Risk Factors of Non-communicable Diseases in Medan City

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Abstract: Although achievements have been achieved to anticipate and control non-communicable diseases (NCDs), the frequency of these diseases are basically greater. The purpose of this study was to assess risk factors of non-communicable diseases in Medan City, in 2017. Using a cross-sectional design, the selected sample was recruited purposively consisting of 440 individuals. The selected individual was approached in the interview and the related questionnaire is filled out. Only 154 were included in the collection of measurement data, namely systolic and diastolic blood data, weight, height, uric acid, blood glucose and cholesterol. Chi-square and independent t test were used to analyze data. Obesity was seen in 16.3% and 8.7% of female and male respondents. There was no significant difference in the proportion of obesity between female and male respondents. Systolic and diastolic blood pressure were estimated at 129.3 and 82.9 mmHg on average and were evenly distributed in female and male. And 32.5% of respondents were smokers and 17.5% of respondents had drunk alcohol. Risk factors for non-communicable diseases were not evenly distributed in male and female. Moderate physical activity, overweight, obesity and high blood pressure were more common in female, while smoking and alcohol consumption were more common in male.

1 INTRODUCTION

Some non-communicable diseases (NCDs) like cancer, cardiovascular diseases, chronic respiratory diseases, and diabetes are the worldwide primary determinant of death, kill 41 million people each year same with 71% of deaths worldwide. Nearly three quarters of all NCDs death, and over 85% of the 15 million people died too early (between the ages of 30 and 69 years), both in low and middle-income countries. These NCDs are caused by modifiable behavioural risk factors like unhealthy diet, lack of physical activity, tobacco use and using alcohol, which consecutively caused some impacts like overweight and obesity, raised blood pressure, and also cholesterol (WHO, 2018).

Although success has been achieved in the recent years in reducing NCDs, the cases of these diseases have became greater unquestionably. Globally cardiovascular disease account for most NCD deaths, or 17.9 million people yearly, followed by cancers (9.0 million), respiratory infections (3.9 million), and the last is diabetes (1.6 million) (WHO, 2011).

Prevalence of NCDs in Indonesia based on Riskesdas (Basic Health Research) 2013, hypertension aged > 18 years (25.8%), Coronary Heart Disease (CHD) aged ≥ 15 years (1.5%), heart failure (0.3%), chronic renal failure (0.2%), kidney stones (0.6%), rheumatism (24.7%), stroke (12.1 ‰), injuries of all ages (8.2%), asthma (4.5%), Chronic Obstructive Pulmonary Disease (COPD) aged ≥ 30 years (3.8%), cancer (1.4 ‰), Diabetes Mellitus (2.1%), hyperthyroid aged ≥ 15 years on the basis of diagnosis (0.4%), and injury due to land transportation (47.7%). While some risk factors for NCDs, obesity in men aged >18 years (19.7%) and in women (32.9%), central obesity (26.6%), tobacco consumption aged ≥15 years (36.3 %), less vegetable consumption (93.5%). Meanwhile prevalence of NCDs in North Sumatera Province based on Riskesdas 2013, hypertension (6.7%), CHD (1.1%), heart failure (0.3%), chronic renal failure (0.2%), kidney stones (0, 3%), stroke (10.3 ‰), asthma (2.4%), COPD (3.6%), cancer (1.0 ‰),

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diabetes mellitus (2.3%), hyperthyroid (0.3 %), and joint disease (19.2%) (Badan Penelitian dan Pengembangan Kesehatan, 2013).

In Indonesia, many policies, strategies and/or plans of action have been done to prevent and control NCDs according to WHO's approach to Major NCDs involving general risk factors. At the community level, Integrated NCD Education Posts (Posbindu PTM) have been established, where early detection of risks are conducted and community activities and education are held towards achieving Clean and Healthy Living Behavior. At the healthcare level, strengthening measures have been taken on the PUSKESMAS as the community's first contact point with the health system. It is recognized that currently the referral system is not organized effectively, and will be continually be improved along with refinements to the National Health Insurance program (JKN), which is the manifestation of the Universal Health Coverage (UHC) that has been implemented since 1 January 2014. However, the above efforts are not sufficient, as cross-sector participation is still limited. So the increasing prevalence of NCDs in Indonesia especially in Medan during the last few decades is occurring, both with respect to morbidity and mortality. It is understood that NCD is related to social determinants for health, particularly with regard to risks associated with behavior and environment (Directorat General Disease Control and Environmental Sanitation, 2016).

