COGNITIVE STATUS WITH FRAILTY SCALE IN THE ELDERLY PEOPLE AT SANTO YOSEF NURSING HOME SURABAYA

Kadek I Pratama[1)], Ary Christy[2)], Darmawan Budianto[3)]

ABSTRACT

Introduction: The increasing life expectancy of the elderly in Indonesia is also followed by an increase in morbidity rate and decreasing the elderly's physiological function of the body. One of the health problems is decreasing cognitive function. A pathological result of decreasing cognitive function causes frailty in the elderly.
Aim : The purpose of this research is to analyze the correlation between cognitive status with frailty scale in the elderly at Santo Yosef Nursing Home Surabaya in 2017.
Method : The type of this research is observational analytic with a cross-sectional study and purposive sampling technique. The instrument that been used in this research is the Montreal Cognitive Assessment (MoCA) Indonesian version (MoCa-Ina) and FRAIL Scale. Data collected through the interview method.
Result : We used the Rank Spearman correlation test as the analytic test; the result suggesting that there is a significant correlation (p=0,000) with moderate strength of correlation (r=0,593) between cognitive status with the Frailty Scale.
Conclusion : From the result, we can conclude that there is a correlation between cognitive status with the Frailty Scale in the elderly.

Keywords: Elderly, Cognitive Status, Frailty

[1)] Student of Faculty of Medicine, Widya Mandala Catholic University Surabaya, Kalisari Selatan 1 Surabaya email: Pratamaindra26@gmail.com
[2)] Internal Medicine Department, Faculty of Medicine, Widya Mandala Catholic University Surabaya, Kalisari Selatan No. 1 Surabaya
[3)] Public Health Department, Faculty of Medicine, Widya Mandala Catholic University Surabaya, Kalisari Selatan No. 1, Surabaya

INTRODUCTION

Indonesia is included in the top five countries with the most significant number of elderly people aged 60 years or more in the world. It is estimated that in 2025, the number will reach 36 million people.[1] The increase in the elderly population is followed by an increase in the morbidity of the elderly. Frailty or fragility is an important concept that must be understood in the management of geriatric patients. Frailty is a condition that shows physiological vulnerability related to age, as a result of impaired homeostatic capacity and decreased ability to cope with stressors.[2] There are several factors that can cause frailty in the elderly, including obesity, anemia, sarcopenia, inflammation, and decreased function cognitive.[3]

The incidence and prevalence of frailty increase with age, and results in poor outcomes for the elderly.[4,5] The dynamic frailty concept allows the opportunity for intervention to prevent the elderly with pre-frail conditions from falling in frailty conditions. Frailty is associated with an increased risk of the geriatric syndrome, including falling, delirium, and significantly related to morbidity and mortality.[6] When the elderly people have fallen in frailty, clinical manifestations such as malnutrition, functional dependence, and lying down too long, can occur. Furthermore, frailty complications include repeated falls and fractures, increased hospital stay, nosocomial infections, deteriorated mobility, and total dependence, to death.[7]

According to The Cardiovascular Health Study, the prevalence of frailty reaches 7% in the elderly aged 65 years and over and reaches 30% in the elderly aged 80 years or older. According to The Women's Health and Aging Study, the prevalence of women with a 65-year-old age reaches 28%.[8] Some previous studies suggest that frailty has a strong relationship with age, chronic condition, cognitive function, and depression status.[9] The results of other studies suggest the existence of a significant relationship between frailty with decreased cognitive status in Hispanic elderly. In a 10-year study, it was mentioned that a person's cognitive status with frailty status tends to decrease cognitive status than before.[4] Another study of fragility and cognitive status found that there was a significant relationship between cognitive status and the risk of being pre-frail to frail.

In Indonesia, research on frailty is still very rarely done. Therefore, this research needs to be done because detection of cognitive function can prevent the elderly people from experiencing frailty, as our case study, the elderly in the Santo Yosef Nursing Home Surabaya.

METHOD

This study uses analytic research designs and types of observational studies because researchers do not provide a particular intervention or treatment of research subjects. Meanwhile, the research design used was cross-sectional by taking data that was only done once. The independent variable in this study is cognitive status, while the dependent variable in this study is frailty, and the confounding variables in this study are the severe acute infection, disability, malnutrition, age, and gender.

