



The Relationship Of Nutritional Status With The Incidence Of Metabolic Syndrome In Security And Order Employees In Universitas Pendidikan Indonesia

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ABSTRACT

Background: Metabolic syndrome is a real threat to the occurrence of non-communicable diseases. One of the factors that causes metabolic syndrome is a person's nutritional status. Based on this, this research aims to determine the relationship between nutritional status and the incidence of metabolic syndrome in UPI K3 employees.

Research Methods: The design used is cross sectional. The population is K3 employees of the University of Education, Indonesia. The research sample was taken using a purposive sampling method from 30 K3 officers at the Indonesian University of Education, Bandung City. Data processing uses the chi-square correlation test

Research Result: The results of the study showed that there was a significant relationship between nutritional status and the incidence of metabolic syndrome with a p value = 0.029 (<0.05). A person with an obese nutritional status has a 5.091 times greater risk of experiencing metabolic syndrome than a person who has a normal nutritional status or is thin. This is because obese sufferers have a greater risk of developing other complications

Conclusion: there is a significant relationship between nutritional status and the incidence of metabolic syndrome. The importance of implementing a healthy lifestyle, especially in managing adequate diet and exercise to reduce the incidence of metabolic syndrome

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1. INTRODUCTION

Degenerative diseases or non-communicable diseases are currently the main cause of morbidity and mortality that occur in almost all countries. The non-communicable disease (NCD) that is a real threat is the metabolic syndrome (Saklayen, 2018). The Metabolic syndrome is an asymptomatic pathophysiological condition with signs of obesity, insulin resistance, hypertension, dysglycemia and dyslipidemia. Nutritional status is a description of a person's health condition in terms of the balance between nutritional needs and nutritional intake. A simple indicator recommended for determining nutritional status is body mass index (BMI). BMI can be used to determine whether a person is at risk of certain diseases caused by body weight (Harahap H et al 2014).

The increasing incidence of metabolic syndrome is related to changes in lifestyle, namely changes in physical activity, lack of exercise and changes in consumption patterns. Unbalanced calorie intake and usage results in excess nutritional status (obesity) (Dian PR et al 2020). The results of a survey on obesity conducted in 195 countries in 2015 showed that 604 million incidents occurred in adults, 108 million were children (Saklayen, 2018). In 2030, it is estimated that 1.12 billion people will potentially suffer from obesity. In Indonesia itself, there has been a trend for obesity to increase in women since 2007-2013, from 22.8% to 32.9%. In West Java, the incidence of central obesity has increased from 23.1% to 25% (Azkia F & Wahyono T, 2012).

Obesity is a factor in other health problems such as insulin resistance, dyslipidemia, hypertension and central obesity (Choirotussanijah C & Hotimah, H, 2018; CDC. 2011). This is in line with research conducted by Wildman (2004) which states that excess nutritional status (obesity) has a significant relationship with the incidence of metabolic syndrome because it can have an impact on high cholesterol, LDL cholesterol, triacyl glycerol, as well as systolic and diastolic blood pressure (Wildman RP et al, 2004). One of the risk factors that can cause central obesity in workers is workers who work shifts (Health Ministry, 2018). Research by Lee et al. (2016) states that workers who go through shifts are 3.21 times more likely to develop central obesity than daily/non-shift workers (Lee GJ et al, 2016). This is caused by factors such as unhealthy dietary habits, low physical activity, lack of sleep, and circadian rhythm disorders (Peplonska B et al, 2015). Night shift workers have a 28% higher risk of contracting the disease (Fitriani, N, 2017). Shift work is riskier compared to non-shift workers because shift work hours can cause health problems such as sleep pattern disorders, gastrointestinal disorders, cardiovascular metabolic syndrome, and other health problems (Noer ER & Laksmi K, 2014).