Because the frequency of noncommunicable diseases are expanding and their risk factors can be controlled, so this study aimed to understand the NCD risk factors in Medan City in 2017 to offer applicable action to prevent NCD.

2 MATERIALS AND METHODS

This study using cross-sectional design, selected samples were recruited purposively by using POSBINDU sampling unit (11 POSBINDU, each POSBINDU consisted of 40 persons, totally 440 samples) from the whole Medan City. Selected individuals were approached in designated interview and fill the related questionnaires. The questionnaire contained questions about personal information as well as the information about all risk factors related to non-communicable diseases.

Height was measured using a staturemeter installed on the wall and the individuals were asked to stand up in front of the staturemeter without shoes while looking forward and their head and ankles

were stuck to the back wall. Weight was measured using an analogue scale. The participants were asked to stand on the scale without shoes and with the least clothing. BMI was calculated by dividing weight (kg) by square height (m^2).

Data entering were done and analyzed using the statistical software. Chi-square, Fisher exact, and independent t tests were used as appropriated and P values less than 0.05 were results were presented as numbers (percents) and mean ± standard deviations.

3 RESULTS

The socio-demographic characteristics of the respondents can be seen in Table 1. Most female respondents (71.0%), with an average age of 44.2 years (+17.2 years) and as many as 60.2% in the reproductive life range of 15-49 years. The ethnic's of respondent's fathers and mothers are mostly Javanese each as many as 44,5% and 45,5% respectively. Most respondents have high school education (46.8%) and many work as domestic workers (25.9%).

Table 1: Characteristics of Respondents' Socio Demography

Characteristics	Frequency	%
Sex		
Male	126	28.6
Female	314	71.4
Age (years)		
15 – 24	76	17.3
25 – 34	65	14.8
35 – 44	84	19.1
45 – 54	83	18.9
55 – 64	65	14.8
65 – 74	52	11.8
75+	15	3.4
Fathers's ethnic		
Javanese	196	44.5
Sundanese	24	5.5
Betawi	4	0.9
Bataknese	90	20.5
Minang	27	6.1
Melayu	25	5.7
Ambon	2	0.5
Madura	1	0.2
Banjar	6	1.4
Acehnese	9	2.0
India	9	2.0
Chinese	7	1.6
Others	40	9.1
Mother's Ethnic		

Javanese	200	45.5
Sundanese	31	7.0
Betawi	3	0.7
Bataknese	88	20.0
Minang	30	6.8
Melayu	21	4.8
Ambon	1	0.2
Madura	1	0.2
Banjar	8	1.8
Acehnese	1	0.2
India	9	2.0
Chinese	5	1.1
Others	42	9.5
Last Education		
No school	9	2.0
Not completed in Elementary School	33	7.5
Graduated from Elementary School	63	14.3
Graduated from Junior High School	93	21.1
Graduated from Senior High School	206	46.8
Graduated from Higher Education	36	8.2
Occupation		
Driver	10	2.3
Domestic workers	114	25.9
Student	21	4.8
Army/Police	1	0.2
Civil Servant	7	1.6
Enterpreneurs	80	18.2
Private Employees	19	4.3
Farmer	1	0.2
Factory Workers	6	1.4
ConstructerWorkers	7	1.6
Retired	14	3.2
Others	160	36.3

3.1 Description of Health Status of Respondents

Health status of respondents can be seen in Table 2 below. When it was viewed from the health status, hypertension was the most common illness (18.2%), then diabetes mellitus (5.9%) and coronary heart disease (4.8%). In general the current health status of respondents is good (83.4%).

