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Cardiometabolic Profile Screening as an Early Detection of Cardiometabolic Risk

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ABSTRACT.

Background: Cardiometabolic risk profile is a set of interconnected risk factors, namely abdominal obesity, hypertension, dyslipidemia, hyperglycemia, and hyperinsulinemia, and causes global death. This study was conducted to obtain data on cardiometabolic profiles of people who participated in the Commemoration of World Hypertension Day 2021 at RSUP H Adam Malik Medan

Method: This research is a descriptive study with a cross-sectional research design peoples namely by looking at the description of the cardiometabolic profile. The sample is an affordable population that meets the inclusion criteria, people with age >18 years old. Variables of blood pressure, waist circumference, blood sugar levels, and total cholesterol levels are numerical variables. Blood pressure examination is measured using a sphygmomanometer and expressed in mmHg units. The measurement of the abdominal circumference is carried out by examining the size of the abdominal circumference obtained using a tape measure in cm. Blood sugar levels are obtained from the results of measuring blood sugar levels during laboratory examination of blood in mg/dl units. Cholesterol levels are obtained from the results of measuring total cholesterol levels from blood laboratory examinations in mg/dl.

Results: All subjects in this study (n= 100) are 42 men and 58 women with normal waist circumference, and education level strata -1, only 9% of the subjects had high blood sugar levels, and 41% of subjects were classified as central obesity 9% of subjects. Most patients (91%) with normal postprandial glucose and high total cholesterol 66%.

Conclusion: In this study, most of the cardiometabolic risks of patients are overweight/obesity and dyslipidemia

Keywords: Cardiometabolic Risk parameters, cross-sectional research

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ABSTRAK.

Latar Belakang*: Risiko kardiometabolik adalah sekumpulan faktor risiko yang saling berhubungan, yang terdiri dari obesitas perut, hipertensi, dislipidemia, hiperglikemia, hiperinsulinemia, yang dapat menyebabkan kematian global. Penelitian ini dilakukan untuk mendapatkan data profil kardiometabolik masyarakat yang mengikuti Peringatan Hari Hipertensi Sedunia 2021 di RSUP H Adam Malik Medan*

Metode*: Penelitian ini merupakan penelitian deskriptif dengan penelitian design potong lintang yaitu dengan melihat deskripsi profil kardiometabolik. Sampel adalah populasi terjangkau yang memenuhi kriteria inklusi, orang dengan usia >18 tahun. Variabel tekanan darah, lingkar pinggang, kadar gula darah, dan kadar kolesterol total adalah variabel numerik. Pemeriksaan tekanan darah diukur menggunakan* sphygmomanometer *dan dinyatakan dalam mmHg. Pengukuran lingkar perut dilakukan dengan memeriksa ukuran lingkar perut yang diperoleh dengan menggunakan pita pengukur dalam cm. Kadar gula darah diperoleh dari hasil pengukuran kadar gula darah selama pemeriksaan laboratorium darah dalam satuan mg/dl. Kadar kolesterol diperoleh dari hasil pengukuran kadar kolesterol total dari pemeriksaan laboratorium darah pada mg/dl.*

Hasil*: Semua subjek dalam penelitian ini (n= 100) adalah 42 pria dan 58 wanita dengan lingkar pinggang normal, dan strata tingkat pendidikan tinkat-1, hanya 9% dari subjek yang memiliki kadar gula darah tinggi, dan 41% subjek diklasifikasikan sebagai obesitas sentral 9% subjek. Sebagian besar pasien (91%) dengan glukosa postprandial normal dan kolesterol total tinggi 66%.*

Kesimpulan*: Dalam penelitian ini, sebagian besar risiko kardiometabolik pasien adalah kelebihan berat badan/ obesitas dan dislipidemia*

Kata Kunci: *Parameter Risiko Kardiometabolik, penelitian potong lintang*

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1 Introduction

Cardiovascular disease is still a global health problem. Data obtained from the World Health Organization (WHO) states that the mortality rate due to cardiovascular disease (CVD) is 17.7 million people annually and 31% is the cause of all global deaths. By 2020, heart disease and stroke will be the leading causes of death and disability worldwide, with the number of deaths projected to rise to more than 20 million per year and by 2030 to more than 24 million per year. The American Heart Association (AHA), reports that coronary heart disease contributes to 1 in 7 deaths in the United States, killing an estimated 3% of adults or about 366,800 people annually. This can happen to the community due to a sedentary lifestyle or due to infections in the heart which are still high prevalence in developing countries such as Indonesia. Based on the doctor's diagnosis, the prevalence of coronary heart disease in Indonesia in 2013 was 0.5% or estimated to be around 883,447 people, while based on the doctor's diagnosis/ symptoms it was 1.5%.

