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Research Article

The Correlation Between Hypertension Experienced by the Elderly and the Risk of Dementia

Reni Zulfitri[1]*, Husnawati[2]

[1]School of Nursing Universitas Riau Pekanbaru, Riau, Indonesia
[2]Sekolah Tinggi Ilmu Farmasi Riau, Pekanbaru, Riau, Indonesia

ORCID
Reni Zulfitri: https://orcid.org/0000-0003-0324-2657

Abstract.
Hypertension can change the structure of the blood vessels of the brain by interfering with the working mechanism of the brain. This study aimed to determine the correlation between hypertension experienced by the elderly and the risk of dementia. This research is a descriptive correlation with cross-sectional approach in Pekanbaru City. Samples in this study were 86 elderly people who were taken by purposive sampling technique. Data on the condition of hypertension experienced by the elderly were collected using a questionnaire and a blood pressure meter. Dementia risk data were collected using the MMSE (mini mental status examination). The descriptive analysis showed that 62.8% of the elderly had uncontrolled hypertension, 52.3% of the elderly did not routinely control their health, 54.7% of the elderly had hypertension for 5 years, 54.7% of the elderly had high-grade hypertension, and 52.3% of the elderly had impaired cognitive function or were at risk of dementia. The Chi-square test showed a significant correlation between the length of time the elderly suffer from hypertension and the risk of dementia with p-value = 0.000 (p-value < 0.005), while the variables of blood pressure condition, history of health control, and classification of hypertension experienced by the elderly do not have a significant correlation with dementia risk (p-value > 0.005). Hypertension for more than 5 years have had lacunar infarction in certain parts of the brain that can cause impaired cognitive function and even dementia.

Keywords: hypertension, elderly, dementia

Corresponding Author: Reni Zulfitri; email: reni.zulfitri@gmail.com

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1. INTRODUCTION

Hypertension is one of the main health problems in the elderly, lasts a lifetime, cannot recover as before, and is a silent killer. Many people with hypertension do not indicate complaints or symptoms, but become one of the causes of complications and death (Smeltzer & Bare, 2013).

The prevalence rate of hypertension tends to increase with age. According to the World Health Organization (WHO) world level human life expectancy in 2019 will reach 72 years. In 2018, human life expectancy in Indonesia has reached 71.2 years (Central Bureau of Statistics, 2019). Human Life Expectancy in Riau Province in 2019 has also

reached 71.48 years (Central Bureau of Statistics, 2019). The increase in human life expectancy (UHH) globally has an impact on the high prevalence of hypertension throughout the world.

The prevalence of hypertension in the elderly (55 years and over) at the world level, in Indonesia, including in Riau Province, has reached 50% (Ministry of Health RI, 2019b). Even in Riau Province and Pekanbaru City, hypertension ranks first for non-communicable chronic diseases at the age of 55 years and over (Health Office in Pekanbaru, 2019). Thus, hypertension is a major health problem in the elderly and is the focus of attention in public health services in the world, including in Indonesia, especially in Pekanbaru City.

The problem is that various study results reveal that the high prevalence of hypertension in the elderly is accompanied by a high condition of uncontrolled hypertension in the elderly. Several studies have shown that more than 50% of elderly people with hypertension are in an uncontrolled condition (Guessous et al., 2012). According to WHO, hypertension is one of the main causes of premature death in the world, where out of 22% of people with hypertension globally, only less than one fifth makes efforts to control blood pressure (Ministry of Health RI, 2019a). In Indonesia, data from the 2013 Riskesdas report shows that 63.2% of hypertension cases in the community were undiagnosed (uncontrolled) and 42.1% of stroke cases in the community were uncontrolled (Ministry of Health RI, 2014).

The condition of uncontrolled hypertension can cause disturbances in various organ systems of the body. In addition to causing disturbances in the cardiovascular and kidney systems, hypertension also causes disturbances in the cerebrovascular system which affects brain function (Smeltzer & Bare, 2013). This condition greatly affects the quality of life of the elderly.

Complications of hypertension in the cerebrovascular system can cause a decrease in cognitive function, including those related to memory or memory (vascular cognitive impairment). Hypertension is very at risk of changes in structure and function through the process of renovating brain blood vessels, which can cause disturbances in brain autoregulation, reduce brain perfusion, and limit the ability of the brain to function (Walker et al., 2017). The results of Aronow's review (2017) argue that hypertension is a significant risk factor for the formation of white matter lesions that affect cognitive function decline. Where hypertension sufferers aged 55 years and over are at risk of developing grade 3 white matter lesions by 2.34 times compared to those without hypertension, and by 3.40 times increased in people with uncontrolled hypertension.

