Profile of Obesity and Diabetes Mellitus in Adult Female Population in North Sumatera, Indonesia

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Abstract. Non-communicable diseases (NCDs) have become the leading causes of death globally, including Indonesia. This study is conducted to find out the distribution of obesity and diabetes mellitus (DM) in adult female population in North Sumatera Utara, Indonesia. A cross-sectional study was conducted from August to September 2016 on a total of 200 adult female respondents aged 20-65 years who agreed to participate in Langkat district and Medan city, North Sumatra. Criteria of obesity based on Body Mass Index (BMI), might be inappropriate for Asian population. DM was diagnosed if plasma glucose level is >200 mg/dl. The prevalence of obesity in female among aged ≥20 years were 68.5%. Subsequently obesity and overweight categories of BMI are highest in the 41-50 year age group (35.5% and 20.5% respectively) as well as pre-DM and DM (24.5 and 11.5%, respectively). The age group of 41-50 years old have also the highest rates of obesity and overweight BMI categories as well as highest rate of DM in this research. In addition, more investigation is needed to establish a relationship between obesity and DM. Therefore, comprehensive strategies for the prevention and control of the problem of obesity and DM in adult female are urgently required.

1. Introduction

Obesity is a global health problem and has emerged as an epidemic in developed and developing countries [1]. Obesity is a threat to the health of people and many studies have shown that obesity is a risk factor for cancer, hypertension, hypercholesterolemia, diabetes mellitus (DM), metabolic disorders and disability in adulthood [2]. Obesity will increase morbidities, shortened life expectancy and reduce productivity during the productive age. Particularly in women, obesity is associated with an increased risk of asthma, endometrial cancer, colon cancer, breast cancer and gallstones disease [3].

WHO predicts that by 2015, there will be approximately 2.3 billion adults are overweight and more than 700 million people will be obese. Report from Basic Health Research in 2013 shows the national rate of obesity prevalence is 15.4%. The prevalence of obesity in women (≥ 18 years) is about 32.9%. Subsequently, the prevalence of obesity in women is about 37.8% [4]. It should be noted that obesity is one of risk factor of DM.

DM is one of the non-communicable diseases (NCDs) that trending to increase progressively in the future. This disease causes the death of 1.5 million people in 2012. In 2014, an estimated prevalence of diabetes is about 9%.¹ The number of diabetic people probably will rise from 171 million in 2000 to 366 million in 2030. The prevalence of diabetes is more in women than men. The urban population in developing countries is projected to increase between 2000 and 2030 [5]. The likelihood of obesity and diabetes in society is closely related to diet, social status and physical activity to the imbalance in composition of diet [6]. To date, the study on prevalence of obesity and diabetes mellitus in adult female
of North Sumatra is limited. Therefore, this study aimed to describe the prevalence of obesity and diabetes mellitus in women in North Sumatra.

2. Methods
This research is a descriptive cross-sectional design and carried out from August to September 2016. Samples were 200 female respondents, aged 20-65 years from Medan city and Langkat district, North Sumatra Province. The type of data collected in this research is the primary data, using a questionnaire and anthropometric measurements and blood glucose tests. Interview with a structured questionnaire was to determine the detailed of socio demographics and risk factors of obesity and diabetes. The anthropometric measurements, including height, weight and waist circumference were to get the value of Body Mass Index (BMI).

Assessment of BMI was by dividing body weight (kg) to height squared (m2). Categories of obesity are based on the WHO criteria for the Asian population, which is normal (18.5 to 22.9 kg/m2), overweight (23 to 24.9 kg/m2) and obese (≥25 kg/m2) [7]. Blood glucose was measured using Easy Touch Glucometer with an accuracy of 0.1 mm/dl. Diagnosis of diabetes was made by consensus of the Indonesian Endocrinologist Association 2011, namely: no DM (<90 mg/dl), uncertain DM (90-199 mg/dl), and DM (> 200 mg/dl) [8]. The data were presented descriptively to show the socio demographics of the respondents, the prevalence of obesity and the prevalence of diabetes mellitus.

3. Results

3.1. Socio-demographic of respondent
Out of 200 respondents, 71 (35.5%) were 41-50 years old, while the highest level of education is high school as much as 74 respondents (37%). Meanwhile, 153 respondents (76.5%) having an income of more than one million and 47 respondents (23.5%) with income of less than one million Indonesian rupiah (IDR). As much as 119 respondents (59.5%) did not have a job and 81 respondents (40.5%) have a permanent job. It is showed that 129 respondents (64.5%) were member of BPJS and 71 respondents (35.5%) did not have BPJS membership (Table 1).

| Variable               | n  | %   |
|------------------------|----|-----|
| Age                    |    |     |
| 21 - 30 yrs            | 9  | 4.5 |
| 31-40 yrs              | 41 | 20.5|
| 41-50 yrs              | 71 | 35.5|
| 51-60 yrs              | 47 | 23.5|
| > 60 yrs               | 32 | 16.0|
| Education              |    |     |
| SD (Primary school)    | 59 | 29.5|
| SLTP (Elementary school)| 43 | 21.5|
| SLTA (High school)     | 74 | 37.0|
| D3/PT (College)        | 24 | 12.0|
| Income / month (IDR)   |    |     |
| <= 1 million           | 47 | 23.5|
| > 1 million            | 153| 76.5|
| Total                  | 200| 100.0|
| Job                    |    |     |
| Jobless                | 119| 59.5|
| Permanent job          | 81 | 40.5|
| BPJS membership        |    |     |
| No                     | 71 | 35.5|
| Yes                    | 129| 64.5|
3.2. Obesity