Table 2: Health Status of Respondents

Health Status	Frequency	%
Coronary Heart Disease		
Yes	21	4.8
No	419	95.2
Stroke		
Yes	10	2.3
No	430	97.7
Diabetes Mellitus		
Yes	26	5.9
No	414	93.9
Cancer		
Yes	7	1.6
No	433	98.4
Obstructive Pulmonary Disease		
Yes	0	0.0
No	440	100.0
Chronic Bronchitis Disease		
Yes	1	0.2
No	439	99.8
Emphysema		
Yes	0	0.0
No	440	100.0
Asthma		
Yes	2	0.5
No	438	99.5
Hypertension		
Yes	80	18.2
No	360	81.8

3.2 Description of Non Communicable Disease Risk Factors

The following table showed the risk factors of non-communicable diseases in Medan City

Table 3: Distribution of Non Communicable Diseases Risk Factors

Risk Factors	Frequency	%
Oil to cook		
Coconut Oil	17	3.9
Coconut Oil Packaging	78	17.7
Palm Oil Bulking	191	43.4
Palm Oil Packaging	154	35.0
Flavoring MSG		
Always	197	44.8
Sometime	122	27.7
Ever	19	4.3
Never	102	23.1
Smoking Habit		
Yes	143	32.5
No	297	67.5
Passive Smooking		
Yes	246	55.9
No	194	44.1
Alcohol Consumption		
Yes	77	17.5
No	363	82.5
Working Activity		

Heavy	37	8.4
Moderate	403	91.6

The most prevalent NCD risk factors were cooking oil bulking (43.4%), always using flavoring (44.8%), most of whom had household members smoking (55.9%).

3.3 Description of Measurement Results

Of the 440 respondents, 154 respondents (35.0%) were willing to measure height, weight, waist circumference, systolic blood pressure, diastolic blood pressure, pulse, blood sugar, uric acid and cholesterol levels.

Table 4: Description of Measurement Results

Measurement	Mean	SD	Min	Max
Height (cm)	154.7	8,1	135	175,5
Weight (kg)	59.0	11,8	34	95
Waist circumference (cm)	86.8	11,4	56	115
Systolic Blood Pressure (mmHg)	129,3	22,7	90	200
Diastolic Blood Pressure (mmHg)	82,9	9,7	50	120
Pulse	82,2	4,3	40	97
Blood glucosa (mg/dL)	144,9	81,0	69	462
Uric acid	7,1	5,7	3,4	7,1
Cholesterol	225,4	60,8	104	392
BMI (kg/m^2)	24.7	4.9	13.4	38.5

When it was viewed by sex, the mean age ($\pm$ SD) of the respondents was 44.2 years ($\pm$17.2 years) with no significant difference between men and women (p = 0.563). The mean height values differed significantly between males and females but the mean values of body weight and waist circumference did not differ significantly, 15.1% of respondents had BMI > 30 (8.7% male and 16.3 female). Mean systolic blood pressure was higher in male respondents but there was no significant difference in mean systolic blood pressure and diastolic blood pressure between men and women. In total, 19.1% of respondents had systolic blood pressure > 140 mmHg and 12.5% had diastolic blood pressure > 90 mmHg.

Respondents use cooking oil for cooking (35.0%) and always use flavoring for cooking (44.8%). A total of 32.6% of the studied population reported smoking (78.6% in males and 14.1% in females), which showed a significant difference between men and women (p <0.001). Similarly in alcohol consumption, there was a significant difference in proportion between men (42.9%) and women (7.3%). The results of this study also show that there is a significant difference between men and women in terms of heavy physical activity in the workplace (18.3% in males and 4.5% in females). While for the sport, who do moderate activities only 32.5% in men and 26.1% in women.

Table 5: Comparison of Mean (+ SD) Quantitative Variables between Male and Female in Medan City, 2017

Variable	Male	Female	Total	p
Age (years)	43,4 $\pm$ 18,3	44,5 $\pm$ 16,8	44,2 $\pm$ 17,2	0,563
Height (cm)	162.2 $\pm$ 6.3	153.4 $\pm$ 7.7	154.7 $\pm$ 8.1	< 0.001
Weight (kg)	60.9 $\pm$ 13.8	58.6 $\pm$ 11.4	59.0 $\pm$ 11.8	0.398
Waist Circumference (cm)	84.3 $\pm$ 12.4	87.3 $\pm$ 11.2	86.8 $\pm$ 11.4	0.242
Pulse	83.2 $\pm$ 3.9	82.0 $\pm$ 4.3	82.2 $\pm$ 4.3	0.217
BMI (kg/m^2)	15.6 $\pm$ 13.1	21.0 $\pm$ 12.6	20.1 $\pm$ 12.8	0.062
Sistolic BP (mmHg)	133.5 $\pm$ 19.5	128.5 $\pm$ 23.2	129.3 $\pm$ 22.7	0.337
Diastolic BP (mmHg)	81.7 $\pm$ 8.3	83.1 $\pm$ 10.0	82.9 $\pm$ 9.7	0.547
Cholesterol (mg/dL)	204.4 $\pm$ 56.2	229.3 $\pm$ 61.0	225.4 $\pm$ 60.8	0.079
Blood Glukosa (mg/dL)	147.0 $\pm$ 63.0	144.0 $\pm$ 83.5	144.7 $\pm$ 81.0	0.867
Uric Acid (mg/dL)	7.9 $\pm$ 2.0	7.0 $\pm$ 6.1	7.1 $\pm$ 5.7	0.475

