The relationship of cognitive function and independence activities of daily living (ADL) in elderly at Panti Darussa'adah and An-Nur Lhokseumawe

Cut Sidrah Nadira[1], Mulyati Sri Rahayu [2]

[1]Division of Physiology, Medical Faculty, Malikussaleh University, Lhokseumawe
[2]Division of Anatomic Pathology, Medical Faculty, Malikussaleh University, Lhokseumawe

cut.sidrah@unimal.ac.id

Abstrak

Penuaan menyebabkan banyak perubahan pada fungsi fisiologis lansia, baik dari segi fisik, mental maupun fungsional, termasuk juga fungsi kognitif. Fungsi kognitif yang diperlukan untuk kemandirian pemenuhan kebutuhan aktivitas sehari-hari cenderung akan mengalami penurunan memasuki usia lanjut. Penurunan fungsi kognitif akan mengakibatkan gangguan dalam memenuhi kebutuhan hidup sehingga meningkatkan ketergantungan terhadap orang lain. Penelitian ini bertujuan mengetahui hubungan fungsi kognitif dengan kemandirian lansia dalam pemenuhan *activity of daily living* (ADL). Penelitian ini dilaksanakan di Panti Jompo Darussa'adah dan An-Nur Kota lhokseumawe menggunakan desain penelitian analitik dengan pendekatan cross sectional dan teknik pengambilan sampel secara purposive sampling. Analisis bivariat dilakukan untuk melihat hubungan antara fungsi kognitif dengan kemandirian dalam pemenuhan ADL pada lansia dengan menggunakan uji *Chi square*. Populasi pada penelitian ini adalah lansia yang tinggal di Panti Jompo Darussa'adah dan An-Nur Kota lhokseumawe pada September 2017. Hasil penelitian diperoleh dari 30 orang sampel responden yang memenuhi kriteria inklusi dan eksklusi. Variabel penelitian ini adalah fungsi kognitif dan tingkat kemandirian dalam pemenuhan ADL. Hasil penelitian menunjukkan sebanyak 50% responden mengalami gangguan fungsi kognitif berat. dan sebagian besar responden (53,3%) hanya dapat memenuhi sebahagian dari ADL. Diperoleh kecenderungan penurunan kemandirian dalam pemenuhan ADL pada lansia seiring dengan penurunan fungsi kognitif walaupun tidak ada kemaknaan secara statistik (p=0,209).

Kata kunci: *Activities of Daily Living* (ADL); Fungsi Kognitif; Kemandirian; Lansia

Abstract

The relationship of cognitive function and independence activities of daily living (ADL) in elderly at Panti Darussa'adah and An-Nur Lhokseumawe Aging causes a lot of changes in elderly's physiologic function. The changes could be physical, mental or functional changes, including cognitive function. Cognitive function needed for performing ADL tend to decrease in elderly. Decreasing in cognitive function will cause disturbance in fulfil daily requirements so that increasing the dependency on others to help performing ADL. This study purpose to analyze relationship between cognitive function and independent level in performing ADL in elderly at panti Darussa'adah and An-Nur lhokseumawe using analytical cross-sectional design with purposive sampling technique. The data was analyzed by chi-square for the statistical test. Population for this study was elderly who lives in panti Darussa'adah and An-Nur by September 2017. Data obtained from 30 participants based on inclusion and exclusion criteria. Variables of this study are cognitive function and independent level in performing ADL. The result showed that half participants (50%) had a severe cognitive impairment and most of participants (53,3%) need helps to perform ADL. There is trend of decreasing independent level in performing ADL by decreasing cognitive function in elderly at Panti Darussa'adah and An-Nur lhokseumawe, although not statistically significant (p = 0,209). However, the results suggest that elderly should have maintained their cognitive function for performing ADL independently

Keywords: *Activities of Daily Living (ADL); Cognitive Function; Elderly; Independence level*

1. Introduction

Indonesia's population is aging, which is elderly proportion above 7%. By 2020, elderly population will significantly increase up to 28,822,879 with proportion 11.34%. Indonesia's rising elderly population was predicted higher than other country in Asia by 2050, which was projected to reach 100 million.[1] Aceh's elderly population aged 60 years and above in 2011 was recorded about 270,000. This number grow to 285,476 in 2012.[2]

Aging changes in organ systems, including nervous system. The nervous system changes cause decreasing in brain function. Elderly's brain weight generally decrease reach to 10-20%. This condition occurs in aged 30-70 years.[3] Recently research showed that brain structure keep changing with increasing age, even without any neurodegenerative disease. This cerebrovascular pathological changing was associated with cognitive function regression.[4]

Cognitive function have important role in memory and most of daily living activities. Cognitive decline will also cause physical and psychological problems in elderly. The physical problem including special senses function, passion and sexual organ and also motoric function decline. The psychological problems in elderly such as inferiority complex, feeling guilty, or feel like an absolute useless, furthermore when they lose their spouse. These conditions made the elderly isolated themselves from others, so that they have no more intention in social contacts.[5]

