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COGNITIVE RESILIENCE AMONGST THE ELDERLY IN SOCAH VILLAGE'S FISHING AND NON-FISHING COMMUNITIES

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ABSTRACT

Alzheimer's Indonesia (ALZI) reports a significant and growing prevalence of Orang Dengan Demensia Dementia (ODD), which is projected to reach 2 to 4 million individuals by 2050. Dementia is often attributed to cognitive deficits, prompting this study to investigate and compare the Community Mini Mental State Examination (MMSE) scores among elderly professionals, specifically fishermen and non-fishermen, residing in Socah Village, Bangkalan, East Java. Objective: This research aims to elucidate the extent of cognitive impairment in this demographic. Method: An analytical observational study employed a purposive sampling approach, with a total sample size of 96 individuals. The age categories ranged from 45 to 89 years, adhering to the Badan Pusat Statistik 2015 guidelines. Data collection took place during August to September 2022. Results: The results of the Mann-Whitney's test indicate a significant difference in Mini Mental State Examination (MMSE) scores between elderly fishermen and non-fishermen in Socah Village, with a p-value of 0.001 ($p < \alpha$, $\alpha = 0.05$). Conclusion: This finding leads to the conclusion that there is a notable disparity in MMSE scores among elderly professionals, highlighting the substantial impact of physical activity on cognitive function.

Keywords: cognitive function; dementia; elderly; mini mental state examination (MMSE); occupational influence

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INTRODUCTION

The current incidence of Alzheimer's disease is estimated to approach 50 million individuals worldwide, with 20.9 million cases in the Asia-Pacific region (Alzheimer's Disease International [ADI], 2017; WHO (World Health Organization), 2017). This escalating prevalence of Alzheimer's is reflected in the growing number of Orang Dengan Demensia Dementia (ODD) cases, with over 10 million new cases reported annually. According to data from Alzheimer Indonesia (ALZI), Indonesia records 1.2 million cases of ODD, and this number is projected to increase to 2-4 million cases by 2050. An obstacle frequently encountered by individuals who have survived Alzheimer's disease is the challenge of identifying it at an early stage. This difficulty arises mostly from the mistaken belief that cognitive decline is a normal aspect of aging for older adults, leading to its disregard. Early onset cognitive impairment can occur. Poor management results in an unachievable level of optimal quality of life (PERDOSSI, 2015). This syndrome has emerged as a substantial detriment to the economic, social, and health dimensions of states in the East Asian region (Kementerian Kesehatan, n.d.). The Alzheimer Association's research highlights the increasing importance of addressing Alzheimer's disease and its prevention in the field of public health (Gavurova et al., 2018; NINDS, 2018).

The rising frequency of Alzheimer's disease presents a serious obstacle to healthcare systems worldwide, especially in regions like East Asia, where the burden is considerable (Wu et al., 2015). Given this, there has been a significant emphasis on studying cognitive function and implementing preventive treatments (Gavurova et al., 2018; Nur Aini & Puspitasari, 2016; PERDOSSI, 2015). Gaining a comprehensive understanding of the complex connection between cognitive decline and the factors that influence it is essential in order to create successful therapies and policies that can help reduce the impact of Alzheimer's disease. This study seeks to enhance the current understanding of cognitive function in aging populations, specifically in coastal areas such as Socah Village, Bangkalan, Madura, by analyzing and comparing the Mini Mental State Examination (MMSE) scores of elderly fishermen and non-fishermen. This study aims to clarify the specific characteristics that affect cognitive health and emphasizes the significance of customized therapies in tackling the increasing public health issue of Alzheimer's disease in Indonesia and other regions.

METHOD

The research employed an Analytical Observational technique with a cross-sectional study design, applying quantitative research methodologies for data gathering and subsequent analysis (Zuhri, 2019). The study examined older adults, including both fishermen and non-fishermen, living in Socah Village, Bangkalan, Madura. The inclusion criteria consisted of being registered in Socah Village, expressing a willingness to participate, and successfully completing the Mini Mental State Examination (MMSE) questionnaire. The sample population consisted of 96 research volunteers in total.During the investigation, multiple research factors were identified. The Mini Mental State Examination (MMSE) was used as the tool to assess the cognitive function(Helena Sibarani, 2014; Kaplan, 2010), with scores indicating potential risk of cognitive decline or dementia (Bahrudin, 2011; Wahjudi Nugroho, 2008; Wibowo et al., 2015), as the dependent variable. The occupational status of participants was used as the independent variable, specifically distinguishing between fishermen and non-fishermen. Key factors, such as age groups, smoking behavior, educational background, medical history, cognitive function, and employment history, were defined operationally.

