The Relationship of the Cardiovascular System Health With Demensia at the Age of 50-60 Years at Haji General Hospital

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Article Info	ABSTRACT
Article history: Received November 29, 2022 Revised December 07, 2022 Accepted December 12, 2022 *Corresponding Author:* Zaim Anshari Dosen Fakultas Kedokteran Universitas Islam Sumatera Utara, Street STM, No 77, Medan, 20219, Indonesia Email: zaim.anshari@fk.uisu.ac.id	Dementia is a syndrome in which there is a decline in memory, thinking, behavior and ability to carry out daily activities. Several studies have shown a link between the development of cognitive impairment and dementia and educational attainment, and lifestyle-related risk factors, such as physical inactivity, tobacco use, unhealthy diet and harmful use of alcohol. Dementia can be identified using the MMSE (*Mini Mental State Examination*). Furthermore, certain medical conditions are associated with an increased risk of developing dementia, including hypertension, diabetes, dyslipidemia, obesity and depression. The ideal cardiovascular health score, also referred to as Life's Simple 7, consists of four health behavior indicators, and three biologics. analysis using a *cross-sectional design* , which was carried out at the Hajj Hospital, December 2020 - March 2021 and involved 70 respondents. Data obtained by medical records and interviews. Based on the results of the study, the results of the *somer's d correlation test* obtained a value of p = 0.000 (p <0.05) so that a significant relationship was found between the Health of the Cardiovascular System and the Incidence of Dementia at the Age of 50-60 Years . There is a relationship between the health of the cardiovascular system and the incidence of dementia at the age of 50-60 years. *Keywords:* Cardiovascular System Health, Dementia, Risk Factors This article is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License..

1. INTRODUCTION

The cardiovascular system is a collection of organs that work together to perform the transport function in the human body . [1]The American Heart Association (AHA) proposes an ideal cardiovascular health score, also referred to as Life's Simple 7, consisting of four health behavior indicators (non-smokers, body mass index <25 kg/m ^{2} , good physical activity, and consumption of a healthy diet) which improve cardiovascular health), and three biologics (untreated total cholesterol <200 mg/dL, untreated blood pressure <120/<80 mm Hg, and fasting blood glucose <100 mg/dL) . [2] According to Severine Sabia's research, the health score of the cardiovascular system is categorized as good if (score 12-14), moderate if (score 7-11), and bad if (0-6) . [3]

Table 1 | Definition of cardiovascular health metrics

Metrics	Poor level (score=0)	Intermediate level (score=1)	Optimal level (score=2)
Smoking	Current smoker	Stopped in past 5 years	Never smoked or stopped >5 years ago
Diet	Consumption of fruit and vegetable less than twice a day AND no consumption of high fibre bread	Consumption of fruit and vegetable twice a day or more OR consumption of high fibre bread	Consumption of fruit and vegetable twice a day or more AND consumption of high fibre bread
Physical activity	No moderate or vigorous physical activity	1-149 min/week of moderate activity OR 1-74 min/week of vigorous activity OR 1-149 min/week of moderate and vigorous activity	≥150 min/week of moderate activity OR ≥75 min/week of vigorous activity OR ≥150 min/week of moderate and vigorous activity
Body mass index	≥30	25-29.9	<25
Fasting glucose	≥126 mg/dL	<100 mg/dL treated OR 100-125 mg/dL	<100 mg/dL untreated
Blood cholesterol	≥240 mg/dL	<200 mg/dL treated OR 200-239 mg/dL	<200 mg/dL untreated
Systolic and diastolic blood pressure	SBP ≥140 mm Hg OR DBP ≥90 mm Hg	SBP <120 mm Hg and DBP <80 mm Hg treated OR SBP 120-139 OR DBP 80-89 mm Hg	SBP <120 mm Hg and DBP <80 mm Hg untreated

DBP=diastolic blood pressure; SBP=systolic blood pressure.

