characteristics of respondents

Table 1. Respondent's characteristic message

|  |  |  |
| --- | --- | --- |
| **Age** | **f** | **%** |
| 60-69 | 44 | 62.86 |
| 70-79 | 24 | 34.29 |
| >80 | 2 | 2.86 |
| **Gender** |  |  |
| Male | 36 | 51.43 |
| Female | 34 | 48.57 |
| **Activity** | |  |
| Depending of total | 8 | 11.43 |
| Depends partly | 28 | 40.00 |
| Selft | 34 | 48.57 |
| **Intellectual functions** |  |  |
| Severe demage | 0 | 0 |
| Moderate demages | 22 | 31.43 |
| Minor demages | 34 | 48.57 |
| Complete intelctual function | 14 | 20 |
| **Nutritional status** |  |  |
| Less | 8 | 11.43 |
| Enough | 28 | 40.00 |
| Good | 34 | 48.57 |
| **Total** | **70** | **100** |

In table 1 It is seen that most of the elderly in Jelok village is 60-69 years old with a percentage of 62.86%, male gender 36 people 51.43%. The level of elderly self-reliance on daily activities with total dependence amounting to 8 people 11.43%, the category depends partly and independently has a difference that is not too large, which is 28 people with a portion dependent 40%, while the self has a greater amount than that depends partly 34 people 48.57%. Elderly intellectual functions in the category of mild damage amounted to 34 people with a percentage of 48.57% and the lowest with a damage status of 22 people 31.43%. The message of the elderly nutritional status amounted to 34 people 48.57% with good nutritional status, the status of nutrition is enough with the amount of 28 people 40% and nutritional status of less 8 people 11.43%.

**3.2** **Result Path Analysis**

In order to test the amount of direct or indirect contributions manifested by the line coefficient on each track diagram of the causal relationship between the age variable, intellectual function to activity and its impact on elderly nutritional status using Path Analysis.

Table 2 Regression Model I

Age, intellectual function and activity affect nutritional status

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | |
| R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .906a | .821 | .810 | .307 | .821 | 74.343 | 4 | 65 | .000 |
| a. Predictors: (Constant), Age, intellectual function, activity | | | | | | | | | |
| b. Dependent Variable: nutritional status | | | | | | | | | |

The regression results of Model I in the table 2 age, intellectual functions and activity significant effect on nutritional status. The magnitude of the value of R square contained in table 2 is 0.821 This indicates that the contribution or donation of the influence of age, intellectual functions and activity on the nutritional status of 82.1%, while the remaining 17.9% is the contribution of other variables not included in this study

Table 3. Analysis Path Test Result

Age, intellectual function and activity affect nutritional status

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | -.112 | .266 |  | -.420 | .676 |
| Age | .002 | .071 | .002 | .029 | .977 |
| Intellectual function | .134 | .060 | .136 | 2.222 | .030 |
| Activity | .858 | .059 | .841 | 14.494 | .000 |
| a. Dependent Variable: nutritional status | | | | | | |

Out put regression model I on the Table 3 section. It can be known that the significance value in the age variable = 0977 > of 0.05, the result is a winning that the age has no effect on the nutritional status, while intellectual function Vareabel = 0.001 and the activity of < 0.05, these results indicate that intellectual functions and activity are influential on the nutritional status.

Table 4. Regression Model II

Age, intellectual function and activity

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | |
| R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .426a | .181 | .144 | .638 | .181 | 4.872 | 3 | 66 | .004 |
| a. Predictors: (Constant), Age, intellectual function | | | | | | | | | |
| b. Dependent Variable: Activity | | | | | | | | | |

Model II regression results, namely age and mental status have significant effect on elderly activities. The size of the R square in table 4 is 0,181 indicates that the contribution or donation of age and mental influence on the activity is 18,1%, while the remaining 81,9% is the contribution of other variables not included in the study.

