

RESEARCH ARTICLE

The Effect of Hypercholesterolemia on Cognitive Function in Elderly Patients at Simalingkar Community Health Center, Medan

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ABSTRACT

Background: of the study. Damage to the structure and function of the brain can lead to a decline and impaired cognitive function. This cognitive impairment can be caused by increasing age and risk factors such as dyslipidemia, hypertension, diabetes and cerebral blood vessels.

Methods: This study used a cross-sectional design. The research population is all the elderly who are in the working area of the Simalingkar Health Center in 2022 as many as 500 people. The sample size is 66 people. The sampling technique was carried out using a consecutive sampling technique. Hypercholesterolemia data collection is based on medical record data, while cognitive impairment uses a mini mental status examination questionnaire. Analysis of research data using univariate and bivariate with Chi Square test.

Results: showed that the majority of the elderly experienced hypercholesterolemia as many as 50 people (76.9%), and cognitive function in the elderly mostly in the normal category as many as 41 people (56.9%). There was no correlation between hypercholesterolemia and cognitive function in the elderly ($p = 0.231 > 0.05$).

Conclusion: Hypercholesterolemia is not associated with cognitive function in the elderly.

Keywords: Hypercholesterolemia, Cognitive Function, Elderly

INTRODUCTION

Hypercholesterolemia is a condition characterized by elevated levels of cholesterol and lipoproteins rich in apolipoprotein B (apoB).¹ According to the Centers for Disease Control and Prevention (CDC), 73.5 million, or 31.7%, adults in the United States suffer from hypercholesterolemia. According to information from the Indonesian Ministry of Health in 2016, the prevalence of hypercholesterolemia in those aged 60 years

and older reached 58.7%, and in North Sumatra it reached 47.6%.²

People with hypercholesterolemia usually experience no signs or symptoms until further complications develop. Hypercholesterolemia with high risk factors is associated with atherosclerotic cardiovascular disease due to the buildup of plaque that blocks the heart's blood vessels.³

The role of cholesterol in dementia pathology may be related to the APOEe4

allele, an isoform of ApoE, an apolipoprotein that plays a crucial role in cholesterol transport. ApoE4 can reduce cholesterol transport from astrocytes to neurons. As a result, it can induce the highest accumulation of A β and gliosis compared to other isoforms, which can affect A β generation and alter synaptic function in neurons.⁴

Poorer cholesterol transport and clearance can increase cholesterol levels in older adults. High cholesterol levels can cause atherosclerosis, which reduces blood flow to the brain and accelerates neurodegeneration through its effect on beta amyloid (Abeta), a plaque-forming protein found in excess in the brains of Alzheimer's patients.⁵

With the increasing prevalence of hypercholesterolemia in elderly patients, coupled with theories and data explaining that excessive plaque buildup can cause blockages in the heart arteries, which can lead to neurodegeneration, which can lead to decreased cognitive function in elderly patients, researchers wanted to further examine the effect of hypercholesterolemia on cognitive function in elderly patients. The study was conducted at the Simalingkar Community Health Center in Medan.

This study was an observational analytical study with a cross-sectional design. The aim was to determine the effect of hypercholesterolemia on cognitive function in the elderly. A consecutive sampling technique was used to select 66 individuals, ensuring that all subjects meeting the criteria were included in the study until the required sample size was reached.

Data collection involved primary data obtained directly from patients. This

study employed an internationally standardized questionnaire, the Mini Mental State Examination (MMSE), and secondary data obtained from medical records, including the number of elderly patients with hypercholesterolemia receiving treatment at the Simalingkar Community Health Center in Medan. Data analysis was necessary to identify any errors. The first stage involved editing, which checked the names and completeness of respondents' identities and data. The next stage involved coding, which coded the questionnaires to facilitate data tabulation and analysis. The third stage involved entering the questionnaire data into the computer. Finally, cleaning, which double-checked the entered data.

RESULTS AND DISCUSSION

Table 4.1. Frequency Distribution of Elderly Characteristics at Simalingkar Community Health Center in 2022

No	Age	Frekuency	%
1	60-74 year	64	98.5
2	75-90 year	1	1.5
Total		65	100.0
Pendidikan			
1	SMP	11	16.9
2	SMA	45	69.2
3	Sarjana	9	13.8
Total		65	100

Table 4.1 shows that the majority of elderly people are aged 60-65 years, amounting to 64 people (98.5%), and the majority of elderly people are high school graduates, amounting to 45 people (69.2%).