Figure 1. Health Factors of the Cardiovascular System [3]

In memory, thinking, behavior and mental abilities do daily activities . [4] Non-modifying risk factors for dementia include gene polymorphisms, age, sex, race/ethnicity and family history. Most importantly, age is the strongest risk factor for cognitive decline. Several studies have shown a link between the development of cognitive impairment and dementia and educational attainment, and lifestyle-related risk factors, such as physical inactivity, tobacco use, unhealthy diet and harmful use of alcohol. Furthermore, certain medical conditions are associated with an increased risk of developing dementia, including hypertension, diabetes, dyslipidemia, obesity and depression . [3]

According to the study, the incidence rate of dementia was 3.2 (95% confidence interval 2.5 to 4.0) per 1000 person/year among groups with poor heart health, the absolute rate difference per 1000 person/year was −1.5 (95% confidence interval −2.3 to −0.7) for the moderate heart health group and −1.9 (−2.8 to −1.1) for the optimal heart health group. Higher cardiovascular health scores were associated with lower dementia risk (hazard ratio 0.89 (0.85–0.95) per 1 point increase in cardiovascular health scores). The association between cardiovascular health at age 50 and dementia was also seen in people who remained free of cardiovascular disease during follow-up (hazard ratio 0.89 (0.84–0.95) per 1-point increase in cardiovascular health score) . [3]

According to WHO, around 47 million people with dementia worldwide were recorded in 2015, with the addition of nearly 10 million new cases each year . [4] As a result of dementia, the death rate has more than doubled in 2015 compared to 2010 , so that dementia is the 7th most common cause of death in the world in 2015. It is estimated that dementia will reach 131.5 million people in 2050, 68% will be found in developing countries, with an increase of one case every three seconds . [6]

Diagnostic guidelines for dementia according to PPDGJ (Guidelines for Classification and Diagnosis of Mental Disorders) in Indonesia, namely: 1) There is a decrease in memory and thinking abilities, which can interfere with daily activities (*personal activities of daily living*) such as: bathing, dressing, eating, personal hygiene, defecation and urination. 2) There is no disturbance of consciousness (*clear consciousness*). 3) Symptoms and disability have been evident for at least 6 months . [7]

The Mini-Mental State Examination (MMSE) is the most frequently used examination to determine cognitive function. The MMSE assesses time and place orientation, registration, attention and calculation, recall, language and execution of orders. The assessment consists of several tests and is given a value for each answer that is considered correct . [8] Guidelines Global cognitive score (in general): 1) Score: 24 -30: normal. 2) Score: 17-23: probable cognitive impairment. 3) Score: 0-16: definitely cognitive impairment. Note: in making cognitive function assessments, the level of education and age of the respondent must be considered . [9]

Based on the data above, there is no data regarding dementia in North Sumatra, especially in Deli Serdang, and no one has explained about the health of the cardiovascular system with the incidence of dementia at the age of 50-60 years. Therefore, the researcher is interested in carrying out this research.

2. METHOD

The research was conducted in an analytic nature using a *cross-sectional design* , where to look for the relationship between the independent variable (cardiovascular system health) and the dependent variable (dementia) which was carried out at one time.

The research will be held from December 2020 to March 2021. This research will be carried out at the Haji Hospital, Deli Serdang, North Sumatra.). The population of this study were 70 patients aged 50-60 years who had cardiovascular health problems in the internal medicine polyclinic at Haji General Hospital. Determination of the sample in this study was based on the *total sampling technique* where the sample was taken as a whole from the population, namely 70 patients.

Data collection techniques in this study were primary and secondary data, because the data was obtained from medical records and directly from the source. The instruments in this study were the MMSE (*Mini Mental State Examination*) and IPAQ (*International Physical Activity Questionnaire)* .

Data management, initially the author assesses the completeness of filling in the data, whether there are errors or not. If the data received is incomplete, it cannot be used (*editting*). After the data is selected, then the data is coded to make it easier to carry out data analysis *(coding*). Data that has been coded is input into computer *software* (*data entry*) , then the data is checked again whether there may be an incorrect code , incompleteness and so on, then corrected (*cleaning*).

Data analysis was performed to determine the relationship between the independent variables and the dependent variable by using *Somers'D test analysis* . The management of this data analysis uses SPSS 16.0 *software* . The results of the analysis are said to be significant or there is a relationship if p <0.05.

Table 1. Somers'D [10]

IntervalCoefficientCorrelation	Relationship Level
0.00 – 0.199	Very low
0.20 – 0.399	Low
0.40 – 0.599	Currently
0.60 – 0.799	Strong
0.80 – 1.000	Very strong

3. RESULTS AND DISCUSSION

Results

This research has been carried out at Haji General Hospital . The Hajj Hospital is located at the Hajj Hospital, Percut Sei Tuan District, Deli Serdang, North Sumatra. Respondents in this study were patients who experienced cardiovascular health problems with a large sample of 70 respondents. The method taken is *total sampling* and the test is by *Somer's d* where this test is to determine the effect of each independent variable on the dependent variable. The characteristics of the respondents that I took are as follows:

Table 2. Frequency Distribution of Respondent Characteristics by Age

Age	N	%
50-55 Years	37	75
56-60 Years	33	25
Amount	**70**	**100**

Based on age categorical characteristics, it was found that the least number of respondents were in the age range of 56-60 years, namely 33 people (25%), and the most were in the age group above 51-55 years, namely 37 people (75%).