The sample used in this study were all the elderly in the Santo Yosef Nursing Home Surabaya in 2017 who met the inclusion criteria and were not included in the exclusion criteria. The samples obtained were 81 people. The sampling technique for the case sample in this study uses purposive sampling (a non-probability sampling). The inclusion criteria in this study were all the elderly in the Santo Yosef Nursing Home aged 60 years, willing to take part in research and be able to understand commands and be able to communicate well.

Exclusion criteria in this study were the elderly who were unable to hear the researcher's questions, the elderly who experienced acute infection conditions and were not willing to take the interview.

Retrieval of data in this study was collected from primary data, namely data collection on age and gender based on the data filling of research subjects. Collaborative Status data collection uses the Indonesian version of the Montreal Cognitive Assessment (MoCA), while the degree of Frailty in the Elderly uses the FRAIL scale. This research was conducted in June 2017 - August 2017.

To test the hypothesis, the researcher used the Chi-Square statistical test because the scale used was nominal to nominal, and odds ratios were calculated. For geriatric profiles (GDS, MNA, Barthel Index), all were analyzed descriptively. Analysis conducted with a computer program, namely IBM SPSS 2.3

RESULT

The research was conducted at the Santo Yosef Nursing Home Surabaya on Jalan Jelidro II / 33, Surabaya, East Java. Santo Yosef Nursing Home Surabaya has 41 bedrooms, seven rooms that each can hold six people, 18 rooms that each can hold four people, one room each can hold three people, five rooms each can holds eight people, and ten rooms each can hold one person. Routine activities carried out together, namely praying, morning exercise, watching, listening to music, and eating together. Santo Yosef Nursing

Home also has a general polyclinic facility that can be used by the elderly both for routine health control and therapy that can help the elderly to walk and move their extremity muscles.

Table 1 Distribution of Respondents by Age of the elderly at the Santo Yosef Nursing Home Surabaya in 2017

Age	Frequency (n)	Percentage (%)
Elderly (60-74 y/o)	27	33,3%
Old (75-90 y/o)	50	61,7%
Very Old (>90 y/o)	4	4,9
Total	81	100%

From the results of the analysis of the distribution of respondents, we found that the highest percentage at Old age group (75-90 years old), which is 61.7% (50 respondents from 81 respondents). Whereas the Elderly age group (60-74 years old) is 33.3% (27 respondents from 81 respondents), and for the Very Old age group (> 90 years old), which is 4.9% (4 respondents from 81 respondent).

Table 2 Distribution of Respondents by Gender of the elderly at the Santo Yosef Nursing Home Surabaya in 2017

Age	Frequency (n)	Percentage (%)
Men	33	40,7%
Women	48	59,3%
Total	81	100%

From the results of the analysis of the distribution of respondents, we found that the highest percentage was in women at 59.3% (48 respondents from 81 respondents), while in men, it reached 40.7% (33 respondents from 81 respondents)

Table 3 Distribution of Respondents by Age and Gender of the elderly at the Santo Yosef Nursing Home Surabaya in 2017

Age	Gender				Total	
	Men		Women			
	(n)	(%)	(n)	(%)	(n)	(%)
Elderly (60-74 y/o)	16	59,2%	11	40,7%	27	100 %
Old (75-90 y/o)	17	34%	33	66%	50	100 %
Very old (>90 y/o)	0	0%	4	100%	4	100 %

From the results of the analysis of the distribution of respondents, we found that a higher percentage was found in male respondents (34%), for the Old category (75-90 years) as many as 17 male respondents, the Elderly category (59, 2%) as many as 16 male respondents, middle-aged and Very Old categories of male 0% and 0 male respondents. Most female respondents aged 75-90, namely as many as 33 female respondents (66%), Elderly category (40.7%) as many as 11 female respondents, at least namely the Very Old category (100%) as many as 4 female respondents, and were not found respondents who are in the middle-aged category.