Mini Mental State Examination (MMSE). Mini Mental State Examination is a structured scale consists of 30-points questionnaire which is grouped in 7 categories, i.e. orientation, registration, attention and calculation, recall, language and copying, that is used to measure cognitive impairment associated with neurodegenerative disorders such as Alzheimer. It has been proved to be a valid and reliable instrument to assess cognitive impairment. MMSE score: 24-30 shows normal cognitive function; 18-23 shows mild cognitive impairment; and 0-17 shows severe cognitive impairment.[6]

Katz Index of Independence in ADL. Katz Index is an instrument to assess functional status as a measurement of the elder's ability to perform ADL independently, either in feeding, bathing, toileting, continence, transferring or dressing. Score: 6 (high) for patient independent and 0 (low) for patient very dependent.[7]

2. Method

This research is an analytical cross sectional study with purposive sampling technique which held in Panti Jompo Darussa'adah and An-Nur, Lhokseumawe. Population for this study was elderly who lives in panti Darussa'adah and An-Nur by September 2017. Data obtained from 30 participants based on inclusion and exclusion criteria. Variables of this study are cognitive function and independent level in performing Activities of Daily Living (ADL). The data was analyzed by chi-square for the statistical test with significant $\alpha = 0.05$.

3. Results

The data of this research was obtained from 30 participants, who have various characteristics. The characteristics of participant can be seen on table 1. Most of the participants are at age 60-74 years (53.3%), 37% are at age 75-90 years and another 3% are at age 45-59 years. The table also showed that 63% of the partipants was only elementary educated, and 30% was uneducated; 50% of them have stayed at Panti for 1-5 years; 63% formerly worked as a farmer; and most of elderly have normal nutritional status (40%), 27% underweight, 23% overweight and 10% obesity.

Table 1. Elderly characteristics

No	Characteristics	n (%)
1.	Age	
	• 45-59 tahun	3 (10%)
	• 60-74 tahun	16 (53.3%)
	• 75-90 tahun	11 (36.7%)
2	Education	
	• No education	9 (30%)
	• Elementary school	19 (63%)
	• Junior High School	2 (7%)
3	Length of stay	
	• < 1 year	6 (20%)
	• 1-5 years	15 (50%)
	• 6-10 years	3 (10%)
	• > 10 years	6 (20%)
4	Occupational history	
	• housewife	9(30%)
	• farmer	19(63%)
	• merchant	2(7%)
5	Nutritional status	
	• underweight	8 (27%)
	• normal	12 (40%)
	• overweight	7 (23%)
	• obesity	3 (10%)

This research data also showed that most of the participants (50%) have severe impaired cognitive function, 43.3% with mild impaired cognitive function and only 6.7% of participants have normal cognitive function. There is a trend of worsing impaired cognitive function by increasing age (Table 2). Mild impaired cognitive was 56.3% in age 60-74 years, and increased by 72.7% in age 75-90 years.

Table 2. Elderly cognitive function based on age

Elderly Class. (years)	Cognitive Function						Total	
	Normal		Mild Impaired		Severe Impaired			
	n	%	n	%	n	%	n	%
45-59	1	33.3	1	33.3	1	33.3	3	100
60-74	1	6.3	9	56.3	6	37.5	16	100
75-90	0	0	3	27.3	8	72.7	11	100
Total	2	6.7	13	43.3	15	50	30	100

Elderly independence was assessed by Katz Independence Index. Results showed that 53.3% participant live in Panti Jompo Darussa'adah and An-Nur Lhokseumawe have partial indepence in ADLs, which means most of the elderly need other helps in performing ADLs, especially in transfer, continence, and feeding activity (table 3).

**Table 3. Elderly independence in Activity of Daily Living (ADL)**

Activity of Daily Living	n	%
Independent	14	46.7
Partial independent	16	53.3
Total	30	100

There was also an incline in decreasing indepence by increasing age. Participants at age 45-59 and 60-74 years, consecutively, 66.7% and 68.8% have full independence in ADLs, while participants at age 75-90 years, 90.9% have partial independence and needs other helps in performing ADLs.

Table 4. Elderly independence in Activity of Daily Living (ADL) based on age

Elderly class. (years)	ADL				Total	
	Independent		Partial Independent			
	n	%	n	%	n	%
45-59	2	66.7	1	33.3	3	100
60-74	11	68.8	5	31.3	16	100
75-90	1	9.1	10	90.9	11	100
Total	14	46.7	16	53.3	30	100

Independence level in ADL based on the cognitive function can be seen in figure 1. Statistical analysis for these data have not been significantly proved that there is a relationship between cognitive function and independence activities of daily living (ADL) ($p = 0.209$)

