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THE RELATIONSHIP OF MACRONUTRIENT INTAKE WITH NUTRITIONAL STATUS PREGNANT WOMEN IN THE WORKING AREA OF THE PUSKESMAS PASAR SUNDAY DISTRICT

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Abstract

Background: Increasing the nutritional status of the community is one of the development priorities in the 2015-2019 National Medium Term Development Plan (RPJMN) document. Based on the results of the 2018 Basic Health Research (Riskesdas), most of the main targets are estimated to not be able to achieve the target. The problem of malnutrition in women of childbearing age is seen in the high rate of Chronic Energy Deficiency (CED). In non-pregnant women, the CED rate was 14.4% and 17.3% in pregnant women.

Methodology: Research carried out using an observational approach taken at the same time aims to study the relationship between the independent variable, namely macronutrient intake and the dependent variable LILA of pregnant women by conducting a 3 × 24 hour food recall of pregnant women's food intake. The sample in this study was 92 people, the sampling technique used the Fisher exact technique. The statistical test used the person correlation test.

Research Results: The results of research conducted in the working area of the Pasar Minggu District Health Center experienced a nutritional status of 73 (79.3%). Pregnant women with sufficient carbohydrate intake were 73 with a percentage (79.3%), pregnant women with sufficient fat intake were 70 with a percentage (76.1%) and pregnant women with sufficient protein intake were 61 with a percentage (66.3%) Based on the Fisher exact statistical test, Statistical relationship between macronutrient intake and nutritional status of pregnant women ($p = 0.001$)

Suggestion: It is hoped that pregnant women can anticipate or prevent poor nutritional status by consuming foods containing carbohydrates, proteins and fats in balance with consultation with health authorities. Health workers should actively provide health information to pregnant women, especially regarding food intake which is important for pregnant women.

Keywords: macronutrient intake and nutritional status of pregnant women

Introduction

During pregnancy or breastfeeding, it is necessary to add nutritious food or drinks to meet the increased nutritional needs. Currently on the market there are beverage products for pregnant women made from milk, but the prices are quite expensive. Low milk consumption is related to high milk prices and low people's purchasing power. A nutritious formula drink based on local non-dairy food ingredients derived from nuts for

pregnant women is an alternative consumption that can be afforded by pregnant women. There are 3 formulas developed, namely red beans, soybeans and peanuts and as a control is a milk formula. Red bean, soybean and peanut formulas contain an average of 300 kkl of energy; protein 17g, iron (Fe) 13 mg, calcium (Ca) 150 mg, magnesium (Mg), folic acid 200mg, vitamin A 300 RE, vitamin B 12 0.2 mg and vitamin C 10 mg in 300 ml. (Indonesian Journal of Clinical Nutrition, vol 14, no 1, July 2017 : 1-9).

Food diversity has the potential to improve the nutrition of pregnant women, however additional food packages must be developed for pregnant women that are high in calories, protein and micronutrients (Ministry of Health, 2015). Pregnant women need to consume a wider variety of foods to meet their needs for energy, protein and micronutrients (vitamins and minerals) because they are used for maintenance, growth and development of the fetus in the womb as well as reserves during the breastfeeding period. Protein requirements during pregnancy increase to maintain maternal health. It is highly recommended to consume food sources of animal protein such as fish, milk and eggs (Ministry of Health of the Republic of Indonesia, 2014).

Pregnancy is a phase in the life cycle that requires special attention, especially in meeting nutritional energy needs. The health success of pregnant women can be seen from the Maternal Mortality Rate (MMR), which includes maternal deaths during pregnancy, childbirth and postpartum. Based on the results of the Inter-Census Population Survey (SUPAS) (2015) in the Indonesian Ministry of Health (2018), the maternal mortality rate (MMR) is 305 per 100,000 live births, this figure is relatively high when compared to the MDGs target of 102 per 100,000 live births. The biggest cause of maternal death is bleeding, namely 30.3%, while the main factors for bleeding in pregnant women are Chronic Energy Deficiency (CED) and anemia (Ministry of Health of the Republic of Indonesia, 2015).

