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Obesity on Preconception Women in Banggai

ErniYusnita Lalusu[1,7], Ratna Djuwita[2], MondastriKorib Sudaryo[2], Dwiana Ocviyanti[3], EndangLaksminingsih Achadi[4], Rimbawan[5], AnangSamudera Otoluwa[6]

Doctoral Student of epidemiology at Faculty of Public Health, Universitas Indonesia, Jakarta, Indonesia[1]
Department of Epidemiology, Faculty of Public Health, Universitas Indonesia, Jakarta, Indonesia[2]
Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas Indonesia/Cipto Mangunkusumo Hospital, Jakarta, Indonesia[3]
Department of Nutrition, Faculty of Public Health, Universitas Indonesia, Depok, Indonesia[4]
Department of Community Nutrition, Bogor Agricultural University, Bogor, Indonesia[5]
Banggai Regency Health Office,Central Sulawesi, Indonesia[6]
Faculty of Public Health, UniversitasTompotikaLuwukBanggai, Central Sulawesi, Indonesia[7]

Abstract— The first 1000 days of life period, which consists of 270 days during pregnancy and 730 days in the first 2 years of the baby's life, is a sensitive period. However, there was a period that was missed, namely the preconception period that is a critical stage for determining a successful pregnancy. This study aims to describe the incidence of obesity and other nutritional problems on preconception women in the Banggai Regency. This is the baseline from an experimental study on the effect of giving multi micronutrient supplements since the preconception period on blood glucose levels during pregnancy in Banggai Regency which was carried out since January 2020. There are 137 samples of preconception women in four districts (Luwuk, Luwuk Utara, Luwuk Selatan, and Nambo). Anthropometric measurements and hemoglobin levels are using standardized tools and procedures. We used univariate analysis. The prevalence of obesity was 36,5% (up to 50,4% with overweight), 67,9% central obesity, and 12,4% anemia and 13,9% chronic energy deficiency. In Banggai, six out of ten preconception women experience central obesity and being overweight. This will affect the health status of the pregnancy and birth outcomes. Interventions must be focused on preventing anemia and overweight that begins from the preconception period.

Keywords— Obesity, central obesity, anemia, chronic energy deficiency,preconception women

1. Introduction

Nowadays Indonesia is faced double burden of nutritional problem. In one side, Indonesia is faced undernutritional problem (malnutrition, stunting and thin), and the other is faced overnutritional problem such as obesity which would end into diabetes mellitus and cardiovascular illness.

Women have important roles in deciding human resources quality because women have roles in pregnancy and giving birth. Obesity rates in women tend to be higher than men. The condition of obesity in women of childbearing age can interfere with future pregnancies. Obesity during pregnancy can cause various complications related to glucose and lipid metabolism disruption. Pregnant women with obesity tend to be at risk of having gestational diabetes and preeclampsia(1)(2).

In the first 1000 days of life rescue movement in Indonesia, there was a period that was missed, namely the preconception period. the first 1000 days of life period, which consists of 270 days during pregnancy and 730 days in the first 2 years of the baby's life, is a sensitive period. However, the preconception period is a critical stage for determining a successful pregnancy.

Health problems related to nutrition (overnutrition and malnutrition) among adolescents in Luwuk City,

Banggai Regency, are still quite high. Based on the results of research by Herawati et al on 2018, there were 18.6% of adolescents who were overweight and obese (3). Likewise, the incidence of anemia in adolescents is still quite high at 29% (3 out of 10 adolescents) in 2019 (based on research by Lalusu, et al) (4). This condition will probably continue in the next period, namely the preconception period.

This Research aim is to describe nutritional problems, namely the incidence of obesity, central obesity and the other health problems on preconception women in Banggai Regency.

1.1 Research Question

How does the incidence of obesity and other nutritional problems in preconception women in Banggai?

1.2 Objectives

This Research objective is to describe nutritional problems, namely the incidence of obesity, central obesity and the other health problems on preconception women in Banggai Regency.

2. Method

2.1 **Design Study**

This is the baseline from an experimental study on the effect of giving multi micronutrient supplements since the preconception period on blood glucose levels during pregnancy in Banggai Regency which was carried out since January 2020. Overall, the study involved 137 samples of preconception women. The location of the study was conducted at Banggai Regency in four districts (Luwuk, Luwuk Utara, Luwuk Selatan and Nambo).

2.2 Data Collection

Anthropometrics Measurements

Anthropometric measurements include body weight, abdominal circumference and arm circumference measurements. Anthropometric measurements were carried out by researchers and several measuring assistants who had been trained in advance by the anthropometric gold standard. Measuring instruments used are calibrated digital scales, microtoise, LILA tape, and centimeter measuring devices to measure abdominal circumference. All measurement results are recorded in an observation sheet by an officer.