The results of Sierra (2020) and Walker et al. (2017) explained that hypertension has a high risk of impaired cognitive function and even dementia. Patients with hypertension are at high risk for stroke, focal brain atrophy, cerebral small vessel disease, increased arterial stiffness where this condition affects the occurrence of endothelial dysfunction, hypoxia, decreased blood flow to the brain, decreased cholinergic neurotransmission which can lead to cognitive impairment and even dementia.

Dementia is a clinical syndrome of loss of intellectual and memory functions that is so severe that it causes dysfunction of daily life (Azizah, 2012) and (Nugroho, 2015). According to Alzheimer's Disease International, every 3 seconds, 1 person in the world has dementia. The incidence of Alzheimer's dementia worldwide is increasing rapidly and is currently estimated to be close to 46.8 or 50 million people diagnosed with dementia in the world, 20.9 million in Asia Pacific (Prince et al., 2015) and there are around 10 million new cases every year. In Indonesia alone, it is estimated that there are around 1.2 million people with dementia in 2016, which will increase to 2 million in 2030 and 4 million people in 2050. The high prevalence rate of dementia greatly affects the quality of life of the elderly.

An examination to test cognitive function in the elderly is to use the Mini Mental State Exam (MMSE) which consists of 30 maximum scores, providing information about orientation, attention, memory, perception, and thought processes (Morton et al., 2014). Dealing with the level of dementia, it is divided into 3, namely mild, moderate and severe dementia. It is said to have mild dementia, that is, if it has an MMSE score of 21-30, it is said to be moderate dementia, it is if it has an MMSE score 11-20, and it is argued to have severe dementia, it is if it has an MMSE score <10 (Azizah, 2012).

The results of the preliminary study in December 2019 showed that in the Working Area of the Payung Sekaki District Health Center, Pekanbaru City, the highest number of elderly populations in Pekanbaru City with the main health problem experienced by the elderly is Hypertension. The results of the interviews showed that 6 out of 8 elderly people had hypertension, 4 out of 6 elderly people with hypertension experienced cognitive problems related to orientation and recall. The other 2 elderly people with hypertension had good memory and thought processes.

Based on this description, the researcher is interested in examining the correlation of hypertension in the elderly based on the classification of hypertension, duration of hypertension, hypertension, and history of blood pressure control with the risk of developing dementia.

2. MATERIALS AND METHODS

This is a descriptive correlational study that was conducted in the working area of Payung Sekaki Subdistrict Public Health Center in Pekanbaru. This subdistrict has the highest elderly population compared to other Public Health Centers. This study involved 86 elders who were recruited using purposive sampling technique according to the inclusion criteria, including: elderly aged 60 years and above, experiencing hypertension, and living with family.

The data was collected through questionnaires. Data on the condition of hypertension experienced by the elderly were collected through a questionnaire compiled based on literature studies in the form of closed questions, consisting of: classification of hypertension, condition of hypertension, history of health control, and duration of hypertension. Data on the risk of dementia was collected through a valid and reliable Mini Mental State Examination (MMSE) questionnaire. The MMSE consists of 11 questions that measure 5 areas of cognitive function which consist of orientation, registration, attention and calculation, repetition, and language. Research will carry out the MMSE test for 5-10 minutes. The maximum score on the MMSE examination is 30, a score ≥24 is said to have no impaired cognitive function and a score <24 is revealed to have cognitive impairment (Silitonga et al., 2017).

Data analysis in this study was univariate and bivariate using computer software. Univariate analysis in the form of frequency distribution (%) and bivariate analysis using Chi Square test with p value (0.05). This research process has applied the principles of research ethics, namely using informed consent, the principle of benefits, fairness, and guaranteeing confidentiality.

3. RESULTS

3.1. Description of hypertension experienced by the elderly

Responding to the table, it shows that the majority of hypertension conditions experienced by the elderly are not controlled, namely as many as 54 respondents (62.8%), most of the elderly have a history of non-routine health control, namely as many as 45 respondents (52.3%) and most of the elderly 47 respondents (54.7%) had hypertension, namely ≥ 5 years, and the majority of the elderly had grade 1 (mild) hypertension, namely 47 people (54.7%).

3.2 Description of the risk of developing dementia in elderly people with hypertension

Table 1: Frequency Distribution of Hypertension Conditions in the Elderly (N = 86).

No.	Condition of Hypertention Disease Experienced by Elderly	N	%
1.	Hypertension condition Controlled hypertension Not controlled hypertension	32 54	37,2 62,8
	Total	86	100,0
2.	History of health control Routine Not routine	41 45	47,7 52,3
	Total	86	100,0
3.	Time of suffering from hypertension ≥ 5 Years < 5 Years	47 39	54,7 45,3
	Total	86	100,0
4.	Hypertension Classification		
	a. Normal	19	22,1
	b. Level 1	47	54,7
	c. Level 2	19	22,1
	d. Level 3	1	1,2
	Total	86	100

An overview of the risk of developing dementia based on the description of cognitive function in elderly people with hypertension can be seen as follows:

Table 2: Frequency Distribution Based on the Description of the Risk of Dementia in Elderly Patients with Hypertension (N=86).