Correlation Analysis between Activity Daily Living (ADL) with Frailty

From the analysis of the relationship between Activity Daily Living (ADL) and frailty, we found that the elderly in the frail category and ADL

independently showed a percentage of 26.3% and the elderly in the frail category with ADL dependency, representing a percentage of 79%. Whereas the elderly in the robust and independent ADL categories showed a percentage of 73.7% and the elderly in the robust category with the ADL dependency showed a percentage of 21%. From the analysis using the Chi-Square test showed the value of p = 0,000, and the odds ratio value is 10,554.

Table 4 Correlation Analysis between ADL and Frailty in the elderly in Santo Yosef Nursing Home Surabaya in 2017

ADL	FRAILTY				Total		p Value	OR (IK 95%)
	Robust		*Frail*					
	(n)	(%)	(n)	(%)	(n)	(%)		*Value*
Indepedent	14	73,7%	5	26,3%	19	100 %	0,000	10,554 (3,210 - 34,698)
Dependent	13	21%	49	79%	62	100 %		

Correlation Analysis between Mini Nutritional Assessment (MNA) and Frailty

From the analysis of the relationship between MNA and frailty, we found that the elderly in the frail and malnutrition categories showed a percentage of 67.7%; the elderly in the frail category with good nutritional status showed a percentage of 63.2%; the elderly in the robust and malnutrition categories showed a percentage of 32.3%; the elderly in the robust category with good nutritional status showed a percentage of 36.8%. Analysis using the Chi-Square test showed a value of p = 0,711 and an odds ratio value of 0,816.

Table 5 Correlation Analysis between MNA and Frailty in the elderly in Santo Yosef Nursing Home Surabaya

MNA	FRAILTY				Total		p Value	OR (IK 95%)
	Robust		*Frail*					
	(n)	(%)	(n)	(%)	(n)	(%)		*Value*
Malnutrition	20	32,3%	42	67,7%	62	100%	0,711	0,816 (0,279 - 2,388)
Good nutriti-on	7	36,8%	12	63,2%	19	100%		

Correlation Analysis between Gender and Frailty

From the analysis of the relationship between gender with frailty, we found that the elderly men in the frail category showed a percentage of 60.6%, and the women elderly in the frail category showed a percentage of 70.8%. While the elderly men in the category of robust showed a percentage of 39.4% and the elderly women in the category of robust showed a percentage of 29.2%. Analysis using the Chi-Square test showed a value of p = 0.337 and an odds ratio value of 1.579

Table 6 Correlation Analysis between Gender and Frailty in Santo Yosef Nursing Home Surabaya in 2017

Gender	FRAILTY				Total		p Value	OR (IK 95%)
	Robust		*Frail*					
	(n)	(%)	(n)	(%)	(n)	(%)		*Value*
Male	13	39,4%	20	60,6%	33	100 %	0,337	1,579 (0,619 - 4,023)
Female	14	29,2%	34	70,8%	48	100 %		

Correlation Analysis between Age and Frailty

From the analysis of the relationship between age and frailty, we found that the elderly in the Very Old category (> 90 years old) had the most significant percentage of frail categories by 100%, in the Elderly category (60-74 years old) in the frail category showed a percentage of 70, 4%, and in the Old category (75-90 Years) in the frail category showed a percentage of 62%. Analysis using the Chi-Square test showed a value of p = 0.265.

Table 7 Correlation Analysis between Age and Frailty in Santo Yosef Nursing Home Surabaya

Usia	FRAILTY				Total		p Value
	Robust		*Frail*				
	(n)	(%)	(n)	(%)	(n)	(%)	
Elderly (60-74 y/o)	8	29,6%	19	70,4%	27	100 %	0,265
Old (75-90 y/o)	19	38%	31	62%	50	100 %	
Very Old (>90 y/o)	0	0%	4	100%	4	100 %	

Correlation Analysis between Cognitive Status and Frailty

Table 8 Correlation Analysis between Cognitive Status and Frailty in the elderly in Santo Yosef Nursing Home Surabaya in 2017

Cognitive Status	FRAILTY				Total		p Value	OR (IK 95%)
	Robust		*Frail*					
	(n)	(%)	(n)	(%)	(n)	(%)		*Value*
Normal	16	80%	4	20%	20	100%	0,000	18,182 (5,079 - 65,090)
Abnormal	11	18%	50	82%	61	100%		

