

## Correlation between Oxygen Saturation and Fasting Blood Sugar Levels in the Elderly

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### Abstract

### Original Research Article

According to the World Health Organization (WHO), the elderly are a group of people aged 60 years or more [1]. In 2010 the number of elderly people was recorded at 18.1 million people or 17.6 percent. In 2014 the number increased to 18.8 million people [2]. In Indonesia, the elderly in 2020 are estimated to reach 28.8 million people or 11.34 percent of the total population in the country. The 2018 Riskesdas data noted that the majority of elderly people in Indonesia have degenerative diseases and or chronic health problems, such as diabetes and heart disease. These diseases will cause problems if they are not treated or prevented [3]. Oxygen saturation is the fraction of hemoglobin in oxygen saturation relative to the total hemoglobin in the blood or the oxygen level in the blood. Oxygen is bound by Hemoglobin in red blood cells or Erythrocytes. The human body needs and regulates a very precise and specific oxygen balance in the blood, because the human body needs oxygen from the environment outside the body for metabolic processes and body activities [4]. Normal arterial blood oxygen saturation level in humans is 95-100 percent. Diabetes Mellitus (DM) is a major health problem. Data from a global study shows that the number of people with Diabetes Mellitus in 2011 has reached 366 million people in the world [5]. **Objective:** The objective is to determine the relationship between oxygen saturation and fasting blood sugar levels in the elderly. **Method:** This research is an analytic observational study with a cross-sectional design. The research subjects were elderly aged  $\geq 60$  years who live in the Malalayang Dua Village, Manado City, Indonesia. In this study, the normal reference value for oxygen saturation was 95-100% and the normal fasting blood sugar/glucose (FBG) reference value according to WHO was  $<100$  mg/dL. Based on the analysis of the relationship using the Pearson correlation test, there was a significant relationship between oxygen saturation and fasting blood sugar levels ( $p=0.000$ , where  $p<0.05$ ). **Conclusion:** There is a significant relationship between oxygen saturation and fasting blood sugar levels in the elderly.

**Keywords:** Oxygen Saturation, Fasting Blood Sugar, Elderly.

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## INTRODUCTION

The elderly are a group of people aged 60 years or more who are still active and work or those who are depend on other people to support themselves. In Indonesia, the elderly in 2020 are estimated to reach 28.8 million people or 11.34 percent of the total population. In the 21st century, special challenges in the health sector stem from the continuing increase in the number of elderly, namely the emergence of degenerative diseases and non-communicable diseases (NCDs) such as diabetes, hypertension, and mental health disorders such as depression, dementia, anxiety disorders and difficulty sleeping [6].

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% [7].

According to 2020 Central Statistics Agency (BPS) data, Life Expectancy in Indonesia during the COVID-19 Pandemic decreased by 0.18% in 2020, whereas in the previous year, it was 0.20% [6]. As a result of the Covid-19 pandemic, the elderly are more vulnerable to experiencing serious complications if infected with COVID-19 with a fairly high mortality rate, especially the ones with the comorbid such as Diabetes Mellitus [6]. For this reason, researchers feel the need and are interested in knowing the relationship between O<sub>2</sub> saturation and fasting blood sugar levels in the elderly.

## MATERIALS AND METHODS

This research is an analytic observational study with a cross-sectional design. This research was conducted for 10 months. The research subjects were 130 elderly aged 60-83 years.

Data collection techniques are:

- Application for a research permit as well as an application for Ethical Clearance to the Research Ethics Committee of the Faculty of Medicine, Sam Ratulangi University, Manado.
- Application for permission to the Malalayang Dua Village.
- Socialization to the elderly about the purpose of this research with a strict protocol.

- Interview prospective subjects to obtain willingness to become subjects in this study by reading and signing the informed consent.
- Checking oxygen saturation with a pulse oximetry device and taking blood samples and analyzing them in the laboratory for glucose levels.

## RESULTS AND DISCUSSION

Blood sampling was taken from 130 elderly who live in the Malalayang Dua Village, aged 60-83 years who have signed an informed consent. Normal oxygen saturation is 95 -100% and the Reference Value for Fasting Blood Sugar levels (FBG) according to WHO is <100 mg/dL.

**Table 1: Characteristics of Respondents based on Age, Fasting Blood Sugar and Oxygen Saturation**

Characteristics	n	Minimum	Maximum	Mean	Std. Deviation
Age (year)	130	60	83	64.81	5.079
FBG (mg/dL)	130	67	259	112.05	41.255
Oxygen Saturation (%)	130	96	100	98.42	0.888

In table 1 the lowest age of the respondent is 60 years old and the highest is 83 years old, the lowest FPG is 67 mg/dL and the highest is 259 mg/dL, the

lowest oxygen saturation is 96% and the highest is 100%.

**Table 2: Analysis of the Correlation between Oxygen Saturation and FBG**

Correlations		FBG	Oxygen Saturation
FBG	Pearson Correlation	1	-.440
	Sig. (2-tailed)	.	.000
	n	130	130
Oxygen Saturation	Pearson Correlation	-.440	1
	Sig. (2-tailed)	.000	.
	n	130	130

Based on the relationship analysis using the Pearson correlation test, there was a significant relationship between fasting blood sugar levels and oxygen saturation ( $p=0.000$ , where  $p<0.05$ ).

## CONCLUSION

There is a significant relationship between fasting blood sugar levels and oxygen saturation in elderly.

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