TOTAL CHOLESTEROL LEVELS AND DEGREES OF HYPERTENSION IN THE ELDERLY HYPERTENSION

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ABSTRACT

Hypertension is still the leading cause of death in the elderly. Physiological and degenerative processes in the elderly also cause changes in cholesterol levels. It is known that hypercholesterolemia is a risk factor for hypertension. If hypertension and hypercholesterolemia occur in the elderly, it is hazardous for the health of the elderly. Total cholesterol is an important parameter to assess the risk of hypertension. The study aimed to obtain an overview of the total cholesterol profile and the degree of hypertension in elderly hypertension. The research design was a cross-sectional method. Nonprobability sampling with accidental sampling was chosen as a sample selection technique. The sample size was 103. The quantitative descriptive data analysis was presented in a frequency distribution. The results of the study provide an overview of the distribution of elderly hypertension, referring to ACC/AHA classification at hypertension grade I (39.8%), hypertension grade II (35%), and hypertension grade III (25.2%). Meanwhile, the total cholesterol profile was in the desirable range (44.7%), borderline high (26.2%), and high (29.1%). The conclusion that the highest cholesterol levels are in the normal range with the highest degree of hypertension in category I. Future research should examine the factors that cause hypertension in the elderly with normal cholesterol levels.

Keywords: hypertension, total cholesterol, elderly

Introduction

The process of aging is a natural life cycle that will occur in people's life. People will go through the process of aging or become elderly. According to Law Number 13 of 1998, a person is called the elderly if she/he reaches the age of more than 60 years (Maylasari et al., 2020). The number of elderly in Indonesia is dominated by young elderly (age group 60-69 years) as much as 63.82%, middle elderly (age group 70-79 years) as much as 27.68%, and late elderly (age group 80 +) as much as 8.5% (Central Statistics Agency, 2019). The morbidity rate for the elderly in Indonesia is 26.02%, meaning that 26-27 elderly are sick out of 100 elderly (Maylasari et al., 2020). The elderly have decreased physiological functions in their bodies, so they are prone to disease and health problems, hypertension.

Hypertension is the leading cause of death after stroke and tuberculosis, namely 6.7% of deaths of all ages in Indonesia. Hypertension referring to ACC/AHA occurs when the measurement results of systolic blood pressure consistently $\geq$130 mmHg and $\geq$80 mmHg diastolic (Mahampang, Maryusman, Arini, & Malkan, 2015). WHO data for 2015 globally shows 1.13 billion people in the world have hypertension, with a ratio of 1 in 4 men and 1 in 5 women. Hypertension sufferers are predicted to increase 60-80% in 2025 (World Health Organization, 2018). Hypertension sufferers in Indonesia reach 34.1% of the total population over 18 years of age. West Java is a province that occupies the fourth position by 29.4%; this figure is greater than the prevalence in Central Java, East Java, and DKI Jakarta Provinces (RISKESDAS, 2018)

Hypertension in the elderly is still a health problem today. This situation is evidenced by the prevalence of hypertension at 69.5% of $\geq$ 75 years old, followed by 63.2% of 65-74 years old, and 55.2% of 55-64 years old. Based on gender, women are higher, with a percentage of 36.9% and men 31.3% (RISKESDAS, 2018). Hypertension is a chronic disease often found in the elderly and causes death (Devi et al., 2013).

Hypertension is a multifactorial cause. Various causes, among others, are closely related to a family history of hypertension (heredity), dietary fat and salt intake (Na), and physical activity (Mahampang, Maryusman, Arini, & Malkan, 2015). Other factors such as excess nutritional status, low-fiber diet, sodium consumption > 2400 mg/day significantly increase the incidence of hypertension (Fitriana et al., 2015) and have a 4.627 times greater risk of developing hypertension (Feryadi, Delmi, & Kadri, 2014). Other risk factors for hypertension are race, alcohol consumption, and a history of smoking, fat or lipids, sugar, and obesity are fundamental problems in influencing hypertension incidence (Rahajeng & Sulistyowati, 2009).

