

METABOLIC SYNDROME RISK FACTORS IN EMPLOYEES FACULTY OF PUBLIC HEALTH, UNIVERSITAS AIRLANGGA

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Abstract: Metabolic syndrome is a clustering symptoms with cardiometabolic factors including obesity, insulin resistance, dyslipidemia, and elevated blood pressure. Several previous studies have shown the risk factors for metabolic syndrome, such as obesity, smoking, lack of physical activity and unhealthy diet. This study aims to identify risk factors associated with metabolic syndrome at the Faculty of Public Health Airlangga University. This research uses descriptive method with cross sectional design. Population in this research is Employee Faculty of Public Health University of Airlangga. Diagnosis of Metabolic syndrom was followed by National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III). Data analysis was performed by descriptive to determine the risk factors and metabolic syndrome. The results showed 59,46% % (22/37) respondents included in the metabolic syndrome. Metabolic syndrome was more common in women as much as 72,7 %. The component contributing to the presence of MetS is Fasting Plasma Glucose 100 % (p value 0,157), Waist Circumferences 100% (p value 0,000), High Density Lipid 81,8% (p value 0,0025), Diastolic Blood Pressure 45,4 % (p value 0,072), Triglyceride 22,7% (p value 0,36) dan Systolic Blood Pressure (p value 0,632). The Risk Factor of Metabolic Syndrom included increase Added Sugar (90,9%), Sodium (77,27%), less consume fruits (72,7%), less consume vegetables (86,4%), Less consume Gandum(86,4%) and less than 60 minutes of physical activity (77,3%) , Smoking (9,09%).

Keywords: Risk factors, Metabolic Syndrome, Component

Introduction

Metabolic syndrome is a collection of interconnected symptoms with cardiometabolic factors including obesity, insulin resistance, dyslipidemia, and elevated blood pressure (Olijhoek et al., 2004; Angel Rodríguez, 2011). Patients with metabolic syndrome have a greater risk of cardiovascular disease even though there has not been a history of cardiovascular events before. Cardiovascular disease is currently the most common cause of morbidity and mortality. There is currently little data on risk factors associated with metabolic syndrome (Geiss et al, 1995).

The prevalence of metabolic syndrome varies according to the criteria used. In a New Haven study involving 439 subjects aged 4-20 years, the prevalence of metabolic syndrome in subjects with moderate obesity (BMI z-score 2.0-2.5) was 38.7%, and subjects with severe obesity (BMI z Score > 2.5) 49.7% (Weiss, 2004).

The prevalence of obesity is increasing in the developed and developing regions. In 1999 in the United States 61% of adults were overweight and obese. Metabolic syndrome is estimated to be 22% of the adult population in the United States. In the Bogasa Heart study, metabolic syndrome in adolescents in the United States was 4.2%, prevalence in males (6.1%) was higher in women (2.1%) (Cruz et al, 2004), while in Japan 17,7% of obese children have metabolic syndrome (Yoshinaga, 2005).

Several studies have shown that risk factors for metabolic syndrome are obesity of the abdomen estimated by waist circumference, triglycerides (Trig) HDL-C, systolic blood pressure or blood diastolic pressure (DBP)

and glucose blood level (GLU) Cut-off used as defined by International Diabetes Federation (International Federation of Diabetes, 2007). Metabolic syndrome is considered to be those who have three or more of the above factors (IDF, 2007). Other studies suggest smoking may increase the risk of metabolic syndrome events (Li S, 2014).

Obesity and insulin resistance are important components that underlie metabolic syndrome. Hypertension in metabolic syndrome occurs through several factors: increased sympathetic nerve activity, increased activity of renin angiotension system, and vasodilation disorder (Syafruddin H, 2009).

Several complications of the metabolic syndrome have been mentioned in several studies including coronary heart disease, heart failure, renal failure, stroke, and other complications such as increased risk of atrial fibrillation, venous thromboembolism, and sudden death and decreased cognitive function

Faculty of Public Health is one of the health faculty at Airlangga University where it is expected that both employees and lecturers have a good concern for their own health. This metabolic syndrome is still foreign to the community. Therefore, this study wanted to know the risk factors of employees / lecturers to the incidence of metabolic syndrome.

Methods

This study was cross-sectional study. It was conducted in Faculty of Public health, Universitas Airlangga. The population is employees of faculty. A sample was thirty seven respondents by consecutive sampling.

Some of the variables taken in the study included blood pressure measurements performed by physicians on all respondents in a sitting position for approximately 5 minutes. Measurement The abdominal circumference is performed with a standardized measuring instrument and performed in an upright position and the respondent breathing normally. While examination of fasting blood sugar, total cholesterol, LDL levels, HDL levels performed by taking blood samples of respondents. The sample was checked into the laboratory by labeling the identity. The study protocol was approved by The Public Health research Ethics Committee of Universitas Airlangga.