From the analysis of the relationship between cognitive status and frailty, we found that the elderly in the frail and normal cognitive categories had a percentage of 20% (4 respondents), and the elderly who fell in the frail category with abnormal cognitive had a percentage of 82% (50 respondents). Whereas the elderly who are included in the robust and normal cognitive categories have a percentage of 80% (16 respondents), and the elderly who are included in the robust category with abnormal cognitive have a percentage of 18% (11 respondents). Analysis using the Chi-Square test showed the value of p = 0,000 which has a significant meaning, and the value of the odds ratio was 18,182. We conducted a logistic regression test on the ADL variable with Frailty and MoCA-Ina with Frailty to obtain the adjusted odds ratio. From the logistic regression test, it was found that the elderly with cognitive impairment were 16 times more susceptible to entering the frail state compared to without cognitive impairment. And the elderly who have ADL disorders have a risk of 9 times more vulnerable to entering frail conditions compared with the elderly with normal ADL.

DISCUSSION

Geriatrics Profile

In this study, the assessment of geriatric profiles is by assessing Geriatric Depression Scale (GDS), Activity Daily Living (ADL), Mini Nutritional

Assessment (MNA), Montreal Cognitive Assessment (MoCA-Ina), and Frailty. From the assessment of the profile, it was found that the normal GDS profile was higher in women, at 55.2% (32 respondents out of 58 respondents, while respondents with a heavy GDS profile were also in women at 90% (9 respondents out of 10 respondents). This result is in line with the statement that depressive disorders occur more often in women than in men. There are differences in hormonal levels of women and men, psychosocial factors, and the amount of stress faced by women. Psychosocial factors that influence depression include life events and environmental stressors, personality, and social support Stress in women include problems of household life, financial problems, pregnancy, work problems, and health problems. Women can experience a surge in hormones when going before menstruation, thus affecting their mood.

In the ADL geriatric profile with the dependent category, a higher percentage was found in women in the amount of 83.3% (40 respondents from 48 respondents), while in men in the amount of 16.7% (8 respondents in 48 respondents). ADL disorders tend to occur in women because women are more susceptible to chronic diseases compared to men.[11]

The geriatric profile of the MNA shows that the percentage of elderly women is the most malnourished at 68.1% (15 respondents out of 22 respondents), whereas, in elderly men, it shows a percentage of 31.8% (7 respondents out of 22 respondents). This is inversely proportional to research which says that men tend to experience the risk of malnutrition; because men need more nutrition than women, to help the metabolic process. Men have high physical activity and are also affected by body weight, where a man's body is heavier than a woman's. Likewise, for height, men also need more food than women.12 In this study, elderly women tended to experience depressive disorders so that they could reduce appetite.

The MoCA-Ina geriatric profile found that older women experienced a decline in cognitive function, which was 62.2% higher (38 respondents from 61 respondents) and 37.7% for men (23 respondents from 61 respondents). Women have a tendency to experience cognitive decline, which is more meaningful than men. Women are more at risk of experiencing a decreased in cognitive function due to the role of endogenous sex hormone levels in cognitive function

changes. Estrogen receptors have been found in areas of the brain that play a role in learning and memory functions, such as the hippocampus.[13]

In the geriatric frailty profile, it was found that women in frail conditions had a higher percentage than men, which was 63% in women and 37% in men. Frailty is more likely to occur in women.[7]

Geriatric Characteristics

Age

In this study, the elderly who were included in the inclusion criteria were those aged over 60 years. From the data taken, researchers found that the average age of the elderly (mean) was 76, median 78, mode 78, and a standard deviation of ± 8,139. Researchers used a cross-sectional study design, namely by taking data that was only done once. Overall, the data collection went well, although some elderly people experienced concentration problems. Concentration problems in question are answers that are not following the questions asked, invite researchers to talk, and also ask things outside the study, causing longer time needed for the study.