Previous research has shown that cholesterol levels were significantly related to hypertension. Narrowing and stiffness of blood vessel walls due to cholesterol build-up can cause an increase blood pressure (Maryati, 2017). Lipids can trigger hypertension through various mechanisms, either directly or indirectly, significantly influenced by diet and high fat intake (Feryadi et al., 2014).

Kamso's study found a disruption in the lipid profile in the elderly, which was dominated by elevated levels of total cholesterol (> 240 mg/dl by 56.1%), LDL (> 160 mg/dl by 64.6%), and triglycerides had significant numbers below both (> 200 mg/dl by 6.1%) and low HDL levels (<3.5 mg/dl as much as 3.7%) (Kamso, Purwantyastuti, & Juwita, 2002). What is different from this study is the subject. The focus of this study is to find total cholesterol levels in the elderly with hypertension. These data are the basis for the advanced management of hypertension in the elderly.

A preliminary study conducted at the Cimalaka Community Health Center, Sumedang West Java, in January 2020, found a total number of visits by elderly with hypertension as many as 439 patients with 133 patients were 45-59 years, 209 patients were 60-69 years, and 97 patients were above 70 years with the condition of unknown cholesterol levels. Based on this background, the researchers aimed to analyze the total cholesterol levels and the degree of hypertension in the elderly.

Research Methodology

The research design was survey research with a cross-sectional study approach, namely observing variables only once at the same time (Creswell, 2014). This study looked for an overview of the total cholesterol levels and the degree of hypertension in the elderly with hypertension. This study's population was all elderly patients with hypertension in the Cimalaka Community Health Center's work area. The sampling method is nonprobability sampling with accidental sampling. Accidental sampling was chosen because it was easier, faster, and the availability of the elderly as research subjects who came to visit Pos Pembinaan Terpadu (Posbindu) during the Covid-19 pandemic. The samples were selected from the elderly who came to visit Posbindu for medical examinations. Then screening was carried out to determine the subjects who met the sample criteria (elderly over 45 years old, hypertensive patients, as evidenced by the systolic blood pressure results in ≥130 mmHg and diastolic ≥90 mmHg are willing to be research subjects). The sample size was elderly with hypertension from August to September 2020, who met the inclusion and exclusion criteria for the study as many as 103 people. Data collection tools use a digital touch rate calculator (Easy touch cholesterol kit) and a blood pressure measuring device (Digital Sphygmomanometer). Data collection techniques by interview and observation of measurement of total cholesterol and blood pressure in the elderly with hypertension. Further research data were analyzed descriptive quantitative with a computer program then presented in a frequency distribution table.

Results

After collecting data through interviews and measurement of blood pressure and total cholesterol levels, the data is processed and presented in the following frequency distribution table:

Overview of Elderly with Hypertension

The criteria for determining the sample were determined based on the elderly aged over 45 years who visited the Posbindu to have their health checked. It is known that people with hypertension are proven by the results of systolic blood pressure ≥140 mmHg and diastolic ≥90 mmHg and are willing to be respondents. The hypertension category refers to the 2017 AHA provisions.

Based on data collected from a total of 103 elderly, it was found that the number of elderly with the pre-elderly category (45-59 years old) was 13 people (12.6%), elderly category (60 to 74 years old) as many as 70 people (68%), late elderly (75-80 years old) as many as 19 people (18.4%), and very late elderly (80+ years old) as many as one people (1%).

Table 1 Distribution of respondents by age category

No	Age category	Frequency	Percentage
1.	Pre-elderly	13	12.6
2.	Elderly	70	68
3.	Late Elderly	19	18.4
4.	Very late elderly	1	1
	Total	103	100

Primary sources: August – September 2020

Based on table 1, it can be noted that the category of elderly with hypertension attends substantially 70 people (68%). And highly small in the very late elderly category, namely one person (1%) from August to September 2020.