The cardiometabolic risk profile is a set of interconnected risk factors, namely abdominal obesity, hypertension, dyslipidemia, hyperglycemia, and hyperinsulinemia. Especially adults who have several cardiometabolic risk factors have a higher risk of developing type 2 diabetes and cardiovascular disease. [1] Dyslipidemia, glucose intolerance, diabetes mellitus, and metabolic syndrome are metabolic conditions that are often asymptomatic and have a strong relationship with high morbidity and cardiovascular mortality rates. The distribution of abdominal fat has a negative influence on blood pressure, metabolism fat, glucose tolerance, or insulin resistance. Obesity correlates with left ventricular hypertrophy, and weight loss is a factor that can restore heart muscle mass. Cardiovascular risk is associated with high blood pressure, especially isolated systolic hypertension as a cause of coronary heart disease and stroke. Hyperglycemia is associated with an increased risk of coronary heart disease. Diabetes worsens the long-term prognosis of life expectancy, where 2/3 of deaths in diabetics are associated with cardiovascular disease. Atherosclerosis is positively associated with low-density lipoprotein cholesterol (LDL-C) but negatively associated with high-density lipoprotein cholesterol (HDL-C).[2] The Covid-19 pandemic that has hit the world and Indonesia since March 2020 is also believed to have played a role in increasing the incidence of cardiometabolic diseases. Self-isolation, limited mobility, and the prohibition of gatherings, which are the strategies for preventing the transmission of Covid-19, turned out to be a double-edged sword where physical activities and sports can reduce the incidence of cardiometabolic diseases are hampered. This has the potential to cause an increase in cardiometabolic cases during the Covid-19 pandemic in addition to limited access to health facilities. Even so, the conditions that cause cardiovascular disease events due to the risk of this cardiometabolic profile are still rarely checked in the general population, especially in young adults. The rapid transition of CVD from developed countries to occurring globally, with increasing prevalence in lower-income countries and reflects the extraordinary pace. Instead of a discussion covering all perspectives of global CVD, this review reflects a perspective from populations of developing countries during economic development, the evolution of CVD, and the contribution of risk factors to disease development. Current recommendations on the management of risk factors are highlighted.[3]

Based on these reasons, this study was conducted to obtain data on cardiometabolic risk profiles in cases during the Covid-19 pandemic era.

2 Method

This research is a descriptive study with a cross-sectional research design of people who participated in the examination at the Commemoration of World Hypertension Day 2021 at RSUP H Adam Malik Medan, namely by looking at the description of the cardiometabolic profile in the people of Medan. The sample is an affordable population that meets the inclusion criteria, people with age >18 years old. Variables of blood pressure, waist circumference, blood sugar levels, and total cholesterol levels are numerical variables. Blood pressure examination is measured using a

sphygmomanometer and expressed in mmHg units. The measurement of the abdominal circumference is carried out by examining the size of the abdominal circumference obtained using a tape measure (midline) in cm. Blood sugar levels are obtained from the results of measuring blood sugar levels during laboratory examination of blood in mg/dl units. Cholesterol levels are obtained from the results of measuring total cholesterol levels from blood laboratory examinations in mg/dl.

Statistical Analysis

Processing and analysis of statistical data using SPSS applications. Categorical variables are presented with frequency (n) and percentage (%). Numeric variables are presented with mean and standard deviation (SD) values for normally distributed data. As for the normal non-distributed data numerical variables are presented with the middle value (median) and the interquartile range.

3 Result

All subjects in this study (n= 100) are 42 men and 58 women. By age group, the number of subjects in the age groups of 21-30 years, 31-40 years, 41-50 years, 51-60 years, and more than 60 years. All the subjects with normal waist circumference and education level strata -1 (Table. 1)

Table 1. Demographic Characteristics

No	Variable	n(%)
1	Gender	
	- Male	42(42)
	- Woman	58(58)
2	Age (yr)	
	- 21-30	13(13)
	- 31-40	17(17)
	- 41-50	21(21)
	- 51-60	26(26)
	- >60	23(23)
3	Waist circumference (cm)	
	- Normal	59(59)
	- Obesity	41(41)
4	Education Level	
	- Advanced School	12(12)
	- Strata 1	85(85)
	- Strata 2	3(3)

Based on table 2, the blood sugar levels of most subjects were relatively normal, only 9% of the subjects had high blood sugar levels. The average value of blood sugar levels at the time was 121.4±61.0 mg/dl. Meanwhile, the results of measuring abdominal circumference as many as 41%

of subjects were classified as central obesity and female subjects had a higher percentage of 31% (n = 31). In addition, based on pulse frequency measurements, as many as 9% of subjects had tachycardia and 5% of subjects had bradycardia. Of most patients 91% with normal postprandial glucose and high total cholesterol 66%

