Relationship between Oxygen Saturation and Blood Cholesterol Levels in the Elderly

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Abstract	Original Research Article

According to the World Health Organization (WHO), elderly people are a population group aged 60 years or more (WHO, 2015). In 2010 the number of elderly people was 18.1 million people or 17.6 percent. In 2014 the number increased to 18.8 million people. In Indonesia, elderly people in 2020 are estimated to reach 28.8 million people or 11.34 percent of the total population in the country. Based on 2018 data, Indonesia Health Research Organization (RISKESDA) stated the majority of elderly people in Indonesia have degenerative diseases and/or chronic health problems, such as diabetes and heart disease (Ministry of Health of the Republic of Indonesia, 2018). In the 21st century, a special challenge in the health sector from the continuing increase in the number of elderly people is the emergence of degenerative problems and non-communicable diseases (NCDs) such as hypercholesterolemia, diabetes mellitus, hypertension, and mental health disorders, namely depression, dementia, anxiety disorders, and sleeping disorders. These diseases will cause problems if they are not treated or prevented. Oxygen saturation is the hemoglobin fraction of oxygen saturation relative to the total hemoglobin in the blood or the oxygen level in the blood. Oxygen is bound to Hemoglobin in the Red blood cells or Erythrocytes. The human body needs and regulates a very precise and specific balance of oxygen in the blood, because the human body needs oxygen from the environment outside the body for metabolic processes and body activities. The normal arterial blood oxygen saturation level in humans is 95-100 percent. Based on data from the Global Health Observatory (GHO) from the World Health Organization (WHO), it shows that one third of ischemic heart disease is caused by high cholesterol levels. Overall, elevated cholesterol is estimated to cause 2.6 million deaths (4.5% of total deaths in the world) and 29.7 million disability-adjusted life years (DALYS), or 2% of total DALYS. (Increased total cholesterol in the blood is a risk factor for cardiovascular disease such as ischemic heart disease and stroke in developed and developing countries, including Indonesia. *Objective*: The general objective is to determine the relationship between Oxygen saturation and total blood cholesterol levels in the elderly with a specific aim which is to determine the relationship between oxygen saturation based on age and gender and total blood cholesterol levels in the elderly. *Method*: This research is an analytical observational study with a cross-sectional design. The research subjects were elderly people aged 60-83 years, consisting of 49 women and the remaining 78 men who lives in Malalayang Dua Village, Manado City. In this study, the reference value for normal oxygen saturation is 95-100% and the reference value for normal blood cholesterol based on WHO is < 200 mg/dL. Analysis of the relationship using the Spearman correlation test shows a significant relationship between oxygen saturation and blood cholesterol levels in the elderly ($p= 0.000$, where $p<0.05$). *Conclusion*: There is a relationship between oxygen saturation and total blood cholesterol levels in the elderly.
Keywords: Oxygen Saturation, Fasting Blood Cholesterol, Elderly.

INTRODUCTION

Elderly is someone aged ≥ 60 years who is still active and work or those who are no longer able to earn their own living so they depend on other people to support themselves. In Indonesia, elderly people in 2020 are estimated to reach 28.8 million people, or 11.34 percent of the total population in the country. In the 21st century, a special challenge in the health sector from the continuing increase in the number of elderly people is the emergence of degenerative diseases and non-communicable diseases (NCDs) such as hypercholesterolemia, hypertension, and mental health disorders, namely depression, dementia, anxiety disorders, difficulty sleeping [3].

Oxygen saturation is a measure of the percentage of oxygen that is able to bind to hemoglobin in the bloodstream. The normal arterial blood oxygen saturation level in humans is 95- 100% [4].

According to data from the Central Statistics Agency 2020, Life Expectancy (UHH) in Indonesia during the COVID-19 Pandemic decreased by 0.18% in 2020 even though in the previous year, namely 2019, it was 0.20%. [7]. Consequences due to the Covid 19 pandemic, the elderly are included in a group that is vulnerable to experiencing serious complications if infected with COVID- 19 with a fairly high mortality rate, one of which is the elderly with comorbid hypercholesterolemia. For this reason, researchers feel it is necessary and interested to know the relationship between O2 saturation and total blood cholesterol levels in the elderly.

MATERIALS AND METHODS

This research is an analytical observational study with a cross-sectional design. This research was conducted for 10 months. The research subjects were 127 elderly people aged 60-83 years.

Data Collection Techniques Are
a) Request for research permission as well as request for Ethical Clearance to the Research Ethics Committee of the Faculty of Medicine, Sam Ratulangi University, Manado.
b) Request permission from Malalayang Dua Village
c) Socialization to the elderly regarding the purpose of this research.
d) Interviews with prospective subjects to obtain willingness to become subjects in research This is done by reading and signing the informed consent.
e) Carrying out oxygen saturation test using a pulse oximetry device and taking samples of total cholesterol blood and analyzed in the laboratory.

RESULTS AND DISCUSSION

Blood samples were taken from 127 elderly people living in Malalayang Dua Village, aged 60-80 years who had signed informed consent. Normal oxygen saturation is 95 -100% and the WHO reference value for blood cholesterol levels is < 200 mg/dL.

Table 1: Characteristics of Respondents based on Age, Total Cholesterol and Oxygen Saturation

Karateristik	n	Minimum	Maximum	Mean	Std. Deviation
Age (year)	127	60	83	64.64	4.845
Total Cholesterol (mg/dL)	127	105	286	184.00	45.620
Oxygen saturation %	127	96	100	98.42	0.886

In table 1, the lowest age of respondents is 60 years and the highest is 83 years, the lowest total cholesterol is 67105 mg/dL and the highest is 286 mg/dL, the lowest oxygen saturation is 96% and the highest is 100%.

Tabel 2: Analisis Hubungan (Korelasi Spearmen) antara Saturasi Oksigen dengan Kadar Kolesterol Total

Correlations			
Total cholesterol	Correlation Coeefficient	Total cholesterol	Oxygen Saturation
Total cholesterol	Correlation Coeefficient	1.000	-0.246[**]
	Sig. (2-tailed)	.	0.000
	n	127	127
Oxygen Saturation	Correlation Coefficient	-0.246	1.000
	Sig. (2-tailed)	0.005	.
	n	127	127

**Correlation is significant at the 0.01 level (2-tailed).

Based on the results of the Spearman correlation test, the correlation coefficient value was obtained (R= -0.246) with a significance of 0.000. These results show that there is a statistically significant relationship between total cholesterol and oxygen saturation (SO2) where the direction of the correlation is negative, meaning that if cholesterol levels increase, oxygen saturation levels will decrease and vice versa.

CONCLUSION

There is a statistically significant relationship between total blood cholesterol and oxygen saturation in the elderly.

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