Table 5. Analysis Path Test Result

Age and intellectual function of elderly activities

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | 1.499 | .522 |  | 2.869 | .006 |
| Age | -.058 | .148 | -.047 | -.389 | .699 |
| Intellectual function | .388 | .116 | .401 | 3.340 | .001 |
| a. Dependent Variable: Aktivitas | | | | | | |

Out put regression model II in the Table 5 section can be known that the significance value in the age variable = 0699 > 0.05, the result is winning that the age has no effect on the activity, while the intellectual functions = 0.001 < of 0.05, this result indicates that intellectual functions affects the activity.

**X1**

**Age**

**X2 Intellectual function**

**Y**

**Aktivity**

**Z**

**Nutritional**

**status**

Pzx2 =0,136

Pzx1 =0,002

Pyx2 =0,401

Pyx2 = -,0,047

R 2Square =0,821

Pz =0,179

Py =0,819

Figure 1. The pathway of causal relationship impiris age, intellectual function and activity to nutritional status

**3.3. Age contributions through activity to nutritional status**

Results of age impact analysis through activity to nutritional status in tabel 3 and Figure 1. It is known that the effect of the age given to the nutritional status of 0.002, while the indirect influence of the age through activity to the nutritional status is -0.047 x 0.841 = -0.039. Hence the total influence given age to nutritional status is 0.002 + (-0039) =-0037. Based on the results of the calculation above the direct influence of 0.002 >-0.039 indirect influence, this result indicates that indirectly the age through activity has no significant (negative) effect on nutritional status. The condition is likely due to the elderly that the majority of men aged 60-69 years 62.86% and have a certain disease, the work of the majority of peasants who do not pay attention to nutritional intake and knowledge of poor nutrition.

In table 3 shows the contribution of age to the status of nutrition indirectly affects the nutritional status of 0.0022 = 0.000004 = 0.0004%, very small of age affects the nutritional status of elderly. In table 5 age contributions that do not directly affect activity amounting to-0.0472 =-0.0022 =-0.220%

The results were not in line with Ibrahim's research stating that age also has an effect on nutritional status [10] . It is theoretically mentioned that increasing age will cause the elderly to undergo changes in body organs that affect the disturbance of organ function and decrease in deficiency so that lean body mass decreases progressively. People who are 70 years old, nutritional needs are the same as they are 50 years old, but their appetite tends to decline and there is more activity to make appetite decline. Therefore, the nutritional needs of Mencukui is very important for elderly through the empowerment of consumption of full nutrition [11] .

In everyday life, human beings cannot be avoided from the aging process. In the elderly, there is a decline in brain function, resulting in decreased short-term recall, slowing down the ability to receive information, difficulty in knowing the objects, and doing daily activities called amnesia or senile. Age 45-78 years old has decreased and the difference between male and female, activity and muscle function. Muscle strength in the age of elderly will reduce the power of muscles because if excessive activity, it will be at risk of disability. With age Semakian increase, activities are also increasingly reduced. The high prevalence of falls in older people becomes a consequence of their diminished muscular strength [12] .

Increasing age, the elderly usually experience a decline in mental functioning. Starting from memory, mind acuity, until the ability to manage emotions can be interrupted. Especially if you've always worked all day before taking retirement. A brain that is not sharpened every day will rapidly decline its function. Physical activity is a way to train a healthy brain. When performing physical moves and activities, brain nerves will work and build healthy new cells to replace damaged or dead cells.

**3.4. Intellectual functions contributions through activity to elderly nutritional status**

Analysis of mental influence through activity on the nutritional status in table 3 ang figure 1 of known direct influence given mentally to the nutritional status of 0.136, while indirect influence of gender through activity to nutritional status is 0.401 x 0.841 = 0.337 Hence the total influence given age to nutritional status is 0.136 + 0.337 = 0.473. Based on the results of the above calculations that the direct influence value is 0.136 and the indirect effect of 0.473 which means that the value of indirect influence is greater than the value of direct influence, these results indicate that indirectly the gender through activity has a significant influence on nutritional status.