Good community nutritional status is one of the determining factors for the success of health development and is inseparable from overall national development. This is reflected in the Human Development Index (HDI) which consists of life expectancy, literacy level and per capita income. Low HDI is influenced, among other things, by nutritional and health status which has an impact on high mortality rates for infants, toddlers and mothers (Ministry of Health, 2010).

Increasing the nutritional status of the community is one of the development priorities in the 2015-2019 National Medium Term Development Plan (RPJMN) document, with the main targets including: 1) the prevalence of anemia in pregnant women is 28%, 2) the prevalence of underweight in children under five 17%, 3) prevalence of wasting in children under five 9.5%; and, 4) the prevalence of stunting (short and very short) in children aged (under 2 years) was 28% in 2019.

Based on the results of Basic Health Research (Riskesdas) in 2018, the figures targeted to be achieved in 2019, it is estimated that most of the main targets will not be able to achieve the target. The problem of malnutrition in women of childbearing age is seen in the high rate of Chronic Energy Deficiency (CED). In non-pregnant women, the CED rate was 14.4% and 17.3% in pregnant women. The nutritional status of women of childbearing age and pregnant women is very important considering that the quality of a child begins with the quality of nutrition in the first 1000 days of life (from when a mother is pregnant until a child is 2 years old) (Ministry of Health of the Republic of Indonesia, 2018).

The problem of chronic energy deficiency (CED) in Women of Childbearing Age (WUS) and pregnant women aged 15-49 years, based on the Upper Arm Circumference (LILA) indicator. To describe the presence of risk (KEK) in relation to reproductive health in pregnant women and WUS, a threshold of average LILA value < 23.5 cm is used. The prevalence of risk of CED in pregnant women aged 15–49 years, nationally is 24.2 percent (Riskesdas, 2013). Based on the background above, researchers are interested in conducting research on "The Relationship between Macro Nutrients and the Nutritional Status of Pregnant Women in the Working Area of the Pasar Minggu District Health Center.

Method

This research uses analytical observational research methods through a cross-sectional approach . The population of this study was all pregnant women in the working area of the Pasar Minggu Community Health Center who came for pregnancy checks at the KIA Polyclinic in January 2024, totaling 92 people . The number of samples in this study was 92 people . When taking samples using the Total Sample technique . .

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Results _

Research result

Respondent Characteristics

Table 1

Frequency Distribution of Age of Respondents

Age	*Frequency* (f)	*Percentage* (%)
18-25	45	50
26-35	37	41
36-40	10	9
Amount	**92**	**100%**

Based on the table, it is known that respondents at the Pasar Minggu Community Health Center, South Jakarta in 2024 showed that from 92 respondents there were 45 pregnant women aged 17-25 years with a percentage of (50%).

Table 2

Frequency Distribution of Respondents' Education at Pasar Minggu Community Health Center

Education	*Frequency* (f)	*Percentage* (%)
elementary school	5	3
JUNIOR HIGH SCHOOL	15	10
SENIOR HIGH SCHOOL	40	47
Bachelor	32	40
Amount	**92**	**100%**

Based on the table, it is known that the respondents at the Pasar Minggu Community Health Center, South Jakarta in 2024, had a high school education, as many as 40 pregnant women with a percentage of (47%)

Table 3

Frequency Distribution of Respondents' Occupations

Work	*Frequency* (f)	*Percentage* (%)
IRT	47	50
Self-employed	17	13
Civil servants/Private	28	37
Work	*Frequency* (f)	*Percentage* (%)
Amount	**92**	**100%**

Based on this , it is known that respondents at the Pasar Minggu Community Health Center, South Jakarta in 2024 will work as housewives as many as 47 pregnant women with a percentage of (50%) .

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Univariate Analysis

Table 4

Frequency Distribution of Macro Nutrient Intake (protein, fat and carbohydrates) among Pregnant Women in the Pasar Minggu Community Health Center Working Area

Variable	Category	Frequency	Percent
Proteins	Less < 65 gr	31	33.7
	Enough >=65 gr	61	66.3
Fat	Less < 60	22	23.9
	Enough >=60 gr	70	76.1
Carbohydrate	Less <360 gr	19	20.7
	Enough >=360 gr	73	79.3
Total		92	100.0

Based on the known data, there were 61 (66.3%) respondents with sufficient protein > = 65 grams, 70 (76.1%) respondents with sufficient fat > = 60 grams, and 73 (79.3%) respondents with sufficient carbohydrates > = 360 grams.

