

**PREVALENCE AND CHARACTERISTICS OF METABOLIC SYNDROME PATIENTS IN CIBEBER VILLAGE CIMAH I INDONESIA
(PREVALENSI DAN KARAKTERISTIK PASIEN METABOLIC SYNDROME DI DESA CIBEBER CIMAH I INDONESIA)**

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ABSTRACT

Metabolic syndrome is a health problem that often occurs among populations in Indonesia. Data on the characteristics of patients with metabolic syndrome is still very limited, despite the importance of cardiovascular disease prevention. The study aims to explain the prevalence and characteristics of patients with metabolic syndrome in Indonesia. The research methodology used descriptive research using a cross-sectional design. The number of respondents was seven men and 34 women, counted by consecutive sampling. The data was collected from the SQ-FFQ questionnaire and calculating the DQI-I score, analyzing physical activity through the GPAQ questionnaire converted into METs, measuring blood pressure, taking blood, measuring waist circumference, measuring fasting blood sugar. Through enzymatic tests, Serum triglyceride levels through the enzymatic colorimetric GPO-PAP test and HDL cholesterol levels were measured by the CHODPAP method. The results showed that the prevalence of SM was 20.45%, and the majority were women. The largest age group were the elderly. Most cases of metabolic syndrome have three components, with the largest components being central obesity (100%) and blood pressure (88.89%). Most categories of activity were moderate, and diet quality was low. All metabolic syndrome patients in this study were found not to smoke and not to consume

alcohol. Based on these results, it can be concluded that SM incidence was high. Further research is needed regarding the relationship between acquired risk factors and metabolic syndrome.

Keywords: *metabolic syndrome, prevalence study*

ABSTRAK

Sindrom metabolik merupakan masalah kesehatan yang prevalensinya cenderung meningkat di Indonesia. Data tentang karakteristik pasien SM pada penduduk di Jawa Barat yang diperlukan untuk upaya pencegahan penyakit kardiovaskular masih sangat terbatas. Penelitian ini bertujuan memaparkan prevalensi dan karakteristik pasien SM pada penduduk Desa Cibeber Cimahi. Penelitian dilakukan pada tahun 2020 di Desa Cibeber Cimahi dengan metode penelitian deskriptif menggunakan rancangan cross-sectional. Jumlah responden yaitu 7 orang laki-laki dan 34 orang wanita dilakukan dengan consecutive sampling. Pengumpulan data dilakukan dengan analisis asupan makanan melalui pengisian kuesioner SQ-FFQ dan perhitungan skor DQI-I, analisis aktivitas fisik melalui kuesioner GPAQ yang dikonversikan dalam METs, pengukuran tekanan darah, pengambilan darah, pengukuran lingkar pinggang, pengukuran gula darah puasa melalui uji enzimatis, kadar trigliserida serum melalui uji enzimatis kolorimetri GPO-PAP, serta pemeriksaan kadar kolesterol HDL diukur dengan metode CHODPAP. Hasil penelitian didapatkan prevalensi SM pada penduduk di Desa Cibeber Cimahi adalah 20,45%, dengan jenis kelamin terbanyak adalah wanita, kelompok usia terbanyak adalah lansia. Sebagian besar kasus SM memiliki tiga komponen, dengan komponen terbanyak adalah obesitas sentral (100%) dan tekanan darah (88,89%). Sebagian besar pasien kategori aktivitas fisik sedang dengan kategori kualitas diet rendah. Seluruh pasien SM pada penelitian ini didapatkan tidak merokok dan tidak mengonsumsi alkohol. Berdasarkan hasil tersebut disimpulkan bahwa angka kejadian SM di Desa Cibeber Cimahi cukup tinggi dan diperlukan penelitian lebih lanjut mengenai hubungan antara faktor risiko yang didapat dengan SM.

Kata kunci: *penduduk, sindrom metabolik; studi prevalensi*

INTRODUCTION

Syndrome Metabolic (SM) is known to increase the risk of cardiovascular disease and condition of chronic other, and d natural past few years, the number of cases of cardiovascular disease in almost all over the world and Indonesia increased rapidly.^{1,2,3} Three components of metabolic syndrome, namely: (1) Obesity visceral, for the Asian men > 90 cm and > 80cm in women , (2) Increased levels of TG >150 mg/dL (1,7 mmol/L) or in the process of treating the state of hypertriglyceridemia, (3) Decreased HDL women <50 mg/dL, men <40 mg/dL, (4) Systolic blood pressure increased > 130mmHg or an increase in diastolic pressure > 85mmHg or being treated due to hypertension, (5) Increased fasting blood glucose > 100 mg/dL (5,6 mmol/L) or type 2 diabetes.^{1, 4-8} Blood pressure that was not handled unknown becomes a factor risk of disease cardiovascular exceeds disease heart coronary. In addition, diseases in people with metabolic syndromes, such as dyslipidemia, hypertension, impaired glucose tolerance, pro-inflammation and thrombosis in people with metabolic syndrome, also significantly increase the risk of other degenerative diseases atherosclerosis disease, diabetes, stroke, and death.^{2,8,9}