The data collecting procedures entailed the distribution of questionnaires to eligible individuals in Socah Village, Bangkalan, Madura, from August to September 2022. The

gathered data underwent rigorous management procedures, including editing, coding, tabulation, input, and cleaning, to guarantee precision and uniformity. Afterwards, the data analysis included both univariate and bivariate methods. The univariate analysis consisted of descriptive evaluations of variables, such as frequency distributions, means, medians, and standard deviations. The Mann-Whitney U test was used as the preferred statistical approach for bivariate analysis, which examines the comparations between variables The research methodology employed aimed to thoroughly examine cognitive function in elderly individuals residing in Socah Village, Bangkalan, Madura. The study specifically focused on comparing MMSE scores between fishermen and non-fishermen, thereby enhancing our understanding of cognitive health in this particular demographic. This study has obtained a certificate of ethical feasibility of health research with ethics letter number No. I/134/UHT.KEPK.03/XI/2022 issued by the health research ethics commission of the Faculty of Medicine, Hang Tuah University.

RESULTS

Characteristics of Respondents

Distribution of respondents based on gender

Based on the results of filling out questionnaires by respondents in this study, there were more male respondents than female. The elderly community which is categorized based on the Central Statistics Agency in 2015 into 4 categories, namely pre-elderly (45-59 years), young elderly (60-69 years), middle elderly (70-79 years) and old elderly (80-89 years). The level of education is categorized into : not in school, elementary school, junior hish school, senior high school, and undergraduate.

Table 1.
Distribution of respondents based on gender, age and education level

Characteristics of Respondents	f (%)
Gender	
Male	65 (67.7%)
Female	31 (32.3%)
Age of Respondents	
Pre-elderly (45-59 years)	34 (35.4%)
Young elderly (60-69 years)	41 (42.7%)
Middle elderly (70-79 years)	18 (18.8%)
Elderly (80 – 89 years)	3 (3.1%)
Level of Education	
Not in school	2 (2.1%)
Elementary school	16 (16.7%)
Junior High School	26 (27.1%)
Senior High School	44 (45.8%)
Undergraduate	8 (8.3%)

Distribution of smoking behavior of research respondents

One of the factors that can cause cognitive function deficits in a person is smoking activity. So that the table below will display respondent data according to smoking behavior carried out within the last 1 month.

Table 2.
Distribution of Smoking Behavior of Research Respondents

Smoking Behavior	f (%)
Smoker	58 (60.4%)
Non-smoker	38 (39.6%)

Distribution of disease history of research respondents

Some diseases such as type II Diabetes Mellitus have a tendency for survivors to experience impaired changes in cognitive function. In addition, cognitive function deficits are also experienced by survivors of vascular disorders. So the researcher also attached the disease history of the research respondents to the table below.

Tabel 3.
Distribution of disease history of research respondents

Disease history of research respondents	f (%)
With co-morbidities (diabetes mellitus and/or vascular disorders)	62 (64.6%)
Without co-morbidities	34 (35.4%)

Distribution of research respondents' professions

In this study, researchers discussed the comparison of Mini Mental State Examination (MMSE) scores of elderly people who were divided into 2 large professional groups, namely fishermen and non-fishermen. These large groups are distributed in detail based on the type of profession of the respondent according to the following table:

Table 4.
Research Respondents' Professions

Types of Profession	f (%)
Fishermen	41 (42.7%)
Merchant	20 (20.8%)
Shellfish seeker	5 (5.2%)
Security Guard	5 (5.2%)
Retirees	5 (5.2%)
Teachers	4 (4.2%)
Self-employed	4 (4.2%)
Housewives	4 (4.2%)
Drivers	2 (2.1%)
Pond Fishermen	2 (2.1%)
Village officials	1 (1.05%)
Barbers	1 (1.05%)
Housemaids	1 (1.05%)
Pedicap drivers	1 (1.05%)

Cognitive Function of the Research Respondents

To be able to determine the presence of cognitive function deficits in research respondents, researchers used the Mini Mental State Examination (MMSE) questionnaire which consisted of several questions related to the memory function of respondents and the following researchers distributed in the form of a table below:

Table 5.
Number of respondents by profession on Mini Mental State Examination (MMSE) test results

Respondents' Mini Mental State Examination (MMSE) Tes Results	Fishermen	Non-Fishermen
Respondents with normal scores (24 – 30)	46 (47.91%)	6 (6,25%)
Respondents with probable cognitive impairment (17 – 23)	2 (2,08%)	42 (43,75%)
Respondents with definite cognitive impairment (0 – 16)	-	-