The Metabolic syndrome is on the rise with the exponential increase in obesity worldwide (Rochlani Y et al, 2017). Epidemiologic data states that the prevalence of metabolic syndrome in the world is 20-25%. In Indonesia, using the NCEP ATP III criteria with modified criteria for Asia, it was reported that the prevalence of metabolic syndrome in Jakarta was 21.6%, consisting of 24.7% in men and 11.8% in women. Based on previous research, it is known that workers, especially those aged 30-55 years and occupying managerial positions, are at risk of experiencing metabolic syndrome due to having a high workload, being susceptible to work stress, inadequate physical activity, and a diet dominated by carbohydrates and fat (Dian PR et al, 2020). What's more, someone who suffers from his, her, their, etc. Metabolic syndrome has a 2-fold risk of death, 3 times the risk of developing heart disease, 5 times the risk of developing type II diabetes, and 2 times the risk of developing Cardiovascular Disease (CVD) (Lasmadasari N & Pardosi MU, 2016). Based on the description above, researchers are interested in conducting research on the relationship between nutritional status and the

incidence of metabolic syndrome in UPI K3 employees.

2. METHODS

The design used in this research is cross sectional, namely collecting exposure and results at one time to describe subject characteristics and the relationship between variables. This research was carried out at the Indonesian University of Education, Bandung City. The subjects in this research were 30 K3 officers at the Indonesian University of Education, Bandung City. Subjects were selected using a purposive sampling method based on inclusion requirements, namely K3 employees who were on duty at the Indonesian University of Education, Bandung City, had worked ≥ 10 hours/day, and were willing to be research subjects. The data in this study is primary data collected through direct interviews in the form of demographic data, anthropometric data, and self-questions about disease history. The questionnaire was designed by the author and has been tested for validity and reliability.

Demographic data includes gender, age, and family status. Anthropometric data includes height and weight with the aim of determining nutritional status based on Body Mass Index (BMI). Body Mass Index (BMI) is calculated by dividing body weight (BB) in kilograms by height in meters squared (kg/m^2). According to the [Ministry of Health \(2019\)](#), BMI is divided into 3 categories, namely thin/underweight if BMI is less than 18.5; normal if BMI is between 18.5 to 25.0; and more/overweight if more than 25.0. Self-questions about disease history include history of diabetes (E1), central obesity (E2), hypertension (E3), and dyslipidemia (E4). If the answer is "yes" is given a value = "1." Respondents are categorized as being at risk of metabolic syndrome if the answer value is one or more "yes." Statistical analysis used SPSS software with the chi-square because the data was normally distributed. A correlation test was carried out to analyze the relationship between nutritional status and the incidence of metabolic syndrome in K3 officers at the Indonesian University of Education, Bandung City.

3. RESULTS AND DISCUSSION

Table 1 shows that the majority of the study respondents were male (90%). Data on the components of metabolic syndrome, namely waist circumference, diabetes, hypertension and dyslipidemia, show that there are 23.33% of respondents who have central obesity (waist circumference for women > 88 cm, men > 102 cm); diabetes was 6.67%, hypertension was 13.33%, and dyslipidemia was 33.33%. Nutritional status showed that 33.33% of respondents were overweight, 6.67% of respondents were underweight, and 43.33% of respondents had a family history of degenerative diseases (hypertension/diabetes/dyslipidemia).

Tabel 1 Distribution of Components of Respondents' Metabolic Syndrome Criteria.

No	Variable	f	%
1	Sex		
	Male	27	90,00
	Female	3	10,00
2	Disease History Family		
	No	17	56,67
	Yes	13	43,33
3	waist circumference		
	Central obesity	7	23,33
	Normal	23	76,67

No	Variable	f	%
4	Nutrition Status		
	Overweight	10	33,33
	Normal	18	60,00
	Underweight	2	6,67
5	Diabetes		
	No	28	93,3
	Yes	2	6,67
6	Hypertension		
	No	26	86,67
	Yes	4	13,33
7	Dyslipedemia		
	No	20	66,67
	Yes	10	33,37

Based on the table 2, the results showed that of the 10 respondents who were in the overweight category, there were 8 respondents who had metabolic syndrome, of the 18 respondents who were in the normal category, there were only 5 respondents who had metabolic syndrome, and of the 2 people who were in the underweight category, only 1 respondent experienced metabolic syndrome. These data suggest that the proportion of respondents with overweight nutritional status who had metabolic syndrome was greater than that of respondents with normal nutritional status but underweight.