Table 3. Frequency Distribution of Respondent Characteristics by Gender

Gender	N	%
Man	36	55,2
Woman	34	44.8
Amount	**70**	**100**

Based on gender characteristics, 34 female respondents (55.2%) were obtained, while 36 male respondents (44.8%).

Table 4. Frequency Distribution of Respondent Characteristics Based on Hypertension

Hypertension	N	%
Normal	13	27,6
Hyper I	57	72,4
Hyper II	0	0.00
Amount	**70**	**100**

Based on the characteristics of hypertension, it was found that the most respondents had stage I hypertension, namely 57 people (72.4%), and the normal ones were 13 people (27.6%).

Table 5. Frequency Distribution of Respondent Characteristics Based on Lipids

Lipids	N	%
Normal	20	29,6
Tall	50	70,4
Amount	**70**	**100**

Based on lipid characteristics, it was found that the most respondents had high lipid levels, namely 50 people (70.4%), and normal lipid levels, 20 people (29.6%).

Table 6. Frequency Distribution of Respondent Characteristics Based on DM

DM	N	%
DM Stage I	8	12,7
DM Stage II	60	84.5
Normal	2	2,8
Amount	**70**	**100**

Based on the characteristics of DM, the most respondents had a history of type II DM, namely 60 people (84.5%), and type I DM were 8 people (12.7%), and the least normal blood sugar levels were 2 people (2.8%).

Table 7. Frequency Distribution of Respondents' Characteristics Based on Smoking

Smoke	N	%
There is	42	60,6
There isn't any	28	39,4
Amount	**70**	**100**

Based on smoking characteristics, it was found that the majority of respondents had a smoking history, namely 42 people (60.6%), and no smoking history, 28 people (39.4%).

Table 8. Frequency Distribution of Respondent Characteristics Based on Diet

Diet	N	%
Well	52	74,6
Bad	18	25,4
Amount	**70**	**100**

Based on the characteristics of the diet, it was found that the majority of respondents had a good diet pattern, namely 52 people (74.6%), and had a bad diet pattern, 18 people (25.4%).

Table 9. Frequency Distribution of Respondent Characteristics Based on Physical Activity

Physical Activity	N	%
Well	52	74,6
Bad	18	25,4
Amount	**70**	**100**

Based on the characteristics of physical activity, it was found that most respondents had good physical activity, namely 52 people (74.6%), and had poor physical activity, as many as 18 people (25.4%).

Table 10. Frequency Distribution of Respondent Characteristics Based on BMI

BMI	N	%
Thin	12	17,1
Normal	31	44,3
Obesity	8	11,4
Overweight	19	27,2
Amount	**70**	**100**

Based on the characteristics of BMI, it was found that most respondents had Normal BMI, namely 31 people (44.3%), and 8 people who were obese (11.4%).

Table 11. Frequency Distribution of Respondent Characteristics Based on Cardiovascular System Health

Cardiovascular System Health	N	%
Well	52	74,6
Bad	18	25,4
Amount	**70**	**100**

Based on the characteristics of the health of the cardiovascular system, it was found that most respondents had good cardiovascular system health, namely 52 people (74.6%), and had poor cardiovascular system health, as many as 18 people (25.4%).

Table 12. Frequency Distribution of Respondent Characteristics Based on Dementia

Characteristics of Respondents	N	%
definite	23	39,4
Normal	47	60,6
Amount	**70**	**100**

Based on the characteristics of dementia, the majority of respondents did not have a history of dementia (normal) , as many as 47 people (60.6%), and there was a history of dementia (definite cognitive disorder) as many as 23 people (39.4%).

Table 13. Analysis of the Relationship between Cardiovascular System Health and Dementia at the Age of 50-60 Years

Cardiovascular System Health	dementia						Somers' d Correlation Test
	There is		There isn't any		Total		
	N	%	N	%	N	%	
Well	17	73,8	35	74.9	52	74,3	p=0.000
Bad	6	26,2	12	2 5,1	18	25,7	r=0.960
Total	23	100	47	100	70	100	

Based on the results of the *somer's d correlation test* shown in table 4.2, a value of p = 0.000 (p <0.05) is obtained so that it can be concluded that there is a significant relationship between the Health of the Cardiovascular System and the Incidence of Dementia at the Age of 50-60 Years . The value of the correlation coefficient r = 0.960 indicates the strength of the correlation between variables, namely a very strong correlation (r = 0.80-1.000). The direction of positive correlation (+) indicates that the higher the patient's cardiovascular health system, the lower the patient's level of dementia and vice versa.