Table 6: Distribution of NCD Risk Factors between Male and Female in Medan City, 2017

Risk Factors	Male	Female	p
Oil to cook			
Coconut oil	6 (4,8%)	11 (3,5%)	0,705
Coconut oil packaging	25 (19,8%)	53 (16,9%)	
Palm oil	50 (39,7%)	141 (44,9%)	

bulking			
Palm oil packaging	45 (35,7%)	109 (34,7%)	
Flavoring MSG			
Always	54 (42,9%)	143 (45,5%)	0,941
Sometime	37 (29,4%)	85 (27,1%)	
Ever	6 (4,8%)	13 (4,1%)	
Never	29 (23,0%)	73 (23,2%)	
Ever smoke			
Yes	99 (78,6%)	44 (14,0%)	< 0,001
No	27 (21,4%)	270 (86,0%)	
Ever consume alcohol			
Yes	54 (42,9%)	23 (7,3%)	< 0,001
No	72 (57,1%)	291 (92,7%)	
Heavy physical activity when working			
Yes	23 (18,3%)	14 (4,5%)	< 0,001
No	103 (81,7%)	300 (95,5%)	
Moderate physicial avticity when sport			
Yes	41 (32,5%)	82 (26,1%)	0,174
No	85 (67,5%)	232 (73,9%)	
Body Mass Index			
<18,5	4 (17,4%)	9 (7,0%)	0,293
18,5 – 24,9	12 (52,2%)	61 (47,3%)	
25,0 – 29,9	5 (21,7%)	38 (29,5%)	
≥ 30	2 (8,7%)	21 (16,3%)	
Systolic Blood Pressure			
≤ 140 mmHg	18 (78,3%)	105 (81,4%)	0,725
> 140 mmHg	5 (21,7%)	24 (18,6%)	
Diastolic Blood Pressure			
≤ 90 mmHg	21 (91,3%)	112 (86,8%)	0,549
> 90 mmHg	2 (8,7%)	17 (13,2%)	
Waist Circumfe-rence			
Normal	13 (56,5%)	28 (21,7%)	< 0,001
Abdominal Obesity	10 (43,5%)	101 (78,3%)	

4 DISCUSSION

The incidence and prevalence of Non Communicable Diseases (NCD) has increased over the past decade. The disease is the most important cause of death and illness in developed and developing countries. According to WHO report in 2014, eight controlled risk factors (smoking, high salt/sodium intake, alcohol consumption, poor physical activity, hypertension, overweight/obesity, hyperglycemia and hyperlipidemia, account for 70% of deaths in the world (WHO, 2014). In this study, the risk factors for non-communicable diseases in 440 respondents in Medan City were overweight and obesity correlated with cardiovascular disease, and some cancers as well as increased obesity and overweight caused death rates and morbidity also increased. In this study 8.7% of men and 16.3% of women had BMI> 30. Also 21.7% of men and 29.5% of women were overweight. Southeast Asia, the highest prevalence of obesity has been reported from Brunei (16.6% in males and 29.7% in females) followed by Laos with 12.6% prevalence in males and 3.3% pad a woman (Dans, 2011). In the Middle East, the prevalence is reported to be 30.0% and 16.6% respectively in women and men (Shara, 2010). Research in Iran Fars Province obtained the prevalence of BMI > 30 as much as 93.4% in males and 20.3% in females. Also 32.8% of men and 35.0% of women were overweight, indicating a high prevalence of obesity and overweight from the population studied (Akbarzadeh, 2016). In a 2001 study of Muslims living in urban areas in Palestine, the prevalence of obesity in women was greater than in men (49% vs 30%). Research in Medan City shows that the prevalence of overweight is quite high compared to the prevalence of obesity, which can lead to an increase in the prevalence of chronic diseases. A person who is overweight may soon become fat if inactive and run a diet is not right. They should be treated the same as the obese to control overweight.

