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Occupational History as a Predictor of Cognitive Ability in the Elderly

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Abstract

Cognitive ability is important for the elderly to be able to live independently. Many factors influence this ability in elderly, one of them being occupational history. The purpose of this study was to analyze occupational history as a cause of decreased cognitive ability. An observational analytic study with a cross-sectional approach. 87 subjects who met the inclusion criteria were recruited from Nursing Homes in Surabaya. 71.3% of the subjects have a history of physical-dominated occupation and 28.7% have intelectual-dominated occupation. There were no differences regarding duration of work and perception of workload in both groups. The average cognitive score is 18.57 (SD 5.939). The ANOVA test between occupational history and cognitive abilities shows p=0.001, R Square=0.172, and estimated standard of error of 5.501. This study concluded that occupational history can be used as a predictor of cognitive ability in elderly.

Keywords: *Cognitive ability, Elderly, MoCA-Ina, Nursing homes, Occupational history.*

Introduction

Health development success in Indonesia has an impact on the increasing number of elderly people. The National Socioeconomic Survey reported that the total number of elderly had reached 22,4 millions in 2016 (equal to 8,695 of the total population). This is indeed an achievement, but along with it are the consequences that arise.[1] Health development effort for eldery has been focused on making them live independently and productive.[2] Better cognitive ability is believed to increase the ability of the elderly to do their daily activities, which in turn can increase their quality of life.[3] Productive is to remain and work to produce something, including living income.

Being old is a normal process, butthe problems with cognitive ability and body strength is the focus on elderly because they can impair information processing in the brain that eventually can affect an individual's social function, work, and daily activities.[4]

There are many risk factors of cognitive ability decline that have been well studied including that of age, gender, race and genetic. Other risk factors associated with lifestyle and diseases were also studied frequently such as hypertension, cardiovascular disease, obesity, diabetes, hyperlipidemia, alcoholism, smoking cigarettes, bad dietary habit, lack of B6, B12, and folic acid and also history of trauma.[5] But occupational history as a risk factor for cognitive impairment is still unclear.

Occupation is a set of activities that takes up most of an individual's time. According to Indonesian Ministry of Manpower, there are 10 categories of occupation.[6] When those ten are categorised based on cognitive function, there are two types of occupation: intelectual-dominated and physical-dominated occupation. The former stimulates the cognitive more than the latter does.

'Use it or lose it' is one of aging theories that is widely used in explaining the brain function. This theory stresses on the neurogenesis of the brain cells: the more they are used, the more developed it would be in terms of information processing.[7] On the contrary, 'wear and tear' theory argues that part of the body which is used repeteadly over time would be more likely to wear out sooner.[8] Based on those two theories, this study aims to find out whether occupational history (occupation category, length of working time and perception of workload) influences the cognitive ability.

Methodology

An analytic observational study using cross-sectional approach. This study was conducted from January to May 2018 at four different nursing homes at surabaya. Using purposive sampling technique and obtained 87 respondents. Respondents over 60 years old and could communicate well as inclusion criteria. Respondents excluded are those who had undergone brain surgery, history of brain injury, parkinson, epilepsy, stroke, hypertension, diabetes, depression, and had a history of a long-term psychotropic drugs use.

The data was collected by interviewing subject using a questionnaire. Cognitive ability was measured using MoCA-Ina.The operational definition of occupational history in this study is a set of activities within a profession on which the respondents spent most of their time for a minimum of five consecutive years. This research is part of the research that has received ethical clearance.

Result

Subject Characteristics

Most of the subject were in the age range of 75-90 years (49 out of 87)whilethere were only 2 who age more than 90 years. The rest of subjects were in the age range of 60-74. Subject were dominated by female, yielding a total of 57 people. This study found that most of the subjects did not finish high school, thus their education level categorised as low (n=52). Only 4 subject who have bachelor degree.

Occupational History: The description of occupation category is depicted in the diagram below:

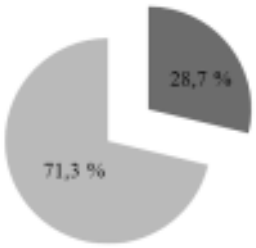

Figure 1. The Subjects Occupational History

Figure 1 showed that most of the subjects had a history of physical-dominated occupation (n=62) whereas fewer of them had an intellectual-dominated occupation (n=25).This study found that the average duration of the physical-dominated work categoryis 20,66 years (SD=10,38) and 18,24 years for the intellectual-dominated work category (SD=8,28). The statistical test showed no significant difference between the two categories ($p=.407$).