Table 2. Characteristics of cardiovascular risk factors

No	Variable	n(%)
1	BMI (kg/m^2)	
	- Underweight (<18.5)	2(2)
	- Normal (18.5-24.9)	39(39)
	- Overweight (25.0-29.9)	35(35)
	- Obesity class I (30.0-34.9)	19(19)
	- Obesity class II (≥35.0)	5(5)
2	Blood Pressure (mmHg)	
	Systolic	
	- <140	81(81)
	- ≥140	19(19)
	Diastolic	
	- <90	86(86)
	- ≥90	14(14)
3	Pulse frequency (x/minute)	
	- <60	5(5)
	- 60-100	86(86)
	- >100	9(9)
4	Blood Sugar (mg/dL)	
	- <200	91(91)
	- ≥200	9(9)
5	Kolesterol Total (mg/dL)	
	- <200	34(34)
	- ≥200	66(66)

4 Discussion

Cardiovascular risk factors consisting mostly of plasma lipids including triacylglycerol (triglycerides), cholesteryl esters, and cholesterol are synthesized by the liver and adipose tissues and may also be absorbed from the diet.[4] They are also efficiently synthesized from carbohydrate diets largely in the intestinal epithelia tissues in addition to the liver,[5] and are transported between various tissues and organs for utilization and storage. These plasma lipids like other lipids are generally insoluble in water and pose a transportation problem in aqueous blood plasma. This problem is overcome by associating the nonpolar lipids comprising triacylglycerol (triglycerides) and cholesteryl esters with amphipathic lipids such as phospholipids, cholesterol, and proteins to produce water-miscible lipoproteins.[6] A lipoprotein is a particle consisting of core hydrophobic lipids surrounded by a shell of polar lipid and apoprotein and mediates the cycle by transporting lipids from the intestine as chylomicrons and

the liver as very low-density lipoproteins-cholesterol (VLDL-c) - to most tissues for oxidation and to adipose tissue for storage.

In the UAE, a 3-year prospective registry of ACS patients found that patients were relatively young and had risk factors such as smoking and DM.[7] On the other hand, a GRACE analysis from 18 hospitals in the UAE estimated adjusted mortality rates of 4.6% in women and 1.2% in men; also, HF was recognized to be more common in women than in men.[8] In contrast, another GRACE study validated the utilization of the post-discharge GRACE risk score among Arabian Gulf patients and found that the score can be utilized for stratifying 1-year mortality risk across the population of the Arabian Gulf.[9] In Al-Ain, a cross-sectional CVD risk assessment study15 demonstrated the need for targeted interventions. Of the population screened, around 28.4% had a Framingham risk assessment score >20%, 19.6% of men smoked, 22.7% had metabolic syndrome, 37.3% were obese, 20.8% had hypertension and 23.3% had DM. CHD was reported in 2.4%. In 53.9% of women and 64% of men, lipid profiles were abnormal, largely owing to high triglyceride levels and low high-density lipoproteins. Another study[10] carried out in a mandatory residency visa health screening center in Abu-Dhabi reported an overall prevalence of BMI-derived obesity and overweight and 'waist-to-hip-derived central obesity' of 44.7% in women and 66.7% in men. A health survey,[11] that elicited 'self-reported hypertension' reported that high-density lipoprotein-cholesterol, triglycerides, obesity/overweight, dyslipidemia, and DM prevalence, and thus, 10-year Framingham risk scores were considerably higher among hypertensive respondents than in normotensive respondents. A prospective analysis[12] of patients with decompensated HF at two government hospitals in the UAE found that the prevalence of respiratory diseases and AF among women and older patients was higher than in developed countries. In a community-based survey,[13] DM, increased waist circumference, and smoking was associated with hypertension. A case-control study,[14] involving 90 patients with MI admitted to a government hospital in the UAE showed a higher rate of incidence of Type A personality in the MI group. Four other studies on the management of CVD and the evaluation of public health programs were identified. A meta-analysis[15] was carried out in six studies conducted in the UAE (1995–2009) among individuals with ST-segment elevation MT who were treated with the thrombolytic drug.

In this study, we found the cardiometabolic risk profile of patients who participated in the Commemoration of World Hypertension Day at RSUP H Adam Malik Medan. are overweight/obese, and dyslipidemia.

5 Conclusion

The most cardiometabolic risk profile of patients who participated at the Commemoration of World Hypertension Day is overweight/obesity, and dyslipidemia**.**

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