In addition to BMI, waist circumference is one of the important risk factors, which should also be considered. Body fat distribution is an important risk factor associated with obesity. Excess abdominal fat is associated with an increased risk of cardiometabolic disease. However, the exact measurement of abdominal fat levels requires the use of expensive radiological devices. Therefore, waist circumference is often used as an alternative marker of abdominal fat mass. This is because the waist circumference correlates with abdominal fat mass (subcutaneous and intraabdominal) and is

associated with cardiometabolic disease (Klein, 2007). The waist circumference can provide a simple measurement of central obesity. The waist circumference data in males is categorized to be normal (<90 cm) and abdominal obesity (> 90 cm) and in women categorized to normal (<80 cm) and abdominal obesity (> 80 cm) [10]. As found in this study, the prevalence of abdominal obesity was higher in females (78.3%) than in men (48.5%), similar to the prevalence of obesity higher in females than in males (16.3% and 8.7%). Thus women should be closely monitored to control these risk factors.

Until now, hypertension is still a big challenge in Indonesia. Hypertension is a condition that is often found in primary health care health. This is a health problem with a high prevalence of 25.8%, in accordance with RISKESDAS 2013 data (PUSDATIN, 2014). In addition, hypertension control is inadequate even though effective drugs are widely available. Long-term persistent blood pressure can cause damage to the kidneys (kidney failure), heart (coronary heart disease) and brain (causing stroke) if not detected early and receive adequate treatment. Many hypertensive patients with uncontrolled blood pressure and the number continues to increase. Hypertension accounts for about 12.8% of total global mortality (WHO, 2017). The results showed the mean systolic blood pressure was 133.5 and 128.5 mmHg in both men and women. Compared with findings in Iranian Fars Province (systolic blood pressure is 122.4 and 119.2 mmHg in men and women) the rate in Medan city is quite high. The prevalence of hypertension in women is higher than that of men (21.0% and 11.1%). Reports from the Middle East show that the prevalence of hypertension in women is more than male (23.0% and 20.0%) (Shara, 2010).

Globally 12% of adult deaths over 30 years old are caused by tobacco. In 2004, some 5 million adults over 30 years old died directly from tobacco use (active and passive smoking) worldwide. The proportion of tobacco mortality is higher in males than in females. Globally, 14% of deaths of PTM cases in adults over 30 years are due to tobacco (WHO, 2012). In this study 78.6% of men and 14.1% of women had smoked. Current prevalence of smoking in Southeast Asian countries varies from 36% in Singapore to 64% in Laos. However in women, smoking prevalence varies from 2% in Vietnam to 15% in Thailand, Laos, and Myanmar (Dans, 2011).

The high incidence of non-communicable diseases (NCD) is caused by unhealthy lifestyles, one of which is lack of physical activity. The density of busyness and high mobility make people less allocate time to exercise. In addition advanced technology increasingly facilitate the community in meeting the needs, so that activities that require movement of the body was reduced. The lack of physical activity also resulted in the changing trend of NCD, which initially suffered only by the elderly age group, but has now been found in the young age group (0-15 years) and productive age group (15-65 years). The study found that only 28.0% of the respondents had moderate exercise whereas the proportion of moderate exercise men (32.5%) was higher than the proportion of women (26.1%). Men were significantly more involved in heavy physical activity in their workplace (18.3%) than women (4.5%). More male involvement in heavy activity can be explained largely by the nature of their work (drivers, factory workers, construction workers, private employees and self-employed/service), which may require more activity. But about sporting activities, lack of knowledge about the importance of exercise and the lack of appropriate sports facilities may be one contributing factor that causes low exercise activity in women.

5 CONCLUSIONS

Most respondents have hypertension (18.2%), diabetes (5.9%), and Coronary Heart Disease (4.8%). Meanwhile most of NCD risk factors were using palm oil bulking to cook (43.4%), always use flavoring MSG (44.8%), and household member smoke (55.9%). NCD risk factors which had significance diffrence between male and female were height, smoking habit, alcohol consumption, physical activity and waist circumference.

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