Measurement of Hemoglobin Levels

Measurement of hemoglobin levels is carried out by trained health workers using standardized procedures and tools namely hemocue. Before taking a blood sample, respondents are welcome to fill out their inform consent.

Measurement of blood glucose levels

Measurement of blood glucose through enzymatic tests in the laboratory Using a certified laboratory service.

2.3 Variable Definition

The respondent's body weight is measured in kilograms (kg), height in meters (m), abdominal circumference and mid-upper arm circumference (MUAC) is measured in centimeters (cm). Hemoglobin levels is measured in mg / dl. Blood glucose level is the amount of glucose in the blood measured between sleep times (anytime regardless of fasting and 2 hours after fasting).Obesity is defined based on body mass index (BMI), which is> 27 Kg / m2 and overweight with a BMI of 25.1-27 Kg / m2. Central obesity is determined based on the measurement of abdominal circumference that is >80cm. Chronic energy deficiency (CED) is

defined based on the MUAC<23.5cm. Anemia is determined if the preconception hemoglobin level is <12 mg / dl. Characteristics of respondents studied included: age, respondent's occupation, husband's occupation, age of first birth, parity, physical activity (based on the severity of work and length of work per day), exposure to cigarette smoke (both as active smokers and passive smokers), iodized salt consumption and fruit and vegetable consumption habits. Various characteristics is rated using closed questionairres

2.4 Data Analysis

The data in this study were analyzed descriptively. Respondent characteristics and some risk behavior data with nominal and interval scales are presented in frequency and percentage values. Meanwhile, data from anthropometric measurements and laboratory examinations with ratio and interval scales are presented with the mean value and standard deviation

3. Result

Overall, this study involved 137 preconception women. However, for blood glucose data analysis, only 128 respondents were involved, where 9 other respondents were not successful in taking blood samples. Likewise, in some characteristics, not all respondents provide this data. Demographic characteristics in this study include: age, respondent's occupation, husband's occupation, education level, exposure to cigarette smoke, physical activity, habit of consuming iodized salt and habit of consuming fruit and vegetable (table 1.).

The average age of preconception women involved in this study was 28.6 years with a standard deviation of 5.2 years. This shows that some preconception women in the Banggai Regency being in a high risk group in pregnancy and childbirth (85.4% of them did not have children or before their first pregnancy). Averagewhile, the other 14.6% with an average age of first delivery at 25 years. Based on the type of work, the majority of preconception women work as housewives (71.9%), with the 49% husband's work as a enterpeneur. At the education level, there are still 39.2% of mothers with a low level of education, namely junior high school and below, with 47% of them having the highest education at primary school. Low educational level could affect the knowledge and one’s life competency, included in the management of nutrition and health care during pregnancy. Other characteristics associated with health risks, include: as 35.1% of preconception women with low physical activity, 60.5% exposed to cigarette smoke in the home either as active or passive smokers, 17.6 consumption of non-iodized salt and even 46, 2% and 19.7% of respondents did not consume fruits and vegetables in a day.

Table 1.Characteristics and determinant of preconception women’s health

		Average (SD) or n (%) *
Age		28,6 (5,2)
Occupation	Government officer	12 (9,9)
	Enterpreneur	7 (5,8)
	Freelancer	11 (9,1)
	Farmer/fishermen	4 (3,3)
	Housewives	87 (71,9)
Husband’s Occupation	Government officer	18 (15,8)
	Private Company	24 (21,1)

	Enterpreneur	56 (49,0)
	Farmer/fishermen	4 (3,5)
	Freelancer	12 (10,6)
Education	No	3 (2,4)
	Kindergarten	1 (0,8)
	Primary School	19 (15,2)
	Junior High School	26 (20,8)
	Senior High School	39 (31,2)
	Diploma/ Bachelor/undergraduate	37 (29,6)
Physical activity	Low	46 (35,1)
	Heavy	12 (16.0)
Cigarette smoke exposure		78 (60,5)
Iodized salt consumption		24 (17,6)
Consume fruits less than once perday		62 (46,2)
Ate vegetables less than one time per day		26 (19,7)

*) The number of respondents' data for each variable varied: age = 137, occupation = 121, husband's occupation = 114, education = 125, physical activity = 131, cigarette smoke exposure = 129.iodized salt consumption = 134, fruit and vegetable consumption habits = 134

Based on anthropometric measurements(can be seen in table 2.), most preconception women experience over nutritional problems (obesity). Incidence of obesity including overweight reached more than half (50,4%) of preconception women studied. This can also be seen in the average BMI which shows a number above the normal, namely 26.1 kg/m^2. The incidence of central obesity shows a higher proportion of 67.9%. This can also be seen in the average BMI which shows a figure above the normal limit, namely 26.1 kg/m^2 with an average abdominal circumference exceeding the normal standard, namely 84.6 cm. In addition to experiencing over nutrition, among the preconception women studied, there were also problems with malnutrition, where 2 out of 10, have iron deficiency (anemia) (12,4%) and / or CED (13,9%). Although not yet half of the total, this proportion is considered quite high and contributes to the health of pregnant women and birth outcomes.