According to various institutions and studies from different countries/regions, the prevalence of metabolic syndrome varies from <10% to 84%. Depending on the area, urban or rural environment, gender, age, race and ethnicity of the population

studied the definition of the population syndrome. metabolic used.^{5,10} In Indonesia, the prevalence of SM in Indonesia continuously increasing and in the year by Riskesdas mentioned that the majority of SM in Indonesia reached 23.34%.^{4, 11, 12}

Metabolic syndrome is said to have many risk factors that contribute, and there are risk factors that can be changed, such as physical exercise and type or food intake, and risk factors such as gender and age that cannot be changed.¹³⁻¹⁵ This represents a picture of the incidence of BC in other areas, especially in Indonesia. It is expected to represent a picture of the incidence of metabolic syndrome in different regions. The purpose of the research is to describe the prevalence of SM, which occurred in Indonesia.

METHOD

This research used a descriptive method. The physical activity measurement used the GPAQ questionnaire (*Global Physical Activity Questionnaire*). Later, it was converted into *metabolic equivalent* (METS) units. The quality of the diet measurement used the SQ-FFQ questionnaire, and it was calculated using the DQI-I. The research conducted in Cibeber village Cimahi, Indonesia, with the retrieval of data, is *cross-sectional*. Observational characteristics of blood pressure were used with fasting blood glucose, triglycerides, cholesterol levels, and *high-density lipoprotein* (HDL). The circumference of the abdomen and the observation of risk factor

metabolic syndrome were found from physical activity and diet quality.

The total sample was 44 respondents conducted with a *consecutive sampling* approach. Questionnaires were carried out. Collecting *blood intravenously* from the subject who have fasted for at least 10 hours was done in this research.

Several tests were carried out in this research. The blood was checked in the laboratory with the serum triglyceride levels measurement through the enzymatic colorimetric GPO-PAP (*Glycerol Peroxidase Phosphate Acid*) test. Blood glucose levels fasting was measured using spectrophotometry. The CHODPAP has measured the HDL cholesterol examination levels, and blood pressure was measured using a mercury sphygmomanometer. The population were measured the abdominal circumference.

RESULT

This study was conducted on 44 subjects who met the inclusion criteria. Characteristics subject shown in Table 1.

Table 1. Characteristics subject of research based on age and sex type

In Table 1, the age distribution of the

Variable	Population (n)	Total	
		n	%
Age group			
Youth (16-25 years)	4	44	9,1
Adult (26-45 years)	15	44	34.1%
Elderly (45-65 years)	24	44	54.5%
Seniors (66-89 years)	1	44	2.3%
Sex type			
Man	7	44	15.9%
Women	37	44	84.1%

research subjects showed as many as four people (9.1%) are adolescents aged 16-25 years, as many as 15 people (34.1%) are adults aged 26-45. Many 24 people (54.5%) were elderly aged 45-65 years, and seniors aged 66-89 were one person (2.3%). The higher the age, a decrease in the body's metabolic function and physiological function so that chronic disease often occurred.^{4,15}

Based on Table 2, of the 44 subjects studied, it was found that nine subjects had three of the five components of SM or met the criteria for metabolic syndrome based on NCEP/ATP III or 20.45%.

Table 2. Prevalence of metabolic syndrome

Variable	Metabolic Syndrome				Total	
	Yes		Not		n	%
	n	%	n	%		
Research subject	9	20.45	35	79.55	44	100

The prevalence of metabolic syndrome by age and sex was presented in Table 3.

Table 3. Prevalence of patients with metabolic syndrome

Variable	Metabolic Syndrome				Total		Prevalence	
	Yes		Not		n	%	n	%
	n	%	n	%				
Age group								
Youth (16-25 years)	0	0	4	100	4	100	9	0%
Adult (26-45 years)	2	13,33	13	86.67	15	100	9	22.22%
Elderly (45-65 years)	6	25	18	75	24	100	9	66.67%
Seniors (66-89 years)	1	100	0	0	1	100	9	11.11%
Gender type								
Man	0	0	7	100	7	100	9	0%
Women	9	24.32	28	75.68	37	100	9	100%

Levels of Cholesterol HDL low (men <40 mg / dl, women <50 mg / dl) 0 0%

In Table 3, the age of the patient metabolic syndrome was the majority of the elderly, aged 45-65 years as many as six people (66,67%), and adults aged 26-45 years of as much as two people (22.22%) and seniors age 66-89 years as many as one person (11.11%).