Table 5

Frequency distribution of nutritional status of pregnant women in the working area of the Pasar Minggu Community Health Center

Nutritional status	Frequency	Percent
SEZ	19	20.7
Not KEK	73	79.3
Total	92	100.0

Based on the table, it is known that there were 19 respondents with KEK nutritional status (20.7%) and 73 respondents with non-CED nutritional status (79.3%).

Bivariate Analysis

Table 6

The Relationship between Macro Nutrient Intake (Protein, Fat and Carbohydrates) on the Nutritional Status of Pregnant Women in the Working Area of the Pasar Minggu Community Health Center

Variable	Category	Nutritional status				Amount		*P-Value*	OR 95%CI
		SEZ		Not KEK					
		n	%	n	%	N	%		
Proteins	Less < 65 gr	16	51.6	15	48.4	31	100.0	0.001	28,622 (5,306-40,151)
	Enough >=65 gr	3	4.9	58	95.1	61	100.0		
Total		19	20.7	73	79.3	92	100.0		
Fat	Less < 60 gr	15	68.2	7	31.8	22	100.0	0.001	15,357 (9,163-36,435)
	Enough >=60 gr	4	5.7	66	94.3	70	100.0		
Total		19	20.7	73	79.3	92	100.0		
Carbohydrate	Less < 360 gr	10	52.9	9	47.4	19	100.0	0.001	7,901 (2,529-24,686)
	Enough >=360 gr	9	12.3	64	87.7	73	100.0		

Total	19	20.7	73	79.3	92	100.0

Based on the table, it is known that the statistical test results obtained *p-value* = 0.001 which means p<α = 0.05 (Ha accepted and Ho rejected), it can be concluded that there is a relationship between macronutrient intake (protein, fat and carbohydrates) on the nutritional status of pregnant women in the Pasar Minggu Community Health Center Working Area. From the OR value of 28.6, it can be concluded that mothers who consume less protein are at risk of experiencing CED 28.6 times greater than mothers who consume sufficient protein.

The statistical test results obtained *p-value* = 0.001 which means p <α = 0.05 (Ha is accepted and Ho is rejected), it can be concluded that there is a relationship between fat macronutrient intake and the nutritional status of pregnant women in the Pasar Minggu Community Health Center Working Area. From the OR value of 15.3, it can be concluded that mothers who consume less fat are at risk of experiencing CED 15.3 times greater than mothers who consume sufficient protein.

The statistical test results obtained *p-value* = 0.001 which means p<α = 0.05 (Ha is accepted and Ho is rejected), it can be concluded that there is a relationship between carbohydrate macronutrient intake and the nutritional status of pregnant women in the Pasar Minggu Community Health Center Working Area. From the OR value of 7.9, it can be concluded that mothers who consume less carbohydrates are 7.9 times more likely to experience CED than mothers who consume sufficient protein.

Discussion

Proteins

Based on the research results, it is known that there were 61 (66.3%) respondents with less than 65 grams of protein and 61 (66.3%) of respondents with sufficient protein > = 65 grams.

In line with research from Dalima (2023), it shows that the distribution of protein intake of pregnant women in the Pertiwi Community Health Center working area is more dominant, namely those whose intake is insufficient, namely 76 people (70.4%), and those who have adequate intake are 32 people (29.6%). Research from Megauleng (2018) showed that protein intake was classified as good in 2 samples (5%) and poor in 38 samples (95%). Siwi's (2018) research shows that the majority of respondents (84.8%) have good protein intake

These protein reserves are used to prepare for childbirth, the postpartum period, and breastfeeding. It is recommended that 2/3 of the protein consumed comes from protein sources with high biological value, namely animal sources, such as lean meat, fish, eggs, milk and processed products (Fikawati, 2015).

According to researchers, the availability of protein in the body, whether or not it covers the needs that must be met, is very dependent on the composition (composition) of the food consumed every day.