Overview of Elderly Hypertension based on ACC/AHA 2017 Classification

Referring to the classification of hypertension based on ACC/AHA 2017, the degree of hypertension in the respondents, the following data were obtained that the number of elderly with blood pressure in the category of grade I hypertension (TDS> 140-159 mmHg, TDD 90-99 mmHg) was 41 people (39.8%), hypertension grade II were 36 people (35%) (TDS> 160-179 mmHg, TDD 100-109 mmHg), and hypertension grade III (TDS> 180 mmHg, TDD 110 mmHg) were 26 people (25.2%). Data visualization can be seen in Figure 1 below:
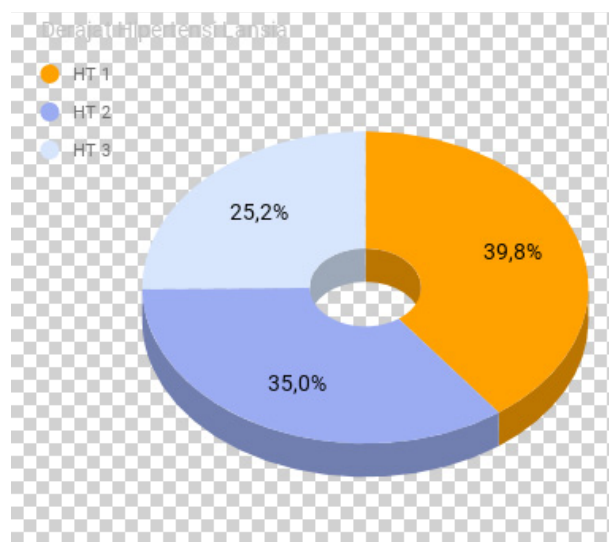

Figure 1 Distribution of respondents based on the Hypertension classification

Overview of Total Cholesterol Levels in the Elderly with Hypertension

Based on data collected from a total of 103 elderly, it was found that the total cholesterol level of the elderly with the normal category (<200 mg/dL) totaled 46 people (44.9%), borderline high cholesterol levels (200-239 mg/dL) as many as 27 people (26.2%), and high cholesterol levels (> 240 mg/dL) amounted to 30 people (29.1%).

Table 2 Distribution of respondents based on blood cholesterol levels and respondent characteristic

Cholesterol Level Hypertension	Hypertension Grade						Total	
	Hypertensiaon Stage 1		Hypertension stage 2		Hypertension stage 3			
	n	%	n	%	n	%	n	%
Desirable	17	37	19	41,3	10	21,7	46	44.9
Borderline high	9	33,4	8	29.6	10	37	27	26.2
High	15	50	9	30	6	20	30	29.1
Total	41	39,8	36	35%	26	25,2	103	100

It can be seen in table 2 that the highest degree of elderly hypertension was in the grade I hypertension category, as many as 41 people (39.8%), while grade II hypertension as many as 36 people (35%). The total number of elderly with hypertension and high cholesterol levels was 30 people (29.1%), while the elderly with hypertension with normal cholesterol levels were 46 people (44.7%) from August to September 2020.

Discussion

Hypertension is characterized by an increase in systolic and diastolic blood pressure. Systolic blood pressure is blood pressure that occurs when the heartbeats, while diastolic blood pressure is formed when the heart is at rest. It is called hypertension when there is a pressure higher than 130/80 mmHg (Ibrahim, 2008; Benetos, Petrovic, & Strandberg, 2019). The hypertension category refers to AHA/ACA classification for the <60 years age group, the hypertension category is if the systolic pressure is ≥ 130 mmHg and the diastolic pressure is ≥ 80 mmHg, while for the > 60 years age group, the hypertension category is if the systolic pressure is ≥ 140 mmHg and the diastolic pressure is ≥ 90 mmHg (WHO, 2018).

Based on table 1, it can be seen that the most elderly category of hypertension sufferers is in the pre-elderly category, as many as 70 people (68%). That is in line with previous research results showing that the highest number of elderly with hypertension occurs in the young elderly (60-74 years) as much as 68%. This number is close to the proportion of the elderly population who occupy the most in the pre-elderly age group. A survey conducted by the Central Statistics Agency (2019) shows one in four elderly experience pain (Maylasari et al., 2020). That is in line with the research results that the pre-elderly group will experience pain, including hypertension sufferers, with a greater morbidity rate than the elderly group.