Statistical Analysis Results

Cross tabulation between profession and gender of respondents, smoking history and co-morbidities on Mini Mental State Examination (MMSE) test results

Table 6.
Cross tabulation between profession and gender of respondents on Mini Mental State Examination (MMSE) test results

MMSE	Fishermen		Non-Fishermen	
	Male	Female	Male	Female
Normal	33 (34,38%)	13 (13,54%)	2 (2,08%)	3 (3,12%)
Probable	2 (2,08%)	-	16 (16,7%)	28 (29,16%)
Definite	-	-	-	-
MMSE	Fishermen		Non-Fishermen	
	Smoker	Non-Smoker	Smoker	Non-Smoker
Normal	27 (28,12%)	19 (19,8%)	2 (2,08%)	3 (3,12%)
Probable	2 (2,08%)	-	28 (29,16%)	15 (15,6%)
Definite	-	-	-	-
MMSE	Fishermen		Non-Fishermen	
	With Co-morbidities	Without Co-morbidities	With Co-morbidities	Without Co-morbidities
Normal	30 (31,3%)	16 (16,7%)	-	5 (5,2%)
Probable	1 (1,04%)	1 (1,04%)	30 (31,3%)	13 (13,5%)
Definite	-	-	-	-

Mann-Whitney test between research respondents' profession and Mini Mental State Examination (MMSE) test results

Table 7.
Mann-Whitney test between research respondents' profession and Mini Mental State Examination (MMSE) test result

	FgsKognitif
Mann-Whitney U	166.000
Wilcoxon W	1342.000
Z	-7.270
Asymp. Sig (2-tailed)	.000

Based on the results of the Mann-Whitney test between the profession and the Mini Mental State Examination (MMSE) test results, the significance result is $p = 0.000$ ($p < 0.05$), this states that this study is significant and there is a difference between the profession of fishermen and non-fishermen on the Mini Mental State Examination (MMSE) test results.

Correlation between gender of research respondents and Mini Mental State Examination (MMSE) test results

Table 8.
Correlation between gender of research respondents and Mini Mental State Examination (MMSE) test results

Correlations				
			FgsKognitif	Gender
Spearman's Rho	FgsKognitif	Correlation coefficient	1.000	0.000
		Sig (2-tailed)	.	.997
		N	96	96
	Gender	Correlation coefficient	0.000	1.000
		Sig (2-tailed)	.997	.
		N	96	96

The Spearman test was conducted to examine the relationship between gender and the Mini Mental State Examination (MMSE) score. The results showed that the correlation coefficient

was 0.000 (meaning No. correlation at all) and p-value was 0.997 (Not statistically significant). This indicates that there is no significant relationship between the gender of elderly fishermen and non-fishermen in relation to the results of the Mini Mental State Examination (MMSE).

Spearman test between smoking behavior of research respondents and Mini Mental State Examination (MMSE) test results

Table 9.
Relationship between Smoking Behavior of Research Respondents and Mini Mental State Examination (MMSE) Test Results

Correlations				
			FgsKognitif	Merokok
Spearman's Rho	FgsKognitif	Correlation coefficient	1.000	-0.016
		Sig (2-tailed)	.	0.875
		N	96	96
	Merokok	Correlation coefficient	-0.016	1.000
		Sig (2-tailed)	0.875	.
		N	96	96

The Spearman test was conducted to analyze the relationship between the smoking behavior of the research respondents and their scores on the Mini Mental State Examination (MMSE). The results showed a correlation coefficient of -0.016 (meaning No. correlation at all) and significance level of p = 0.875 (p> 0.05), indicating that this study is not statistically significant. Therefore, this study found no relationship between the smoking behavior of elderly fishermen and non-fishermen and their performance on the Mini Mental State Examination (MMSE).

Spearman test between study respondents' disease history and Mini Mental State Examination (MMSE) score

Table 10.
Spearman Test between Medical History of Research Respondents and Mini Mental State Examination (MMSE) Test Results

Correlations				
			FgsKognitif	Penyakit penyerta
Spearman's Rho	FgsKognitif	Correlation coefficient	1.000	-0.112
		Sig (2-tailed)	.	0.278
		N	96	96
	Penyakit penyerta	Correlation coefficient	-0.112	1.000
		Sig (2-tailed)	0.278	.
		N	96	96

The Spearman test was conducted to analyze the relationship between the medical history of the research participants and their Mini Mental State Examination (MMSE) scores. The results showed that the p-value was 0.278, which is greater than the significance level of 0.05. Therefore, this study concludes that there is no significant relationship between the comorbid history of elderly fishermen and non-fishermen on the MMSE results.