Based on the categories of BMI (Table 2), most of the respondents were obese (138 respondents or 69.0%) and 29 respondents (14.5%) were overweight. The small group of respondents was categorized as normal and underweight.

| BMI categories     | N   | %   |
|--------------------|-----|-----|
| Underweight        | 1   | 0.5 |
| Normal weight      | 32  | 16.0|
| Overweight         | 29  | 14.5|
| Obese              | 138 | 69.0|
| Total              | 200 | 100.0|

Table 3 showed that 51 respondents (25.5%) among the age of 41-50 years were obese and 20 respondents (10%) were not. In the age of 21-30 years, 7 respondents (3.5%) were obese and 2 respondents (1%) were not.

| Age group       | No Obese | Obese | Total |
|-----------------|----------|-------|-------|
| 21 - 30 yrs     | 2 (1.0%) | 7 (3.5%) | 9 (4.5%) |
| 31-40 yrs       | 11 (5.5%) | 30 (15.0%) | 41 (20.5%) |
| 41-50 yrs       | 20 (10.0%) | 51 (25.5%) | 71 (35.5%) |
| 51-60 yrs       | 14 (7.0%) | 33 (16.5%) | 47 (23.5%) |
| > 60 yrs        | 15 (7.5%) | 17 (8.5%) | 32 (16.0%) |
| Total           | 62 (31.0%) | 138 (69.0%) | 200 (100.0%) |

3.3. Diabetes Mellitus

In Table 4, 23 respondents (11.5%) had DM and 128 respondents (64%) were normal. Subsequently, Table 5 describes the prevalence of type 2 DM by age group in women in North Sumatera. Among the age of 41-50 years, 43 respondents (21.5%) were categorized as no DM, 19 respondents (9.5%) were uncertain DM and 9 respondents (4.5%) were DM. In the group of 41-50 years, 43 respondents (21.5%) were not diabetes, 19 respondents (9.5%) were uncertain diabetes and 9 respondents (4.5%) were diabetes.

| Categories      | N   | %   |
|-----------------|-----|-----|
| No DM           | 128 | 64.0|
| Uncertain DM    | 49  | 24.5|
| DM              | 23  | 11.5|
| Total           | 200 | 100.0|

| Age group        | No DM | Uncertain DM | DM | Total |
|------------------|-------|--------------|----|-------|
| 21 - 30 yrs      | 6 (3.0%) | 3 (1.5%) | 0 | 9 (4.5%) |
| 31-40 yrs        | 31 (15.5%) | 9 (4.5%) | 1 (.5%) | 41 (20.5%) |
| 41-50 yrs        | 43 (21.5%) | 19 (9.5%) | 9 (4.5%) | 71 (35.5%) |
| 51-60 yrs        | 29 (14.5%) | 11 (5.5%) | 7 (3.5%) | 47 (23.5%) |
| > 60 yrs         | 19 (9.5%) | 7 (3.5%) | 6 (3.0%) | 32 (16.0%) |
4. Discussions
This study involved 200 women aged 20-65 years who came from urban and rural areas. It is found that the prevalence of obesity (based on BMI) was 68.5%. There was an increase in obesity when compared with the results of Fujiati et al. (2006) which found obesity by 55% in women in Medan [9]. The results are consistent with studies conducted by Mohamud et al. (2011) who get a high prevalence of obesity in women in Malaysia, which about 64.2%. However, the prevalence of obesity in this study is higher than the national rate (15.4%) of the Indonesian population with age ≥ 18 years and 32.9% for adult women [4]. High prevalence of obesity (68.5%) is a threat to public health and many studies have shown that obesity is a risk factor for cancer, hypertension, hypercholesterolemia, diabetes mellitus, metabolic disorders and disability in adulthood [11]. For women in particular, obesity is associated with an increased risk of asthma, cancer, endometrial, colon breast and gallstones disease [3].

This study shows the prevalence of DM is 11.5% and pre-diabetes is 24.5%. The DM prevalence is similar to Fujiati et al. [9] that they found 12.3% of the population in Medan suffer from diabetes, but the numbers of diabetes in this study is lower than Malaysia (22.6%) [12]. The results in this study showed little higher than the WHO data (2014) which shows the prevalence of DM by 9%. Therefore, the high number of the prevalence of pre-diabetes will increase the prevalence of DM in the future. Compared with the national average, the prevalence of diabetes in this study are also higher. Basic Health Research’ data in 2013, found that the national prevalence of DM was 1.5%. Diabetes was associated with obesity, low physical activity and quality of diets that are low in fibres. DM has been caused of 4.6 million deaths [13]. In addition, more investigation is needed to establish a relationship between obesity and DM.

5. Conclusions
The prevalence of obesity in women in North Sumatra is still high (68.5%). Based on age group, the prevalence of obesity is most prevalent among women aged 41-50 years (25.5%). Meanwhile, the prevalence of diabetes mellitus was 11.5% and 24.5% was pre-diabetes. Therefore, a holistic promotive effort is needed to prevent complications due to obesity and DM.

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