In table 3 The contribution of intellectual function directly affects the nutritional status of 0.1362 = 0.018 or 1.8%. This indicates that the intellectual function has an effect on nutritional status, the better the intellectual function and the better the nutritional status. In table 5 The contribution of intellectual function directly affects the activity of 0.4012 = 0.16 or 16%

Intellectual impairment is a collection of symptoms of the clinic consisting of impaired intellectual function and considerable memory that is adapted to cause disruption of daily life activities. This condition is rapidly increasing at the age of 60 to 85 years or older, which is less than 5% of seniors aged 60-74 years experience dementia while the age after 85 of the incident was increased close to 50%. The thing that can cause interlektual disorders is depression so it needs to be distinguished by other intellectual disorders [13] . Elderly mental conditions are often shown depressive symptoms. Symptoms of depression arising from the illness suffered by the elderly. Depression in the elderly is often not well diagnosed due to organic symptoms. Unhandled depression can reduce appetite, a passion for activity and can lower immunity of the body.

In line with Xiaolai's research stating that, the mental health of the older person significantly affects the nutritional needs, this is because in some aspects. First, when they have a high satisfaction status with life, social capital is correlated with better mental health. Secondly, consuming eating alone is associated with mental problems, such as depression, eating together which is beneficial for the mental health of older adults. Thirdly, as mentioned above, regular eating habits may reduce the incidence of mental illness, so that the feeding status is associated with a mental ststus [14] .

The decline of intellectual function can be a forgetfulness of the most mild form of mental disorders, this disorder is estimated to be complained of 39% elderly aged 50-59 years, increased to more than 85% at the age of more than 80 years. Various psychological factors affecting the nutritional status of parents. The depression is increasingly known as a major health problem for elderly people, as a result of their depression, people may become incapable of conducting physical activity, including cooking and eating, and the appetite may change. Depression in the elderly is associated with chronic disease risk factors, including obesity [15]

This research is also reinforced by the opinion of Garibella which is said that patients with impaired muscle mass treated with 6 months of diving will experience a problem of intellectual function and effect on the nutritional status with P. < 0.05 (16). It is also with the research of Gracia stating that the nutritional strategies for cognitive enhancing by noting existing dietary components, because with adequate nutritional needs needed to optimize brain function and prevent cognitive decline [17]

Wang identified three trajectory of nutritional status: malnutrition (15.4%), at risk for nutritional deficiencies (38.9%), and nutrition (45.7%). In contrast, mental changes followed four linear trajectories but differed: moderately disturbed (12.2%), somewhat disturbed (27.8%), impaired boundary (21.8%), and mentally intact (38.2%). Nutritional Status is significantly indifferent to mental functions, for example, relative to malnourished patients, patients who have nutrients well 95% less likely (or = 0.05, CI = 0.01-0.24) to experience a fairly mental disorder [18] .

In table 1 The intellectual function showed most of the respondents suffered mild damage amounting to 34 people with a percentage of 48.57%. Mild cognitive impairment into clinical diagnosis based on the results of neurological examinations, screening of mental status screening, and secondary testing. Causes of mild cognitive impairment include degenerative and vascular processes, psychology, and disease factors requiring long-term care [19] .

Unlike the research conducted by Dema This research indicates there is no relationship between the IMT and mental function (P = 0,217). Not found a meaningful relationship to this research is caused, in the BMI measurement there is a possibility of less yield accuracy, because one of the physiological that occurs in the elderly is the depreciation of the Invertebralis discs that causes a high decrease in body [20] .

**3.5. Contributions to elderly nutritional status**

In table 3. The contribution of activity directly affects the nutritional status of 0.8412 = 0.707 or 70.7% of physical activity for the elderly should be adjusted to the conditions and physical abilities of each. WHO advocates that every elderly is expected to meet the physical needs of another 150 minutes of moderate-intensity physical activity or 75 minutes of heavy-intensity physical activity during the week. Every physical activity, make sure the duration lasts for at least 10 minutes if you are familiar with the minimum recommendation, get used to moderate physical activity for 300 minutes or heavy physical activity for 150 minutes a week. Elderly who have a problem of body coordination should do a balance exercise at least 3 times a week muscle exercises should be done at least 2 times a week [12] .