Hypertension attacks the elderly, along with degenerative processes that occur due to decreased organ function. Research shows that blood vessels will experience a stiffening process as a person ages. This condition impacts the heart's burden to pump blood, and then it can cause hypertension due to increased resistance to peripheral resistance (Bin Mohd Arifin & Weta, 2016).

Based on table 2, it can be seen that the total cholesterol level of the elderly with hypertension is mostly in the normal category of 46 people (44.7%). Meanwhile, normal high to high levels was 55.3% from August to September 2020. Cholesterol is a type of fatty substance used by the body to make certain hormones, produce vitamin D, and a source of substances that build healthy cells. Cholesterol in the body comes partly from being made by itself and partially obtained from food sources. Healthy cholesterol levels are <200 mg/dL. In certain conditions, cholesterol levels can rise to> 200 mg/dL; this condition can trigger various health problems, among others, are often associated with atherosclerosis, hypertension, and coronary heart disease (Story, 2020)

Previous research has explained that many factors have been linked to hypertension. These factors consist of obesity, fatty food consumption habits, high cholesterol, smoking habits, lack of activity, stress levels, and genetics (Mahampang, Maryusman, Arini, & Malkan, 2015; Mahampang et al., 2015; Arifin, Weta, & Ratnawati, 2016; Artiyaningrum, 2016).

Hypertension and hypercholesterolemia are related. When the arteries become hard, stiff, and narrowed by cholesterol, plaque, and calcium, as in atherosclerosis, the heart has to make a strong effort to pump blood through these stiff blood vessels. This condition causes increased blood pressure (hypertension). When the body experiences hypertension and hypercholesterolemia simultaneously, they can interact with each other, causing blood vessel and heart damage to occur more rapidly (Benetos, Petrovic, & Strandberg, 2019).

A previous study has found differences in cholesterol profiles in the elderly. A study conduct by De Souza et al. (2015) found a disruption in the lipid profile in the elderly, which is dominated by elevated total cholesterol levels. This study's results are different from the previous study conduct by De Souza et al. (2015). It turns out that total cholesterol levels in the elderly with hypertension in the Cimalaka Community Health Centre's work area are mostly normal (<200 mg/dL). This difference in results can occur due to differences in the respondents' characteristics, greatly influenced by individual physiological conditions. The researchers' assumption found that respondents' characteristics in this study were different from respondents' characteristics in the previous study, such as race characteristics, genetic characteristics, environmental conditions, activities carried

out, stress levels, age groups, and food consumption patterns.

Differences in food consumption patterns will significantly affect total cholesterol levels. Low fat intake will affect cholesterol levels, and intake with high lipid levels will affect total cholesterol levels. In addition to the fasting state, various individual physiological mechanisms can also cause differences in total cholesterol levels (Soliman, 2018).

Over time and degenerative processes in the elderly, high blood pressure and cholesterol can damage various organs such as the eyes, kidneys, brain, and other organs. Many scientists have revealed the complications of hypertension. Hypertension impacts the health problems of the elderly, which stroke, heart disease, or kidney failure is one of the complications of this hypertension disease (Dalal, Padmanabhan, Jain, Patil, Vasnawala, & Gulati, 2012).

Preventive action such as health surveillance for the elderly is important to be carried out by a nurse who works in the field and directly contacts the community. It is important to educate the public, especially the elderly with hypertension, to prevent various diseases. Elderly with hypertension are advised to always carry out health control by visiting the elderly integrated guidance post or coming to the nearest community health services. Further research can be developed to find alternative treatments and treatments that are effective in elderly hypertension.

Conclusion

This study concludes that the highest cholesterol levels are found in the normal range with the highest degree of hypertension in category I. The profile of total cholesterol and the degree of hypertension are important for supporting data that can be used for hypertension treatment management, especially in the elderly. Many factors affect blood pressure and total cholesterol levels; this is a limitation of the research. So it is crucial to investigate what dominant risk factors affect the incidence of hypertension in the elderly. It is hoped that further research can answer the dominant etiology and explore appropriate forms of intervention that can be developed in the care of elderly hypertension.

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