Discussion

Based on age categorical characteristics, the majority of respondents were aged over 51-55 years, namely 37 people (75%). Age is known to be the strongest risk factor for dementia. Although dementia can occur earlier. only 1 in 20 people will develop dementia under the age of 65. Over the age of 65, a person's risk of developing Alzheimer's disease or vascular dementia doubles every 5 years. It is estimated that one in 14 people over 65 years of age and one in 6 people over 80 years have dementia . [11]

Based on gender characteristics, the most respondents were men, 36 people (55.2%). Based on 2014 data from the Central Bureau of Statistics, the number of elderly women is greater than that of men, namely 10.77 million elderly women and elderly men -men amounted to 9.47 million. This shows that the life expectancy of women is higher. The results of the 2010 Population Census recorded that the life expectancy of women was 71.74 years, higher than that of men , namely 67.51 years . [12]

Based on the characteristics of hypertension, it was obtained that the most respondents had stage I hypertension, namely 57 people (72.4%). Blood pressure is the strength needed so that blood can flow in the arteries and veins , so that it circulates in all tissues of the human body. Blood that flows throughout the body functions as a carrier of oxygen and other substances needed by body cells .[12]

Based on lipid characteristics, it was found that the most respondents had high lipid levels, as many as 50 people (70.4%). Total cholesterol is the amount of lipid content in the blood volume contained in the composition of

plasma, cholesterol is needed in the body in order to maintain cell health. -blood cells, cholesterol or fatty substances that can be produced by the body in the liver . [14]

Based on the characteristics of DM, it was found that most respondents had a history of type II DM, namely as many as 60 people (84.5%). Blood sugar levels are sugar levels in the blood formed from carbohydrates in food and stored as glycogen in the liver and skeletal muscles. Blood sugar levels are the main source of energy for body cells in muscles and tissues . [15]

Based on smoking characteristics, it was found that the majority of respondents had a history of smoking, namely as many as 42 people (60.6%). Smoking is the activity of burning tobacco and smoking it and then exhaling it. Cigarettes have a very dangerous impact for the long term . [16]

Based on the characteristics of the diet, the most respondents obtained with a good diet pattern, namely as many as 52 people (74.6%). Diet is a person's habit of consuming food and sorting food by paying attention to the composition of food so that it is balanced and according to the body's needs. Diet is done so that the food consumed by a person is not excessive, precise, and balanced .[17]

Based on the characteristics of physical activity, the most respondents with good physical activity were obtained as many as 52 people (74.6%). Physical activity is any activity that involves energy and limbs for its implementation . [18]

Based on BMI characteristics, it was found that most respondents had Normal BMI, namely 31 people (44.3%). Body mass index (BMI) is a good method for determining nutritional status. BMI is obtained from the ratio of body weight (kg) to height (m^2).[19]

Based on the characteristics of the health of the cardiovascular system, it was found that the majority of respondents had good cardiovascular system health, namely 52 people (74.6%).

Based on the characteristics of dementia, the majority of respondents with a history of dementia were obtained, namely 42 people (60.6%).

Based on the results of the *somer's d correlation test* shown in table 4.2, a value of $p = 0.000$ ($p < 0.05$) is obtained so that it can be concluded that there is a significant relationship between the Health of the Cardiovascular System and the Incidence of Dementia at the Age of 50-60 Years . The value of the correlation coefficient $r = 0.960$ indicates the strength of the correlation between variables, namely a very strong correlation ($r = 0.80$-1.000). The direction of positive correlation (+) indicates that the higher the health of the patient's cardiovascular system, the lower the patient's level of dementia and vice versa.

4. CONCLUSION

Diagnosis of dementia can be made by history, physical examination and MMSE examination. Based on the results of research and discussion of the relationship between cardiovascular system health and the incidence of dementia at the age of 50-60 years at the Haj Hospital in 70 respondents, it can be concluded :

somer's d correlation test , it was obtained $p = 0.000$ ($p < 0.05$) so it can be concluded that there is a significant relationship between Cardiovascular System Health and Dementia Occurrence at the Age of 50-60 Years .

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