**3.6. Age contributions, intellectual function and activity to elderly nutritional status**

The contribution of age, intellectual function and activity simultaneously directly affects the nutritional status of R2square = 0.821 = 0.674 or 67% while the remaining 33% are contributions from other variables not included in this study

The elderly who have a high level of self-reliance are the elderly who are physically well-primed, the high level of elderly self-reliance has been accustomed to completing the work in the household related to fulfillment. The results are in line with Alfianita's research that states the relationship of self-reliance and nutritional status, obtained the value of P is 0.015 (p < 0.05) means there is a meaningful relationship between the level of independence in conducting daily life activities (ADL) with the status of elderly nutrition daily necessities [21] . The level of self-reliance in conducting daily life activities (ADL) is one of the factors affecting the status of advanced nutrition, both dependence on eating (bribing food and preparing food) and dependence in mobility. Dependence on the elderly both family and care officers is one of the risk factors of nutritional disorders in the elderly [22] .

The results were the same as the results of the research conducted by the electricity which stated that the hypothesis proved to have a significant relationship between nutritional status with the ability level of Activity of Daily Living (ADL) at the elderly in Paremono Hamlet, Magelang, year 2010 (τ = 0.561; pvalue = 0.01) [23]

Changes in advanced body composition such as: increased body fat, decreased Lean Body Mass (LBM) and decreased bone mass will increase the risk of disease in the elderly (multipathology). Socio-economic changes that occur in the elderly will also affect the number of elderly dependence on productive age. Both of the above will affect the access to food and the level of intake that depends on the individual treating the usila. This will later affect the nutritional status of the elderly [24] . Sleep, eating, bathing and dressing, leisure activities, and light activities are the 5 most activities performed by the elderly. Next followed by walking, activities carried out by sitting, sweeping, washing clothes and plates without machines, and doing housework. This suggests that most habits of the elderly daily activities are less active. If the physical activity is seen, the distribution of samples with the most mild activity on the status of excess nutrients (92.7%) [25] .

The results were also in line with the study conducted by Scharader stating that the ability to conduct daily life activities (ADL) decreased with the declining status of nutrition. The proportion of patients who are unable to do TUG increases with the worsening of nutritional status (45.0% vs 50.4% vs. 77.0%, P. < 0.01) [26] .

Unlike the results of the study conducted by Lores Casanova stating that no significant relationship was observed between physical activity and nutritional status [27] .

Problems encountered in the elderly are lack of appetite, imperfect digestive processes, difficult bowel movements, and food utilization as an energy source. With this problem-oriented, can be designed a physical exercise that aims to increase appetite (input), facilitate the digestion and bowel processes (processes), and streamline the utilization of energy in the body (out put). As great as any nutrient composition is provided, if not eaten, processed, and utilized by the body, then it is not able to give results.

After the elderly, most elderly reduce their physical activity, because stamina has decreased, have a certain health condition or because of the absence of opportunity. In fact, the elderly should be moving and physical activities every day, with the activity of bias preventing health problems as well as keeping the body in prime condition. Such as consuming supplements, vitamins or consuming eating and healthy drinks, physical activity is also able to prevent various diseases.

There are many different types of sports or physical activities for the elderly that can be tailored to the needs. For medium intensity, for example, close-up walking, house cleaning, leisurely cycling, stair climbing, and gardening. Meanwhile, heavy activities include swimming, Tai chi, yoga, jogging, fast walking, carrying children, to badminton [28] .

**3.2.4.Contributions to age and intellectual function of activity**

The magnitude of the simultaneous age and mental contributions that have been on the basis of the elderly activity is R2 square = 0.0327 or 3.27%, the remainder of which is 96.73% influenced by other factors.

The results were in line with the research result of Emile stating that the elderly with Deminsia suffered a mental breakdown of 12 – 50% of the conditions it affects in fulfilling its nutritional status and having difficulties in conducting daily activities [29] .

1. **CONCLUSION**

There is no direct influence on the age of activity and its impact on nutritional status. There is a direct influence on the intellectual function of activity and its impact on nutritional status. The amount of indirect age of contribution to nutritional status is 0.0004%. Contributions that do not directly affect the activity of-0.220%. Contribution of intellectual function directly to the nutritional status of 1.8%. The contribution of intellectual function directly affects the activity by 16%, the rest is influenced by other factors not described in this study. It is hoped that the research can continue with any contribution that can affect the nutritional status of the elderly.

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