Table 2. Anthropometrics and Nutritional Status

Antropometrics	Average (SD) (*)
Height (m)	150,9 (5,3)
Weight (kg)	59,1 (11,6)
abdominal circumference (cm)	84,6 (11,4)
Mid-upper arm circumference (cm)	27,8 (3,9)
Haemoglobin (mm/hg)	12,7 (1,6)
Body Mass Index (kg/m^2)	26,1 (5,2)
Blood Glucose Level (mg/dl)	93,8 (2,8)
Nutrition Status	N (%) (*)
Overweight	19 (13,9)
Obese	50 (36,5)
Central obesity	93 (67,9)
Chronic energy deficiency	19 (13,9)
Anemia	17 (12,4)

*) Respondents measured in total 137 people.

Numerous advancements in the symptomatic strategies have helped in fast precise finding of tuberculosis. To a few, it is as yet a fantasy to get to these quick indicative offices. Real pieces of the creating scene and particularly in high weight nations like India, the confinement to access is progressively obvious in the rustic populace. It would be of incredible preferred position if these more current quick diagnostics permeate into provincial wellbeing offices to lighten the weight in this populace. Cost-viability is the need of great importance to utilize these assets.

4. Discussion

The preconception period is a period of predisposition that largely determines the success of the pregnancy and the outcome of the birth. Pregnancy is part of the first 1,000 days of life which is the most important part of the life cycle. Early life that starts from conception until the first 8 weeks of pregnancy (the period of preconception) is difficult to be reached by programs aimed at pregnant women. During this period of preconception, the success of implantation and placentation will determine fetal development and prevention of pregnancy complications. . Therefore, it is important to pay attention to the preconception, especially on various health problems that occurred in this period. During this period pregnancy preparation must be carried out by maintaining the health of the reproductive organs, the need for balanced nutrition, healthy living behaviors, etc(5).

This study shows that nutritional problems in preconception women in Banggai Regency are still high. This is shown on average 6-7 out of 10 preconception women experiencing over nutrition, namely 50.4% overweight to obese and 67.9% experiencing central obesity. Obesity during the preconception will interfere with metabolism and hormonal. This occurs when visceral fat cells alter metabolism by secreting adipokines (adiponectin and cytokinin) that interfere with hormonal processes. In addition, obesity encourages changes in various hormonal regulation and resulting in the incidence of Gestational Diabetes Mellitu (GDM). Women who develop GDM have been found to have reduced insulin sensitivity before pregnancy(6)(7). In this study, the average blood glucose level of the preconspected women was 93.8 mg / dl with a standard deviation of 2.8 mg / dl. This is felt to be quite high, considering that there will be an increase in blood glucose levels during pregnancy. As gestational age increases, there is an increase in the size and unit of the placenta which is accompanied by an increase in the secretion of hormones needed during pregnancy. this causes a decrease in insulin sensitivity in the mother's tissues, especially in mid-pregnancy and beyond (8)(9). Obesity during pregnancy can cause complications related to glucose and lipid metabolic disorders(2). Pregnant women with obesity have a risk of gestational diabetes and preeclampsia and other pregnancy complications. This condition also affects the quality of birth outcomes and conditions thereafter.

On the other hand, malnutrition is also still a problem. In this study, 2 out of 10 preconception women experience iron deficiency (anemia) and chronic energy deficiency. Both of these will be higher during pregnancy, because the incidence of anemia in the preconception period can continue and become a predisposing factor for the incidence of anemia during pregnancy. Pregnant women who have anemia are at risk for miscarriage, fetal death, premature birth, bleeding, and the mother and infant mortality. Thus the case of CED in pregnant women due to lack of energy and protein intake. Pregnant women with CED cases are at risk of giving birth to babies with low birth weight (LBW). All nutritional problems starting from preconception to pregnancy, if not addressed, there is a risk of stunting.

The high nutritional problems above can be related to the demographic characteristics of the respondents such as age, education, occupation. The average age of preconception women who participated in this study

was partly in the high risk group in pregnancy and childbirth. Based on the type of work, the majority of preconception women work as housewives (71,9%), with the husband's work as a enterpreneur (49%). This employment status indicates the possibility of fulfilling nutrition and the need for health services is still inadequate. At the education level, 4 out of 10 preconception women with low education, such as junior high school and below. The low level of education can affect daily knowledge and behavior.