Table 4.2. Frequency Distribution of RPT at Simalingkar Community Health Center in 2022

No	RPT	Frekuensi	%
1	Ada	32	49.2
2	Tidak ada	33	50.8
	Total	100	100.0

Table 4.2 shows that the majority of RPTs were absent, with 33 individuals (50.8%).

Table 4.3. Frequency Distribution of Hypercholesterolemia at Simalingkar Community Health Center in 2022

No	Hiperkolestolemia	Frekuensi	%
1	Hiperkolestrolenia	50	76.9
2	Tidak hiperkolestrolenia	15	23.1

Table 4.3 shows that the majority of elderly people (50 individuals) experienced hypercholesterolemia (76.9%).

Table 4.4. Frequency Distribution of Cognitive Function at Simalingkar Community Health Center in 2022

No	Fungsi Kognitif	Frekuensi	%
1	Gangguan penurunan kognitif	24	36.9
2	Normal	41	63.1

Table 4.4 shows that the majority of elderly people (41 individuals) had normal cognitive function (63.1%).

Table 4.5. Crosstabulation of Gender and Cognitive Function at Simalingkar Community Health Center in 2022

Jenis Kelamin	Fungsi Kognitif				Total	
	Penurunan		Normal			
	n	%	n	%	n	%
Laki-laki	6	30	1	70	20	100
Perempuan	1	40	2	41,5	45	100
Total	36,9	4	63,1	1	65	100

Table 4.5 shows that of the 20 elderly men, 6 (30%) had cognitive impairment and 14

(70%) had normal cognitive function. Of the 45 elderly women, 18 (40%) had cognitive impairment and 27 (60%) had normal cognitive function.

Usia	Fungsi Kognitif				Total	
	Penurunan		Normal			
	n	%	n	%		
60-74 year	24	37,5	40	62,5	64	
75-90 year	0	0,0	1	100	1	
Total	24	36,9	41	63,1	65	

Table 4.6 shows that of the 64 elderly people aged 60-74 years, 24 (37.5%) had moderate cognitive function, and 40 (62.5%) had normal cognitive function. Of the 64 elderly people aged 75-90 years, 1 (100%) had normal cognitive function.

Table 4.7. Crosstabulation of Education and Cognitive Function at Simalingkar Community Health Center in 2022

Pendidikan	Fungsi Kognitif				Total	
	Decline		Normal			
	n	%	n	%		
SMP	4	36,4	7	63,6	11	
SMA	15	33,3	30	66,7	45	
Sarjana	5	55,6	4	44,4	9	
Total	24	36,9	41	63,1	65	

Table 4.7 shows that of the 11 elderly people with a junior high school education, 4 (36.4%) had cognitive impairment, and 7 (63.6%) had normal cognitive function. Of the 45 elderly people with a high school education, 15 (33.3%) had cognitive impairment,

and 30 (66.7%) had normal cognitive function. Of the 9 elderly people with a bachelor's degree, 5 (55.6%) had cognitive

impairment, and 4 (44.4%) had normal cognitive function.

Table 4.8. Cross-tabulation of the Effect of Hypercholesterolemia on Cognitive Function in the Elderly at Simalingkar Community Health Center in 2022

Hypercholes terolemia	Fungsi Kognitif					
	Normal		Total		p value	
	%	N	%	N	%	
Hipercholes terolemia	32	34	68	50	100	
Tidak Hipercholes terolemia	53,3	7	46,7	15	100	0,231
Total	33,8	6	39	100	100	

Table 4.6 shows that of the 50 elderly people with hypercholesterolemia, 16 (32%) had cognitive impairment, and 34 (68%) had normal cognitive function. Of the 15 elderly people without hypercholesterolemia, 8 (53.3%) had cognitive impairment, and 7 (46.7%) had normal cognitive function. The Chi-Square test showed no effect of hypercholesterolemia on cognitive function ($p = 0.231 > 0.05$).

CONCLUSION

Based on the results of research on the effect of hypercholesterolemia on cognitive function in the elderly at the Simalingkar Community Health Center in 2022, it can be concluded that hypercholesterolemia is not significantly related to cognitive function in the elderly ($p = 0.231 > 0.05$).

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