Gender

In this study, the proportion of elderly women in Santo Yosef Nursing Home Surabaya is higher than the proportion of elderly men. The elderly female there are 48 people, while there are 33 elderly men. This is happened because of the 154 people who were elderly, 87 of them were female, and 67 were elderly male. Based on data from Statistics Indonesia (Badan Pusat Statistik or BPS) in 2015, in Indonesia, more elderly women were found than men, with the percentage of elderly women being 8.96 percent, and the percentage of elderly men being 7,91 percent of the total elderly were 21.68 million people.[14]

Research by Wreksoatmojo in Jelambar and Jelambar Baru villages, West Jakarta, also showed the same findings; the elderly women were more common than men elderly with a percentage of elderly women at 74.5% and elderly male at 25.5%. The study was conducted with a cross-sectional study design with a total of 286 people.[15]

Activity Daily Living (ADL) and Frailty

In this study, the results of the analysis of the Chi-Square Test show that there is a significant relationship between ADL and frailty (p = 0,000). Moreover, the elderly who have ADL disorders have a risk nine times more prone to experiencing a state of frailty compared with the elderly with normal ADL. The elderly in the dependency category or ADL disturbed are more at risk of experiencing frailty. [16]

Mini Nutritional Assessment (MNA) and Frailty

In this study, the results of the analysis of the Chi-Square Tests showed no significant correlation between MNA and frailty (p = 0.065). This finding is inversely proportional to the statement from the study of Artaza et al., in 2016, which states that the elderly people with malnutrition status are at risk for frailty.[17]

Age and F*railty*

In this study, the results of the analysis of the Chi-Square Test showed an insignificant correlation between age and frailty (p = 0.265). This statement is inversely proportional to the findings from the study of Fulop T. et al., in 2010, that frail is strongly associated with increasing age.[18]

Gender and *Frailty*

In this study, the results of the analysis of the Chi-Square Tests showed no significant correlation between gender and frailty (p = 0.337). This statement is inversely proportional to the findings from the study of Setiati et al., in 2014, that women are more likely to experience frailty than men.[7]

Cognitive Status and Frailty Degree

In this study, it was found that all respondents in a frail state had abnormal cognitive function based on MoCA-Ina, amounting to 100% (36 respondents out of 36 respondents), and the elderly who had normal cognitive function did not experience frail conditions. Correlation analysis between cognitive status and degrees of frailty in the elderly using the Chi-Square Test statistical test showed a value of p = 0,000. So, it can be concluded that there is a correlation between cognitive status and degree of frailty in the elderly. The elderly people who have cognitive impairment are 16 times more likely to experience frailty compared to older people without cognitive impairment.

In the study of Alencar et al., in 2013, it was found that the elderly who experienced frailty, also experienced a significant decrease in cognitive function (p <0.001) compared to the elderly with the categories of pre-frail and robust.[16,19]

In the study of Macuco et al., In the elderly with an average age of 72 years with 384 respondents, it was found that cognitive function decreased by 39% in the frail elderly, 22% in the elderly who experienced pre-frail, and in Robust category decreased cognitive function by 16%[20]. Decreased cognitive status in the elderly is feared to have pathological effects, such as dementia and decreased executive function. The pathological

impact of dementia results in impaired social functioning, impaired walking, impaired postural balance, thus increasing the risk of falls. Decreased executive function also causes a decrease in the function of mind control and self control. This can cause the elderly to experience Frail Brain which can cause various effects, such as anorexia, fatigue, falling, depression, sarcopenia.[21] These impacts can lead the elderly to fall in a state of frailty.

Research Scope

This study has limitations that can affect the results of the study: we did not use sample calculations, so this study only applies to Santo Yosef Nursing Home Surabaya.

CONCLUSION

Research on the correlation between cognitive status with the degree of frailty on the number of 154 elderly people living in Santo Yosef Nursing Home Surabaya with age ≥ 60 years (33 male respondents and 48 female respondents) was conducted on July 19, 2017, until July 27, 2017, can be concluded as follows:

1. The prevalence of elderly women tends to experience higher depression than men.
2. The prevalence of elderly women tends to experience ADL disorders compared to men
3. The malnutrition risk category is most common in the elderly who are female.
4. The prevalence of cognitive impairment is most common in elderly women
5. Prevalence of frail events is most common in elderly women
6. There is a relationship between cognitive status and the degree of frailty in the elderly.

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