This study also describes the incidence of nutritional status problems with various risk behaviors. Where there are preconception women with less physical activity, are exposed to cigarette smoke in the house, do not consume iodized salt and are less accustomed to consuming fruits and vegetables.The relationship between smoking and obesity is not fully understood. Nicotine increases energy expenditure (EE) and reduces appetite, which can explain why smokers tend to lose weight compared to nonsmokers. On the other hand, there are smokers who have a higher body weight than light / non-smoking smokers. Cigarettes affect the distribution of body fat associated with central obesity and insulin resistance(10). The effect of smoking on the incidence of obesity is also influenced by other factors, one of them is physical activity(11). Physical activity can increase metabolic rate so that it can help to control body weight. However, smokers tend to be less active than nonsmokers(12). where those who have the habit of smoking tend to have assessments and self-confidence about low health so that the risk of obesity and other metabolic syndromes(13). Women who smoked before did not necessarily stop smoking while pregnant. Smoking during pregnancy can risk pregnancy complications, birth defects and miscarriages and increase the risk of overweight in offspring(14)(15). Likewise with the pattern of activities. So that changes in behavior towards healthier is very important to be pursued during the preconception.

Increased fruit and vegetable consumption is associated with weight loss (16)(17). Fruit contains fiber, various vitamins and antioxidants which play a role in the prevention and reduction of the risk of various diseases such as cardiovascular disease, diabetes, obesity, etc. Consumption of fruits and vegetables causes a feeling of fullness, thereby reducing calorie intake. This is related to the fiber content in fruit (18).

Various behavioral characteristics above also show the same tendency in the incidence of anemia. The incidence of anemia in those who consume iodized salt or consume fruits and vegetables is possible because of the high incidence of obesity and central obesity. Where obesity affects the absorption of iron and various other nutrients needed by the body.Likewise, the relationship between physical activity and anemia. High physical activity can reduce the risk of obesity which indirectly also prevents the incidence of anemia. On the other hand, physical activity is also associated with a high increase in metabolic activity, resulting in a decrease in pH, causing hemoglobin to release more oxygen so that increasing oxygen delivery to the muscles (19)(20). Conversely, the incidence of anemia can affect physical activity. Activity performance will decrease due to decreased hemoglobin concentration. When there is a decrease in iron in hemoglobin, it can alter work activities by decreasing oxygen transport and causing anemia with symptoms such as fatigue, dizziness, palpitations, etc that are related to oxygen transport disorders (21)(22)(23).

In this study, there are various limitations that could potentially lead to bias. First, there is a selection bias in which the sample in this study was recruited not randomly but using accidental techniques, so that some criteria tend to be homogeneous. In addition, those who were willing to attend the survey tended to be interested in health, so that some of the risk behaviors showed little variation. Second, there is information bias. In this study, the validity and reliability of the previous questionnaire had not been tested, like the habit of eating fruit and vegetables as well as questions about physical activity. thus allowing respondents to not understand the contents of the questionnaire (there is a possibility of reporting bias). In this study also asked about event variables that may have lasted a long time, such as the consumption of fruit and vegetables in

the last 30 days. This can lead to recall bias because respondents have difficulty remembering events correctly. Other biased information that may come from non-differential missclassification. For example, in classifying the consumption of iodized salt based on the form of salt consumed. Averagewhile, the previous survey showed that the two types of salt contain iodine which is not much different. So consequently, the answer category on the questionnaire provides an opportunity for misclassification. In the case of anthropometric measurements, there can also be measurement bias because the measurement is done by different people even though they have previously been trained by the same gold standard. This study did not analyze the relationship between the above risk behavior trends with the incidence of obesity, anemia and CED in preconception women. Thus, we cannot specifically determine the determinants of these various health problems.

Prevention of health problems of mother and baby is very important. therefore, management of preconception period is important and requires your full attention. The strategy should be targeted at addressing multiple risk factors, as discussed earlier. Prevention efforts are not only the responsibility of the health sector but must involve multi-sector participation and commitment of all parties.

5. Conclussion

Nutritional problems on preconception women in Banggai Regency are still high. This is indicated by the high problem of over nutrition and there are still problems of malnutrition that have not yet been resolved. On average 6-7 of 10 preconception women experience over nutrition, namely 50,4% overweight to obese and 67.9% have central obesity. In addition, there are still 2 out of 10 experiencing iron deficiency (anemia) and CED. The management of the preconception period can be an appropriate strategy in first 1000 days of life rescue program

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7. Statement of Ethics

This research is part of experimental research that has gone through the ethics review of the Ethics Committee of the Faculty of Public Health, University Indonesia

8. Conflict of Interest

The author states that there is no conflict of interest in this study

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