Independence level in ADL based on the cognitive function
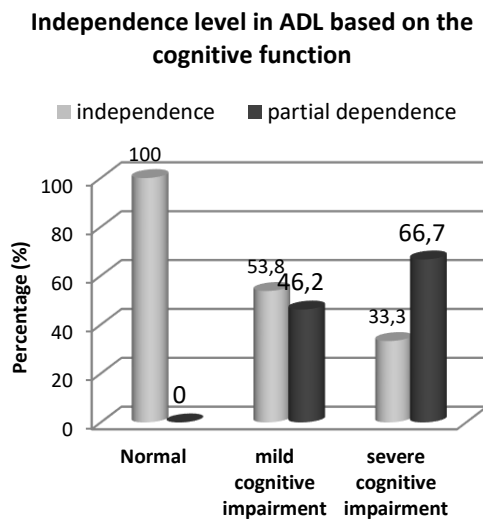
Figure 1. Independence level in ADL based on the cognitive function

Figure 1. shows that there was a tendency in decreasing independence and increasing dependence in performing ADLs by worsen impaired-cognitive function, i.e. 0% in normal cognitive function, 46.2% in mild impaired-cognitive function and 66.7% in severe impaired-cognitive function.

4. Discussion

Table 1 showed that most of the participants are at age 60-74 years (53.3%), 37% are at age 75-90 years and another 3% are at age 45-59 years. This proportion shows that life expectancy of Lhokseumawe citizens were quite high. Increased elderly population tendency happens not only in this region, but also in Indonesia and this number was estimated increased reach to 100 million by 2050.[1]

In this research, 63% of the partipants was only elementary educated, and 30% was uneducated. Education affects cognitive. Estimated 1-1.5% prevalence of cognitive decline occurred by increasing age and low education.[8] sociodemografic factors, such as occupation, environmental factors and personality also affect cognitive function.[9]

Independence is also affected by education, life change, social rule, age and disease.[10]

In this research, 40% of elderly have normal nutritional status, 27% underweight, 23% overweight and 10% obesity. Nutritional status will also affect cognitive function. Brocklehurst dan Allen (1987) explained that elderly have bad homeostatic reserve function, that cannot well adapt on abrupt-decreasing glucose and oxygen anymore and will lead brain metabolic disorders and impaired cognitive function.[11]

This research data also showed that there is a worse impaired cognitive tendency by increasing age. Mild impaired cognitive was 56.3% in age 60-74 years, and increased by 72.7% in age 75-90 years. Fadhia (2012) also got increasing proportion of impaired cognitive function by increasing age, i.e. 48% at age 60-74 years, 57% at age 75-90 years, dan 100% at age > 90 years.[10]

It was estimated that one third of adult will had gradually decreasing cognitive function by increasing aged.[5] Aging changes organ systems, including nervous system. The nervous system changes cause decreasing in brain function. Elderly's brain weight generally decrease reach to 10-20%. This condition occurs in aged 30-70 years[3]. Brain structure keep changing with increasing age, even without any neurodegenerative disease. This cerebrovascular pathological changing was associated with cognitive function regression, affected ADL and lowered elderly quality of life.[4,12]

This research showed that all of uneducated participants have impaired cognitive function, with higher proportion in severe impaired cognitive (66.7%) than the mild impaired cognitive (33.3%). Folstein (1993) was also reported that age and education affects MMSE score. Even Naugle & Kawczak (1989) reported that the only factor that affect MMSE score is education.[10]

Elderly independence was assessed by Katz Independence Index. Results showed that 53.3% participant live in Panti Jompo Darussa'adah and An-Nur Lhokseumawe have

partial indepence in ADLs, which means most of the elderly need other helps in performing ADLs, especially in transfer, continence, and feeding activity. There was also an incline in decreasing indepence by increasing age. Participants at age 45-59 and 60-74 years, consecutively, 66.7% and 68.8% have full independence in ADLs, while participants at age 75-90 years, 90.9% have partial independence and needs other helps in performing ADLs.

Brain mass and brain circulation decline occurred in old age will cause atrocyte proliferation that leads neurotransmitters (dopamine and serotonine) changes. The neurotransmitters changes will increase monoaminooxidases (MAO) activities.[11] This condition slows the central process and reaction time, so that social and occupational function will significantly decrease compared to previous time.[13] It will made the elderly lose intention in daily living activities, so that they will depend on others to do some activities which previously was capable to do.[12]

Cognitive function has an important role in memory process and most of ADLs. Impared cognitive function will affect elderly's physics and psychology. Physical disorders occurred in old age such as decreasing function of special sense, intention, sexual organs, and motoric; and psychological disorders such as inferiority complex, feeling guilty, or feel like an absolute useless, will made the elderly isolated themselves from others, so that they have no more intention in social contacts.[5]

5.   Conclusions

1. Most of participants are at age 60-74 years (53%), have elementary level of education (63%), have been in the dormitory (Panti) for 1-5 years (50%), have occupational history as farmer (63%), and have normal nutritional status (40%).
2. Fifty percents of participants was with severe impaired cognitive, 43.3% with mild impaired cognitive, and only 6.7% participants with normal cognitive function

3. Most of participants (53,3%) are partially independence in performing ADLs
4. Statistics cannot significantly proved the relationship of the cognitive function and independence in performing ADLs.

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