Fat

Based on the research results, it is known that there were 22 (23.9%) respondents with less fat < 60 grams and 70 (76.1%) respondents with enough fat > = 60 grams.

In line with research from Siwi (2018), it is known that the majority (42.4%) experience a deficit in fat intake. Dalima's research (2023) shows that the distribution of fat intake of pregnant women in the Pertiwi Community Health Center working area is more dominant, namely those whose intake is insufficient, namely 82 people (75.9%), and those who have adequate intake are 26 people (24.1%). Padmawati's research (2021) showed that most of the samples had a low level of fat consumption, namely 37 samples (56.1%) and the remainder had a good level of fat consumption, namely 29 samples (43.9%).

Intake of essential fats, namely linoleic and linolenic fatty acids and their derivatives, namely *Docosahexaenoic Acid* (DHA) plays an important role in the development of fetal vision and learning ability. DHA deficiency during pregnancy can affect the baby's visual acuity later in life. In addition, a lack of DHA during the fetus and baby can also have an impact on reducing the child's *Intelligence Quotient (IQ) score* . Foods that are sources of DHA are fish and other seafood (Fikawati, 2015).

Carbohydrate

Based on the research results, it is known that respondents with insufficient carbohydrates < 360 gr were 19 (20.7%) and respondents with sufficient carbohydrates > = 360 gr were 73 (79.3%).

In line with Siwi's research (2018) shows that the majority of respondents (75.8%) has the best carbohydrate intake. Anggoro's research (2020) on carbohydrate intake in the case group, namely the group with mothers who experienced chronic energy deficiency in the carbohydrate intake category with poor nutrition, while all or 30

pregnant mothers without chronic energy deficiency problems were in the carbohydrate intake category with adequate nutritional intake. Good. Dalima's research (2023) showed that the distribution of carbohydrate intake was more dominant, namely 75 people (69.4%) had insufficient intake and 33 people (30.6%) had sufficient intake.

Carbohydrates can fulfill 55-57% of total energy needs. Carbohydrates are the nutrients that play the most important role as energy providers for the mother and fetus. AKG 2019 recommends that during pregnancy every day the mother should consume around 349 g of carbohydrates to meet glucose needs for fetal brain development. Carbohydrates play an important role in cell enlargement in the hypertrophy process which will affect the baby's weight gain, especially in the 3rd trimester of pregnancy. Therefore, it is necessary to increase carbohydrate requirements in each trimester of around 40 g/day so as not to interfere with fetal development (Fikawati, 2015).

Nutritional Status of Pregnant Women

Based on the research results, it is known that there were 19 respondents with KEK nutritional status (20.7%) and 73 respondents with non-CED nutritional status (79.3%).

In line with research from Megauleng (2018), the nutritional status of pregnant women was classified as normal at 12 (30%) and chronic energy deficiency (KEK) at 28 (70%). Research from Mahmudah (2015) The results of the study showed that 26.67% of pregnant women suffered from CED. Study Dalima (2023) stated that the distribution of nutritional status of pregnant women in the working area of the Pertiwi Community Health Center was more dominant with 72 people (66.7%) lacking nutritional status and 36 people (33.3%) with sufficient nutritional status.

According to Almatsier (2011) nutritional status is the condition of the body as a result of food consumption and use of nutrients, differentiated between poor, inadequate, good and over nutrition of the human body, and the human living environment.

Bivariate Analysis

The relationship between macronutrient (protein) intake and nutritional status of pregnant women

Based on the results statistical test obtained *p-value* = 0.001 which means $p<\alpha$ = 0.05 (Ha is accepted and Ho is rejected), then it can be concluded that there is The relationship between macronutrient intake (protein, fat and carbohydrates) on the

nutritional status of pregnant women in the Pasar Minggu Community Health Center Working Area. From the OR value of 28.6, it can be concluded that mothers who consume less protein are at risk of experiencing CED 28.6 times greater than mothers who consume sufficient protein.