Similarly, no difference was found regarding the workload perception between the physical-dominated work group and intellectual-dominated group. 74,2% of the former group perceived their workload as 'moderate' and80,0% of the latter also perceived their workload as 'moderate'.

Table 1. Perception of Workload

Perception of Workload	Intelectual-dominated		Physical-dominated		P=
	n	%	n	%	
Easy	6	9,7	4	16,0	
Moderate	46	74,2	20	80,0	.114
Hard	10	16,1	1	4,0	

The tabel showed no difference on the perception of workload in both groups.

Cognitive Function: The data showed that cognitive function of 73 subject was impaired, indicated that only 14 of them had normal cognitive function.The average score for cognitive function is 18.57 (SD=5,939). Based on each cognitive domain, it was indicated that most of the subjects suffered an impairment of visuoconstruction (n=78), language (n=71) and memory (n=71). The data for each domain is elaborated as follows:

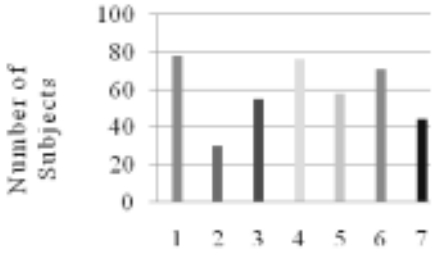

Figure 2. Percentage of Each Domain for Cognitive Function: (1) Visuoconstruction, (2) Naming, (3) Attention, (4) Language, (5) Abstract Thinking, (6) Memory, (7) Orientation

Analysis: The percentage of subjects whose normal cognitive function was higher in the intelectual-dominated work compared to the physical-dominated work. The result duration of work showed no difference between the groups. The percentage of subjects whose

impaired cognitive is range from 73,3%-86,7% in all category of work length.

Regarding the perception of workload, it appeared that the more the subjects perceive their work as 'hard', the more likely it is for their cognitive function to diminish.Despite this, data showed that even when the subjects perceive their work as 'easy', the percentage of those who had impairment of cognitive had already reached 80,0%. The details are shown below:

Table 2. Analysis Between Occupational History and CognitiveFunction

Occupational History	Cognitive Function		p=
	Impaired (%)	Normal (%)	
Occupation Category			**.000**
Physical-dominated	93,5	6,5	
Intelectual-dominated	60,0	40,0	
Duration of Work			**.069**
≤10 years	85,0	15,0	
11-20 years	86,5	13,5	
21-30 years	73,3	26,7	
>30years	86,7	13,3	
Perception of Workload			**.824**
Easy	80,0	20,0	
Moderate	83,3	16,7	
Hard	90,9	9,1	

Spearman test showed that there is a positive, strong correlation between occupation category and cognitive function (*p=.001; Coef. Corelation 0.383***). No specific correlation was found between occupational history with duration of work and perception of workload, respectively.

Regression test resulted in *R Square* of 172, with estimated standard error of 501. This estimation score is smaller than the standard deviation of cognitive function (SD=5,939),. Therefore, this regression model is an appropriate predictor for cognitive function among the subjects.Anova test produced *p=.001*,which means that occupational history is predictive for cognitive function in this study.However, the *p* value for both duration of work and perceptions of workload are not significant.

Discussion

The most of the subject were female with low education level. This finding is in line with what Boedhi-Darmojo stated in his book which argued that elderly population in Indonesia is dominated by female with 3:1 ratio to men and that their education level is low.[9] This number can be caused the life expectancy of female which is higher than that of male.

Households in Indonesia tend to put their elderly who have physical or psychological limitation into a nursing home. This might explain why in this study, more than half of the subjects age more than 75 years. Eastern families actually have had a long-running culture where their parents or grandparents live together in a house. However, this culture seems to shift nowadays since every adult in the family has to work for their living. Thus, no one left in the house to care for the elderly.[9,10]

There are more subject in this study whose occupational history was physical-dominated than those whose occupation is intellectual-dominated with a ratio of 2,5:1. This might be related with the education level. Physical-dominated work, as the name implies, means that physical work is employed more than the intellectual skill. This category of occupation includes salesman, worker of farm, forestry and fishery, handicraft maker, handyman, army and police. Intellectual-dominated work implies that intellectual skill is utilised more than the physical skill. This category includes professionals, professional assistants, manager, technician, administration worker, tool operator, and engine assembler.[6] Considering the economic condition back when the subject were on their productive years, it is understandable that most of them chose the physical work. This type of work was easier to get since it did not require high level of education.