DISCUSSION

Bangkalan Regency, situated within East Java Province, represents one of the numerous coastal regions where prevalent health issues are often observed (Sumampouw & Lengkong, 2015). Elderly populations residing in these coastal areas face heightened vulnerability to various diseases, necessitating focused attention on their health and well-being. Defined as individuals aged 60 or older according to Law No. 13 of 1998 on the Welfare of the Elderly,

this demographic group has notably expanded over the past fifty years, comprising 10.7% of the population in 2020, up from 4.5% (Andry Poltak LG, 2022).

General description of the characteristics of research respondents

A common phenomenon associated with aging is the deterioration of cognitive function(Dayamaes, 2015), encompassing facets such as sensory and motor memory, cognitive speed, comparative functions, categorization, differentiation, and attention (Harijawan et al., 2024; Santrock, 2011). In this study, the researcher explores the discrepancies in Mini Mental State Examination (MMSE) scores among elderly individuals with and without fishing professions in Socah Village, Bangkalan. Employing an analytical observational approach, data were collected via MMSE questionnaires administered to 96 elderly residents. Categorized into four age groups based on Central Statistics Agency data(Armadi Setiawan, 2015), participants included 65 males (67.7%) and 31 females (32.3%). This study also found that more than half, 52 people (54.2%) of the study respondents had normal MMSE scores, while 44 people (45.8%) had low MMSE scores indicating possible cognitive impairment. This is in accordance with the research findings of Dayamaes (2015) and Nur Aini & Puspitasari (2016).

Comparison of Cognitive Function in Fishing vs Non-Fishing Communities

The findings, analyzed using the Mann-Whitney non-parametric test, unveil a cognitive function deficit in elderly individuals lacking fishing professions. Approximately 27.96% of non-fishermen exhibited lower MMSE scores, signifying a significant association ($p = 0.001$, $p < \alpha$, $\alpha = 0.05$). This underscores the importance of physical activity in maintaining cognitive function among the elderly (Lachman et al., 2016; Muzamil et al., 2014), consistent with Guimarães AV's and Parimon's research indicating its beneficial effects on memory, executive function, attention, and long-term memory (Carvalho et al., 2014; Guimarães et al., 2014).

Relationship between Gender and Cognitive function

Moreover, the study investigates the correlation between respondents' gender and MMSE scores using the non-parametric Spearman test, yielding a non-significant p-value of 0.997. This aligns with (Muzamil et al., 2014)et al.'s findings, indicating no gender-related association with MMSE scores. Nonetheless, (Yaffe et al., 2007) posits a connection between estradiol and enhanced cognitive function in women, attributed to estrogen's role in cognitive changes. Discrepancies in gender-related MMSE outcomes may stem from varying factors, including sample composition and physiological differences.

Relationship between Smoking History and Disease Comorbidites with Cognitive function

The analysis of respondents' smoking behavior reveals no significant relationship with MMSE scores ($p = 0.875$). While nicotine's transient cognitive benefits during smoking are acknowledged (Lin et al., 2007), Baumgart's research (Baumgart et al., 2015; Carvalho et al., 2014)underscores smoking's adverse cognitive effects, necessitating a nuanced understanding of its impact on cognitive function. Similarly, a history of disease was not significantly associated with MMSE scores ($p = 0.278$), contrary to prior studies linking illness with cognitive decline (Hutasuhut et al., 2020; Rasyid et al., 2017), like type 2 diabetes mellitus(Umegaki, 2014) and post-stroke(Wibowo et al., 2015). This suggests the presence of mitigating factors ensuring cognitive function resilience despite illness, such as dietary pattern affecting (Harijawan et al., 2024) nutritional status(Wicitania, 2016).

Study Limitations

However, it's important to acknowledge the limitations of this study. The sample size, though adequate for the current analysis, may not fully represent the diverse elderly population in coastal regions. Additionally, the cross-sectional nature of the study limits causal inference, warranting future longitudinal investigations to ascertain temporal relationships between variables. In conclusion, this study highlights the critical role of physical activity, gender, smoking behavior, and disease history in influencing cognitive function among elderly populations in coastal regions. Understanding these factors is paramount for devising targeted interventions to promote cognitive health and overall well-being in this demographic.

CONCLUSION

This study conducted among 96 participants in Socah Village, Bangkalan, has found evidence of cognitive decline in senior adults who do not engage in fishing activities, highlighting the impact of profession on cognitive function. Although there were no notable associations between MMSE scores and gender, education, or medical history, the results emphasize the importance of customized interventions to maintain cognitive function in senior populations living in coastal areas.

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