No.	Description of Dementia Risk on elderly patients	N	%
1.	There is no disorder of cognitive function	41	47,7
2.	Cognitive function disorder (Risky)	45	52,3
	Total	86	100,0

Based on this table, it shows that most of the elderly respondents with hypertension are at risk of developing dementia, where most of the elderly with hypertension experience impaired cognitive function as many as 45 respondents (52.3%).

3.3 Correlation of hypertension experienced by the elderly with the risk of developing dementia

The relationship between the conditions of hypertension experienced by the elderly (hypertensive conditions, history of health control, duration of suffering from hypertension, and classification of hypertension) with the risk of developing dementia can be seen in the following table.

Table 3: Relationship between Hypertension and the Risk of Dementia in Hypertensive Elderly (N = 86).

No	Characteristics	Dementia Risk				Total	P value
		No Cognitive Function Disorder		Cognitive Function Disorder			
		N	%	n	%		
1.	Hypertension Condition						0,120
	a. Controlled hypertension	19	59,4	13	40,6	32	
	b. Not controlled hypertension	22	40,7	32	59,3	54	
	Total	41		45		86	
2.	History of health control						0,195
	a. Routine	23	56,1	18	43,9	41	
	b. Not Routine	18	40,0	27	60,0	45	
	Total	41		45		86	
3.	Time of Suffering from Hypertension						0,000
	a. ≥ 5 Years	5	10,6	42	89,4	47	
	b. < 5 Years	36	92,3	3	7,7	39	
	Total	41		45		86	
4. Hypertension classification							0,581
a. Normal		11	57,9	8	42,1	19	
b. Level 1		22	46,8	25	53,2	47	
c. Level 2		8	42,1	11	57,9	19	
d. Level 3		0	0	1	100	1	
total		41		45		86	

Dealing with the table, it indicates that of the 4 variable conditions of hypertension experienced by the elderly, only the old variable suffering from hypertension has a relationship with the risk of developing dementia with a p value = 0.000 (p value <0.005).

4. DISCUSSION

The results of the bivariate analysis showed that there was no relationship between the condition of hypertension, history of control, and classification of hypertension with the risk of developing dementia. Only the variable duration of suffering from hypertension is associated with the risk of developing dementia in the elderly with a p value of 0.000 (p value <0.005).

Long-term hypertension can cause a decrease in cognitive function, which will certainly greatly interfere with the quality of life of sufferers (Sharp et al., 2011). Taufik et al. (2014) argue that someone who has high blood pressure that is not controlled or is allowed to remain high after 5 years will have a high risk of suffering from impaired cognitive function, especially attentional function which of course this impaired function will be very disturbing for sufferers and those around them, thereby increasing patient dependency on others. Complications of hypertension related to the brain are vascular remodeling resulting in impaired cerebral autoregulation, white matter lesions, lacunar infarctions, and brain changes. If it is left longer, it will further exacerbate the lesions in the white matter and lacunar infarctions, so that cognitive function disorders will also be more severe (Lestari et al., 2018).

The duration of suffering from hypertension can affect the cognitive function of the elderly. In the research process conducted by the researchers, it was found that elderly people who had suffered from hypertension for ≥5 years experienced more cognitive function disorders than <5 years. (Taufik et al., 2014). Regarding to the researcher, the longer the elderly suffer from hypertension, the more they experience impaired cognitive function, such as difficulty in concentrating and recalling, this is due to the occurrence of lacunar infarctions in certain parts of the brain. Impaired function will be very disturbing for the elderly and those around them, thereby increasing the number of dependencies of the elderly on other people.

This is in accordance with research conducted by Turana (2019) who asserts that hypertension is the main factor of damage to target organs, one of which is the brain and causes a decrease in cognitive function. The results of research conducted by Perrotta et al. (2016) argue that hypertension causes hardening of the cerebral arteries and microvascular dysfunction, thus playing a role in the cause of dementia. Microvascular changes due to hypertension are a factor causing decreased cognitive function, and also a prognostic factor for stroke and vascular dementia (Pikir, 2015).

Another study conducted by Coca et al. (2016) argue that cognitive decline and dementia are related to hypertension and other cardiovascular factors.

All the results of these studies concluded that the elderly who have a history of hypertension for a longer time and whose hypertension is not controlled will affect cognitive function related to dementia. Management of hypertension can prevent cognitive dysfunction and dementia in the elderly

5. CONCLUSION

The results of this study concluded that the elderly who have a longer history of hypertension and uncontrolled hypertension will affect cognitive function related to dementia. Management of hypertension can prevent cognitive dysfunction and dementia in the elderly.

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CONFLICT OF INTEREST

No conflict of interest

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