Research by Won in Gyeonggi-do, Korea, showed that 86,4% of elderly suffered from cognitive impairment. Won's finding is similar with the result of this study which showed that 83,9% of the subject had cognitive impairment.[11] He said that the incidence of cognitive impairment increases as the elderly gets older as well as among elderly who have low education level and low income.[11] Sundariyati's research also found that the prevalence of cognitive problemswas the highest in the 75-90 age range and those who did not accomplish elementary school.[12] Similarly, Karp showed that elderly had a history of occupation with low complexity are more prone to dementia.[13]

High prevalence of cognitive impairment in this study can be explained that human body will experience organ function decline by 1% each year starting from

30 years of age. After an individual reaches the age of 30, 100.000 neuron is estimated to decay each year, gyrus shrinks, and brain mass decreases by ≥10%. Furthermore, lipofuscin deposit increases from the brain fatigue, dendrites of neuron slowly decrease, neurons' RNA vanish along with mitochondria and cytoplasm, inclusion of dialin eosinophil and levy body increase, corpora amylacea forms within brain tissue, and blood supply for the brain decreases.[14] This condition is a decrease in physiological brain organs.

In this study, the highest prevalence of cognitive problems was visuospatial domain, language, and memory. One of diagnostic criteria for Mild Cognitive Impairment is the presence of memory deficit. Therefore, memory is considered as the first cognitive function to impair in a physiologic process of brain ageing. Memory function of 75 years old individual is believed to decrease by 25% comparedto someone who ages 20. In elderly, type of memory which deteriorates is short-term memory, whereas long-term memory tends to stay intact or mildly declines.[15]

The association of Indonesian's neurologists (PERDOSSI) in their book 'Neurobehavior' explained about clinical condition in a frontal circuit of the brain as frontal syndrome – an impairment of attention, language, memory, and visuospatial. According to this explanation, this study believes that the frontal lobe is the first to show impairment in a physiologic decline of cognitive function.[16]

6 out of 10subjects in this study whose work was intellectual-dominated showed impaired cognitive function. This can be due to other risk factors that was not excluded yet in this research such as different age range, different level of education, amount of income, anxiety, smoking, and alcoholism. However, the findings on the intellectual-dominated group are better compared to its counterpart where only 1 out of 15 subjects showed normal cognitive function. The statistical test indicated that there was a strong correlation between occupation category and cognitive function.

PERDOSSI argued that working may accelerate an individual's ageing process, especially for physically demanding work such as farmer or handyman.[16] This argument is reinforced by Monginsidi who stated that school teacher is more likely to prevent cognitive function decline than the farmer.[17] Similarly, Pauran in his study stressed that elderly who is passionate in playing chess exhibited better average score of MoCA-Ina than those who are not playing.[18] It can be construed that the theory 'use it or lose it' was perceptible in Pauran's study. He also added that chess players are more preeminent on domains like visuospatial, memory, attention and language. These functions are performed chiefly by the frontal lobe of the brain.

The results in this study revealed that occupational history can be used as a reference in predicting the cognitive disorder in the future. This argument is supported by Stern who stated that education, intellectual job,behavioural factor and life experience enhance the Cognitive Reserve (CR) in the brain so that the brain may survive from the physiologic and pathologic ageing.[19] CR is one of the brain's ability to recover from any cerebral damage so that the clinical manifestation can be minimalised. CR enables nervous system to perform better efficiency, enhance the system's capacity, and make it compensate better to any expansion of the brain function.

Stern explained that CR is also determined by 'Brain Reserve' (BR). BR is defined as the resilience of the brain or the brain's capability in compensating any damage where it can still function sufficiently. Cerebellum is believed to contribute for BR since it is a structure that stores most of the brain neurons. Brain mass and number of neurons are to be called as cognitive saving capacity. An individual with greater cognitive saving capacity is favored to show mild clinical manifestation of Alzheimer.[20]

As an individual grows older the CR is diminishing. Higher education level, intellectual job, healthy lifestyle, relaxed state of mind, and certain genetic pattern may enhance the CR and BR capacity so that cognitive function may perform better. However, at a certain point of time, this capacity too will eventually runs out.[21]

Conclusion

Occupational history, especially the category of occupation, can be used as a predictor of cognitive ability in elderly. Intellectual-dominated occupation category which employs the intellectual skill more showed lower prevalence of cognitive impairment compared to that of the physical-dominated occupation category.