Table 2. Relationship between nutritional status and the incidence of metabolic syndrome

Nutrition Status	have any of the signs of metabolic syndrome		Total (%)	<i>p-value</i>
	Yes (%)	No (%)		
Underweight	1 (50%)	1(50%)	2 (100%)	0,029
Normal	5 (28%)	13 (72%)	18 (100%)	
Overweight	8 (80%)	2 (20%)	10 (100%)	

Metabolic syndrome is a metabolic disorder in which a person has high blood pressure, central obesity, and dyslipidemia, with or without hyperglycemia. If a person meets 3 out of 5 recognized criteria, it is considered that he or she has metabolic syndrome (Soegondo, S., & Purnamasari, D, 2010). Body mass index (BMI) is used to determine a person's nutritional status. According to the Indonesian Ministry of Health (2019), the normal BMI range is 18.5 – 25.0 kg/m² (Lasmadasari N & Pardosi MU, 2016). This study showed that 18 respondents had normal nutritional status (60%), 2 respondents had poor nutritional status (7%), and 10 respondents had obese nutritional status (33%).

Based on the results of the chi square test, it was found that the p value = 0.029 (<0.05) thus indicating a significant relationship between nutritional status and the incidence of metabolic syndrome. This is consistent with research (Rachmah Q & Utari DM, 2019). showing that BMI >25 kg/m² is a major factor in the development of metabolic syndrome. The study by Murningtyas et al. (2020) showed that there is a significant relationship

between nutritional status and the incidence of metabolic syndrome. The analysis results of the chi-square test showed that the p value was 0.009 (95% CI = 1.446 - 17.922; OR = 5.091). The OR value = 5.091, indicating that the risk of developing metabolic syndrome in obese samples is 5.091 times that in non-obese samples.

A person's excessive nutritional status or obesity has a greater risk of developing complications compared to people who have normal or inadequate nutritional status. Obesity can reduce insulin sensitivity due to high levels of free fatty acids in the blood which stimulate the release of cytokines such as proinflammatory cytokines, procoagulants, inflammatory peptides, and angiotensinogen or metabolic products. Products from fat cells and increased free fatty acids in plasma are associated with metabolic diseases, such as diabetes, heart disease, hyperlipidemia, dyslipidemia, gout, and hypertension (Rochmah W, Prabandari YS, & Setyawati LK, 2018). According to research by Rhimayanti et al (2021), obesity is a risk factor for degenerative diseases because it is caused by excessive insulin retention by pancreatic beta cells in the blood (hyperinsulinemia) (Rhimayanti C et al, 2021). Insulin is required for fat to be stored and regulated into body cells. If insulin cannot convert fat into an energy source for body cells, fat in the body will accumulate, causing blood sugar levels to rise (Rochmah W, Prabandari YS, & Setyawati LK, 2018).

Nutritional status is related to work productivity, workers with good nutritional status will have good work productivity, and vice versa. Apart from affecting work productivity, obesity is one of the main risk factors for the metabolic syndrome (Alberti KGMM, 2009). A person with good nutritional status can reduce the risk of developing metabolic syndrome. Hence, all K3 employees can do to achieve good nutritional status is to achieve balanced nutrition. Implementing balanced nutrition is done by managing a good diet, consuming a variety of foods, getting used to clean living habits, controlling body weight, and doing regular exercise. This research has been carried out in accordance with scientific procedures, however there are limitations in determining whether or not metabolic syndrome occurs in employees. Determination of the occurrence of metabolic syndrome is carried out only through self-interview with disease history (hypertension, diabetes, dyslipidemia). Ideally, measurements are carried out by direct blood biochemical examination so that the results are more accurate.

4. CONCLUSION

The results of this study show that there is a significant relationship between nutritional status and the incidence of metabolic syndrome. Obesity and nutritional status are the leading factors in the development of metabolic syndrome. K3 employees need to obtain a good nutritional status to reduce the risk of developing metabolic syndrome.

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