In line with research from Dalima (2023), statistical analysis shows that there is a relationship between protein intake and the nutritional status of pregnant women where the value (p=0.00) is > 0.05. Anggoro's research (2020) results Research shows that there is a relationship between a protein diet and the incidence of chronic energy deficiency with a p-value of 0.000. The p-value is 0.000 > 0.05. Mahmudah's research (2015) found a relationship between protein intake and the nutritional status of pregnant women (p = 0.17).

Protein is the largest component found in the body after water (Auliana, 2001). Inayatullah in Retnaningsih (2010), states that protein is a substance that builds or forms new tissue. Lack of protein intake can inhibit fetal growth. Addition of 12 grams of protein/day. There are 2 types of protein, namely vegetable protein such as: nuts, tofu, tempeh and animal protein such as: eggs, fish, meat, milk and others.

The relationship between macronutrient (fat) intake and nutritional status of pregnant women

Based on the results statistical test obtained *p-value* = 0.001 which means p<α = 0.05 (Ha is accepted and Ho is rejected), then it can be concluded that there is The relationship between fat macronutrient intake and nutritional status of pregnant women in the Pasar Minggu Community Health Center Working Area. From the OR value of 15.3, it can be concluded that mothers who consume less fat are at risk of experiencing CED 15.3 times greater than mothers who consume sufficient protein.

In line with research from Dalima (2023), statistical analysis shows that there is a relationship between fat intake and the nutritional status of pregnant women, where the value (p=0.00) is > 0.05. Mashudi's research (2021), the results of statistical tests using chi square, include a relationship between fat (p=0.036) and nutritional status (LiLA) in preconception women,

According to Handayani (2014), pregnant women are a group that is vulnerable to nutritional problems. There are several factors that influence the nutritional status of pregnant women, including age, weight, environmental temperature, activity, health

status, knowledge of nutrients in food, women's habits and views on food and economic status.

The relationship between macronutrient (carbohydrate) intake and nutritional status of pregnant women

Based on the results obtained *p-value* = 0.001 which means p<α = 0.05 (Ha is accepted and Ho is rejected), then it can be concluded that there is The relationship between carbohydrate macronutrient intake and nutritional status of pregnant women in the Pasar Minggu Community Health Center Working Area. From the OR value of 7.9, it can be concluded that mothers who consume less carbohydrates are 7.9 times more likely to experience CED than mothers who consume sufficient protein.

In line with research by Anggoro (2020), there is a relationship between a carbohydrate diet and the incidence of chronic energy deficiency with a p-value of 0.000 > 0.05. Research by Dalima (2023), statistical analysis shows that there is a relationship between carbohydrate intake and the nutritional status of pregnant women where the value (p = 0.00) is > 0.05. Mashudi's research (2021), the results of statistical tests using chi square, include a relationship carbohydrates (p=0.018) with nutritional status

Carbohydrates are the main energy source nutrient in the menu of some Indonesian people. In general, this carbohydrate content is around 60-70% of total energy consumption. Energy requirements for pregnant women are 300 to 500 kcal more than the food that mothers usually eat every day. This additional energy will fulfill the increased basal metabolism. Physical activity increasingly wastes energy and accumulates fat for energy reserves. The need is approximately 1292 calories or the same as 323 grams of carbohydrates equivalent to 5 plates of rice. This additional heat is especially needed in the last 20 weeks of pregnancy, throughout the third trimester the additional energy is used for the growth of the fetus and placenta.

Conclusions and recommendations

It is known that respondents with sufficient protein > = 65 gr were 61 (66.3%), respondents with sufficient fat > = 60 gr were 70 (76.1%), and respondents with sufficient carbohydrate > = 360 gr were 73 (79.3%). There were 19 respondents with KEK nutritional status (20.7%) and 73 respondents with non-CED nutritional status

(79.3%). There is a relationship between macronutrient intake (protein, fat and carbohydrates) on the nutritional status of pregnant women in the Pasar Minggu Public Health Center Working Area (p-value = 0.000).

Suggestion

For academics, it can be an institutional reference in providing material to students regarding the nutritional status of pregnant women, increasing students' knowledge in applying the knowledge gained to conditions in the field.

Health centers are expected to encourage health workers to actively provide health information in the field to pregnant women, especially regarding food intake which is important for pregnant women.

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