Description of risk factors for metabolic syndrome in residents was presented in Table 4.

Table 4. Description of risk factors for metabolic syndrome in residents

Variable	Metabolic Syndrome				Total		Prevalence	
	Yes		Not		n	%	n	%
	n	%	n	%				
Smoking Status								
Yes	0	0	1	100	1	100	9	0
Not	9	20.93	34	79.07	43	100	9	100
Consumption of alcohol								
Yes	0	0	0	0	0	0	9	0
Not	9	20.45	35	79.55	44	100	9	0
Physical Activity								
Low	1	50	1	50	2	100	9	11.11
Moderate	5	20	20	80	25	100	9	55.56
High	3	17.65	14	82.35	17	100	9	33.33
Diet quality								
Low	9	22.5	31	77.5	40	100	9	100
High	0	0	4	100	4	100	9	0

The distribution of metabolic syndrome cases was presented in Table 5.

Table 5. Distribution of metabolic syndrome cases

Variable	Total	
	n	% (n = 9)
Number of metabolic syndrome markers		
Marker 3	7	77.78
Marker 4	2	22.22
Mark 5	0	0
Components of the metabolic syndrome		
Hypertension (systolic \geq 130 / diastolic \geq 85 mmHg)	8	88.89%
Increased waist circumference (men > 90 cm, women > 80 cm)	9	100%
Increased levels of sugar blood fasting (\geq 110 mg / dl)	6	66.67%
Increase in triglycerides (\geq 150 mg / dl)	7	77.78%

Table 5 found that in patients with metabolic syndrome, most have three markers as many as seven people (77.78%) while 2 (22.22%), the other has four markers.

DISCUSSION

The gender frequency of the largest sample of research subjects was female, namely as many as 37 people (84.1%). The subjects study were also known to be more women than men, who may also have influenced the results. Gender is one factor that affects a person's physical activity and diet (especially since early adolescence). Men generally tend to do general sports, namely moderate and heavy sports, while women prefer good, average and light exercises. Intense physical activity often avoids excess energy, which causes fat accumulation. Biologically, there is still disagreement about the role of androgens in treating cardiovascular disease. While the hormone estrogen is believed to protect against cardiovascular disease.^{16,17,18} In this study, most of the patients were elderly patients (elderly). Sihombing et al. (2015) stated the risk of metabolic syndrome increases by age, especially over 55 years. The risk of metabolic syndrome also increases among those aged under 35 years. The result was a threat because they were vulnerable to metabolic and physiological chronic diseases the older they get.^{4,15}

The gender frequency of metabolic syndrome patients in data was found entirely in the female gender, namely as many as nine people

(100%). Bantas et al. (2012) showed that metabolic syndrome is more common in women than men. Especially in postmenopausal women, due to decreased estrogen, the state of body metabolism and the type of fat replacement in different tissues, which will lead to fat accumulation in the visceral tissue of the stomach, leading to central obesity.^{17,18} men and women affect a person's activity and physical activity and the daily diet. Men prefer to do heavy physical exercises, namely moderate and strenuous exercise, while women prefer light and moderate exercise. The man's physical activity makes him more likely to avoid excess energy, leading to fat accumulation. This situation is also in line with studies in several countries, which show that the prevalence of metabolic syndrome has increased in the last decade. Still, women seem to be more serious than men.^{17,19}

In Table 4, most research subjects were non-smokers, as many as 43 people and one smoker. Toxic substances in cigarettes include tar, nicotine and carbon monoxide. It is said that these toxic chemicals will cause arteriosclerosis and also increase blood pressure because the harmful chemicals contained in cigarettes will mask into the bloodstream and damage the endothelial lining of the arteries.^{2,20} Still, the study's entire syndrome Metabolic patients were not smoke that as many as nine people (100%), and one smoker who become the subject of research was not experiencing the metabolic syndrome. The result is not in line with the study of

Fitria et al. (2015), who showed that the risk of hypertension in people who smoked 10 to 20 cigarettes a day was 3.02 times that of people who smoked less than ten cigarettes a day. And the more cigarettes the subject smoked, the bigger the size of his stomach circumference.^{2,20}

Subject research entirely not consume alcohol, so that the study cannot see an overview of alcohol consumption with figures incidence of the syndrome metabolic. It is said that excessive alcohol consumption will increase blood pressure. In addition, alcohol can raise triglyceride levels which can lead to arteriosclerosis. According to reports, drinking has both acute and chronic effects on hypertension, regardless of obesity, smoking behaviour, physical activity, gender, or age. In a study conducted by Lasmadasari et al., In 2016, people who drank alcohol were 1.7 times more likely to develop metabolic syndrome than people who did not drink alcohol.^{21, 22, 23}