Definition of MetS

Metabolic Syndrome (MetS) is a set of risk factors that are considered responsible for the increased morbidity of cardiovascular disease among obese and diabetics. NCEP_ATP III identifies that MetS is an independent risk factor for coronary heart disease and an indication of an intensive lifestyle modification intervention.

Based on the National Cholesterol Education Program of the Third Adult Treatment Panel (NCEP-ATP III), the Metabolic Syndrome is someone with at least 3 of the following criteria: 1). Obesitas abdominal (waist circumferences ≥ 80 cm for women and for men ≥ 90 cm); 2). Elevated blood triglycerides (≥ 150 mg/dL, atau $\geq 1,69$ mmol/ L) or treatment for this lipid abnormality; 3). Low High Density Lipoprotein (< 40 mg/dL atau $< 1,03$ mmol/ L for men and for women < 50 mg/dL atau $< 1,29$ mmol/ L); 4). Elevated Blood Pressure (Sistolik Blood Pressure ≥ 130 mmHg, Diastolik Sistolik Blood Pressure ≥ 85 mmHg or treatment hypertension drug); 5). Elevated Fasting plasma Glucose (FPG) (FPG ≥ 100 mg/dL, or $\geq 6,10$ mmol/ L Or treatment anti diabetes) (Adult Treatment Panel III, 2001).

Result

The results of this study found there are thirty seven responden. There are 22 /59,45% respondent have metabolic syndrome. Respondent who have metabolic syndrome almost female was 72.7%. It is like study at korea showed that the odds ratios (OR) for CVD were higher in women (OR 4.04; 95% CI 1.78 – 9.14) than in men (OR 1.98; 95% CI 1.30 – 3.03). (Hwang et al,2009)

The range age of metabolic syndrome group was between 22 - 59 years with an average age of 43.08 years. Most respondents were in the age group 40 - 49 years in both the metabolic syndrome group as much as 13 / 59,1% as well as in the non-metabolic syndrome group of 10 / 66,7%.

Table 1 General Characteristic for Metabolic and non Metabolic Syndrome respondents.

Characteristics	Met syndrome		Non Met Syndrome		P value
	Number	Percentage	Number	Percentage	
Sex					
Men	6	27,3%	7	46,67%	0,388
Women	16	72,7%	8	53,3%	
Age					
20 – 29 years	3	13,6%	2	13,3%	
30 – 39 years	2	9,1%	2	13,3%	
40 – 49 years	13	59,1%	10	66,7%	
50 – 59 years	4	18,2%	1	6,7%	

Criteria Diagnosis based on the National Cholesterol Education Program of the Third Adult Treatment Panel (NCEP-ATP III) contains five components that support the occurrence of Metabolic Syndrome. The majorities that cause metabolic syndrome are 100% Glucose Fasting Plasma, 100% Waist Circumferences, High Density Level 81.8%. While the majority component in non-metabolic syndrome group is Glucose Fasting Plasma 86.67%.

All respondents had Fasting Plasma Glucose > 100 mg / dl in the metabolic syndrome group. Similarly, in the non-metabolic syndrome group of 13 / 86.67% of respondents had Glucose Fasting Plasma > 100 mg / dl.

In the composition of Waist Circumferences also occurs in all groups of metabolic syndrome. While in the non-metabolic syndrome group only 4 / 26.7% respondents have the Waist Circumferences \geq 90 cm in men and \geq 80 cm in women. Based on statistical analysis using computer application shows p value 0,000 * which means that there is a significant relationship between Waist Circumferences with the incidence of metabolic syndrome.

Table 2. Prevalence of Metabolic Syndrome Table and Its component for Metabolic and non Metabolic Syndrome respondents.

Characteristics	Met syndrome		Non Met Syndrome		P value
	Number	Percentage	Number	Percentage	
Fasting Plasma Glucose	22	100%	13	86,67%	0,157
Waist Circumferences	22	100%	4	26,7%	0,000*
Systolic Blood Pressure	3	13,6%	1	6,7%	0,632
Diastolic Blood Pressure	10	45,4%	2	13,3%	0,072
High Density Level	18	81,8%	4	26,7%	0,0025*
Triglyceride	5	22,7%	1	6,7%	0,36

Another component that also shows p value <0.05 is at the High Density Lipid level of 0.0025 which means that there is a significant relationship between High Density Lipid and the incidence of metabolic syndrome. In this study, 18 / 81,8% of respondents had smaller level than normal value in metabolic syndrome group, whereas in non-metabolic syndrome group only 4 / 26,7% of respondents had greater than normal level.