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Reference

1. Ministry of National Development Planning Agency, Central Bureau Statistics. Projection of Indonesian Population in 2015-2045 :Result of SUPAS for 2015-2045. Jakarta: Central Bureau Statistics; 2018. p. 466.
2. Deputy for Poverty Reduction and Social Protection. Analysis of Elderly Social Empowerment and Protection policy. Saputro S, Rustama A, PGD S, Kusnandar, Istiqomah N, Khoiriyah S, et al., editors. Jakarta: Deputy for Poverty Reduction and Social Protection; 2015. p. 2-5.
3. Giebel CM, Sutcliffe C, Challis D. Aging & Mental Health Activities of Daily Living and Quality of Life Across Different Stages of Dementia : a UK study. Aging Ment Health. 2014;19(March 2015):63–71.
4. Harlein J, Dassen T, Halfens RJG, Heinze C. Fall Risk Factors in Older People with Dementia or Cognitive Impairment: A Systematic Review. J Adv Nurs. 2009;65(5):922–33.
5. Wreksoatmodjo BR. Some Physical Condition and Diseases that are Factors Risk of Disorders of Cognitive Fungtion. CKD-212. 2014;41(1):25–32.
6. Usman R, Sulaiman DS, Isnaningsih TR, Walujadi D, Setyarini L, Suharni L. Standart Clasification of Indonesian Occupation. Jakarta: Ministry of ManpowerandCentre Bureau of Statistics; 2014. p. xix-xxxvii.
7. Shors TJ, Anderson ML, Curlik DM, Nokia MS. Use it or Lose it : How Neurogenesis Keeps the Brain Fit For Learning. Behav Brain Res. 2012;227(2):450–8. Available from:http://dx.doi.org/10.1016/j.bbr.2011.04.023
8. Schaie KW. Historical Influences on Aging and Behavior. In: Handbook of the Psychology of Aging. seventh ed. USA: Elsevier Inc; 2011. p. 41–55.
9. Martono H, Pranarka K. Buku Ajar Boedhi-Darmojo : Geriatri (Elderly Health Sciences). 5th ed. Jakarta: Publisher FK UI; 2015.
10. Ryadi ALS. Family Health. In: Public Health Sciences. Yogyakarta: Publisher Andi; 2016. p. 39–55.
11. Won JS, Kim KH. Evaluation of Cognitive Fungtions, Depression, Life Satisfaction among the Elderly Receiving Visiting Nursing Services. J Korean Acad Nurse. 2008;38(1):1–10.
12. Sundariyati IGAH, Ratep N, Westa W. Overview of Factors Affecting Cognitive Status in the Elderly at Kubu-II Health Center, Januari-Februari 2014. E-Jurnal Med Udayana. 2015;4(1):1–12.
13. Karp A, Andel R, Parker MG, Wang H, Winblad B, Fratiglioni L. Mentally Stimulating Activities at Work During Midlife and Dementia Risk After Age 75 : Follow-Up Study From the Kungsholmen Project. Am J Geriatr Psychiatry. 2009;17(3):227–36. Available from: http://dx.doi.org/10.1097/JGP.0b013e318190b691
14. Whalley LJ. Understanding Brain Aging and Dementia: A Life Course Approach. New York: A Colombia University Press; 2015.
15. Husein N, Lumempouw S, Ramli Y, Herqutanto. Montreal Cognitive Assessment Indonesian Version (MoCA-Ina) for Screening Cognitive Function Disorders. Neurona. 2010;27(4):8–15.
16. Lestari DN, Kusumoputro S, Dikot Y, Lumampouw SF, Ong PA. Dementia. In: Neurobehavior Module. Indonesia: Perdossi; 2008. p. 1–12.
17. Mongisidi R, Tumewah R, Kembuan MAHN. Profile of Decreased Cognitive Fungtions in the Elderly at Senior Foundation in Kawangkoan District. J E-Clinic. 2013;5(1):1–10. Available from: https://ejournal.unsrat.ac.id/index.php/eclinic/article/view/3297/2840
18. Pauran S v, Maja J, Khosama H. Difference in MoCA-Ina Score oh Chess Player and Not Chess Players. J E-Clinic. 2017;5(1):57–60. Available from: https://ejournal.unsrat.ac.id/index.php/eclinic/article/view/15459/15000
19. Stern Y. Cognitive Reserve in Ageing and Alzheimer's Disease. Lancet Neurol. 2012;11(11):1006–12. Available from: http://dx.doi.org/10.1016/S1474-4422(12)70191-6
20. Stern Y. Cognitive Reserve. Neuropsychologia. 2009;47(2009):2015–28.
21. Tucker-Drob EM, Johnson KE, Jones RN. The Cognitive Reserve Hypothesis : A Longitudinal Examination of Age-Associated Declines in Reasoning and Processing Speed. Develpmental Psychol. 2009;45(2):431–46.

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