Physical activity is any energy expenditure generated from the movement of the muscles of the body's framework when they move. The benefits of physical exercise are well known. In adults, physical exercise is needed to reduce the risk of various diseases and premature death. Regular physical exercise is also considered to have a positive effect in reducing stress and anxiety and can maintain adult mental health. Physical activity has been identified as the fourth risk factor for death globally, accounting for about 6% of global deaths.^{24, 25} Physical exercise doesn't have to be strenuous. Enjoying the scenery while walking in

the morning for 30 minutes or more is a good standard of physical exercise.^{26,27} In Table 4, the highest incidence rate of metabolic syndrome patients has GPAQ criteria for moderate physical activity as many as five people (55.56%), high physical activity as many as three people (33.33%) and low physical activity as many as one person (11.11%). The result did not correspond with Eka et al. (2013), who showed that most people with metabolic syndrome have lower physical activity levels. However, apart from physical activity, many factors contribute to the onset of BC, so even though the subject has a high level of physical activity, it is still possible to develop metabolic syndrome.^{18, 22}

Quality diet in the most major subject of research was the quality of a low diet as many as 41 people and four people with high-quality diets. Excessive calories in the food were converted into triglycerides stored in the adipose tissue and increased adipose tissue size. Long-term obesity increases the risk of hypertension, coronary heart disease, and diabetes.^{14, 28, 29} The entire patient syndrome, metabolic the research, has a quality diet with the criteria of the quality of a diet low that as many as nine people (100%). In contrast, four people who have a quality diet is high does not exist who suffer from syndrome metabolic. The quality of food greatly affects the nutrition of the human body. If food quality is poor, foods contain fat, low in sugar and fibre, which lead to overnutrition or obesity and ultimately to heart disease and diabetes. The results

were consistent with research conducted by Kasiman (Kasiman, 2011 kk). The data showed that subjects with high energy expenditure or low-quality diets had a 9.1 times higher risk of metabolic syndrome than low energy expenditure.^{22,30, 31}

The majority of eight patients with metabolic syndrome (88.89%) had hypertension. The result corresponded to the following theory that in obese patients, hypertension could increase due to insulin resistance, and impaired vascular endothelial function causes vasoconstriction and the process of reabsorption in the kidneys. An increase in the number of fat cells caused angiotensinogen production in adipose tissue, which plays an important role in increasing blood pressure.^{11,32}

The circumference of the waist to the entire patient syndrome, metabolic, as nine people (100%) experienced obesity central. The results agree with the theory that in central obesity, fat will accumulate in visceral or abdominal fat, and this fat will become a source of free fatty acids in its circulation. Fatty acids increased the oxidative stress of endothelial cells, and angiotensin amplified this process. It has been demonstrated that the renin-angiotensin system (RAS) in adipose tissue was involved in the pathophysiology of obesity and obesity-related diseases, this including hypertension and insulin resistance in people with metabolic syndrome.^{11,32}

The majority of fasting blood glucose levels in patients with metabolic syndrome experienced

an increase; six people (66.67%) and three people (33.33%) had fasting blood glucose levels within normal limits. The result is in line with the theory that insulin resistance usually occurs in most people with metabolic syndrome. Fat cells (adipocytes) secrete several hormones, collectively called adipokines. Several adipokines are only released from the visceral fat that surrounds the abdominal organs, and one of them is resisted, which can cause insulin resistance.

The secretion of adiponectin (the adipose factor that increases isolation sensitivity) reduced obesity, increasing insulin resistance.^{33,34}

Levels of triglyceride serum in patient's metabolic syndrome experienced an improvement in that as many as seven people (77,78%) while two (22,22%) others have levels of triglyceride serum within the normal limits. The majority of the metabolic syndrome patients showed elevated triglyceride levels. Consumption of foods containing lots of fat is said to increase triglyceride levels in the blood, besides genetic or familial factors that influence high triglyceride levels.³⁴

Patient with syndrome Metabolic, both women and men, are as many as nine people (100%) had HDL levels within the limits of normal. The result did not correspond with Roy et al. (2015) stated that a decrease in HDL levels is the second most common sign of metabolic syndrome in patients. HDL (High-Density Lipoprotein) will help clean fat deposits in blood vessels, remove cholesterol from cells, and

transport it to the liver. Reducing the risk of heart disease and stroke efforts can increase HDL levels in the blood.^{20,33,34}

CONCLUSION

Based on these results, it is concluded that SM incidence was high, and further research is needed regarding the relationship between acquired risk factors and metabolic syndrome.

CONFLICT OF INTEREST

The authors reported no potential conflict of interest

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