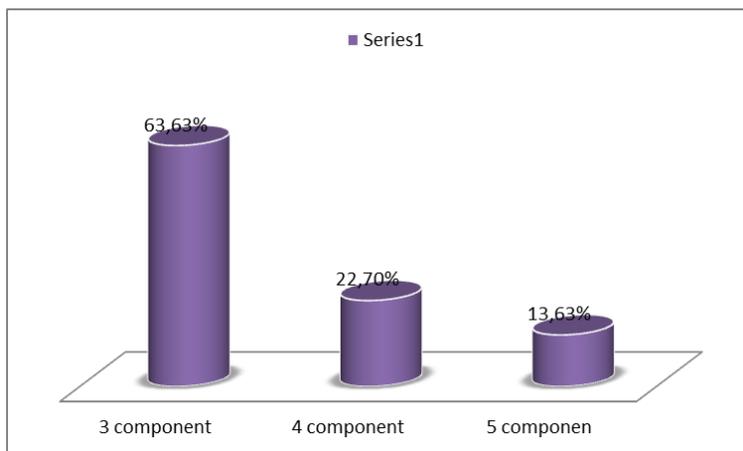


Figure 1 Jumlah komponen yang memberikan kontribusi kejadian metabolik syndrome

The diagnostic criteria based on the National Cholesterol Education Program of the Third Adult Treatment Panel (NCEP-ATP III) suggest that there are at least 3 components that support the onset of metabolic syndrome. Respondents with the most experience of MetS consisted of three components of 63, 63%, four components 22, 70% and 13.63% of which five components (Figure 1).

Metabolic Syndrome Influenced by several risk factors such as lack of physical activity, smoking, additional sugar consumption, excessive consumption of sodium, lack of consumption of vegetables, fruits and wheat. This Study, We found that Risk Factor of Metabolic Syndrom included increase Added Sugar (90,9%), Sodium (77,27%), less consume fruits (72,7%), less consume vegetables (86,4%), Less consume Gandum(86,4%) and less than 60 minutes of physical activity (77,3%) , Smoking (9,09%).

The World Health Organization recommend 150 min/weeks of moderate or vigorous exercise.(Muntner et al, 2005). This study only 1 person at Met syndrome group or non Met syndrome group have exercise more than 150 min/weeks. Actually the faculty has been conducting physical activity periodically 1x per week at the University in the form of aerobic exercise. However, only a few employees who take advantage of these activities.

Table 3 Risk Factor for Metabolic and non Metabolic Syndrome respondents.

Risk Factor	Met syndrome		Non Met Syndrome		P value
	Number	Percentage	Number	Percentage	
Smoking	2	9,09%	1	6,7%	1.000
Physical Activity					
240 minutes/ weeks	1	4,54%	0	0%	0,499
150 minutes/weeks	0	0%	1	6,7%	
120 minutes/weeks	1	4,54%	2	13,3%	
90 minutes/weeks	1	4,54%	0	0%	
75 minutes/weeks	0	%	1	6,7%	
60 minutes/weeks	11	50%	5	33,3%	
30 minutes/weeks	4	18,18%	4	26,7%	
15 minutes/weeks	2	9,09%	1	6,7%	

5 minutes/weeks	0		1	6,7%	
Diet					
Sugar	20	90,9%	12	80%	0,377
Sodium	17	77,27%	12	80%	1.000
Gandum	3	13,6%	1	6,7%	0,632
Fruits					
3 cup/weeks	2	9,09%	0	0%	0,424
2 cup/weeks	4	18,18%	2	13,3%	
1 cup/ weeks	16	72,7%	13	86,7%	
Vegetables					
2 cup/weeks	3	13,6%	1	6,7%	0,632
1 cup/weeks	19	86,4%	14	93,3%	

Other study found that eating fruit and vegetables are associated with increased protection to cardiovascular disease (Mark et al,2015; Steemburgo et al,2009; Shin et al, 2009; Panagiotakos et al,2007).

Conclusion

The component contributing to the presence of MetS is Fasting Plasma Glucose 100 %, Waist Circumferences 100%, High Density Lipid 81,8%, Diastolic Blood Pressure 45,4 %, Triglyceride 22,7% dan Systolic Blood Pressure. The Risk Factor of Metabolic Syndrome included increase Added Sugar (90,9%), Sodium (77,27%), less consume fruits (72,7%), less consume vegetables (86,4%), Less consume Gandum(86,4%) and less than 60 minutes of physical activity (77,3%) , Smoking (9,09%). Need to Modified healthy lifestyle to avoid Metabolic Syndrome.

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