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Maternal diet during pregnancy: Implementation on the length and birth weight of the baby

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ABSTRACT

Background: Diet is a description of the types and amounts of food consumed each day. The amount of food intake of the mother during pregnancy is one of the factors that can affect the weight and length of the baby's birth.

Methods: This study aims to determine the relationship between maternal diet during pregnancy and the length and birth weight of the baby. This research uses a Cross Sectional Study Retrospective design

Results: The results of the study showed that 62.2% of mothers' diets during pregnancy applied a good diet during pregnancy and 37.8% applied a poor diet. In terms of birth length, 85.6% of babies had normal birth length and 14.4% had short birth length. In terms of birth weight, 91.1% had normal birth weight and 8.9% had low birth weight. The mother's diet during pregnancy with the baby's birth length was marked with a p-value of 0.004 (p-value <0.05) which means there is a significant relationship between the mother's diet during pregnancy with the baby's birth length. The mother's diet during pregnancy with the baby's birth weight was marked with a p-value of 0.000 (p-value <0.05) which means there is a significant relationship between the mother's diet during pregnancy with the baby's birth weight.

Conclusion: to improve education and counseling on the importance of nutritional intake and diet for pregnant women, so that growth and development of the fetus and mother are better, and give birth to children with normal body length and birth weight.

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KEYWORDS

Birth Weight, Mother's Diet During Pregnancy, Body Length

INTRODUCTION

Pregnancy is part of the Window of Opportunity period or also called the golden period for the short fetal growth and development process. This period is the time when a mother can do something that can improve the growth and development of the baby (Narasiang, et al., 2018). The nutritional adequacy of pregnant women greatly affects the nutritional status of the child in the womb which will then determine the child's development, especially during the growth period[1].

Data from the 2021 Indonesian Nutritional Status Survey (SSGI) shows that the proportion of toddlers with a birth weight of <2500 grams in Indonesia is 6.6% and in South Sulawesi it is 7.7%. The proportion of toddlers with a birth length of <48 cm in Indonesia is 19.4% and in South Sulawesi it is 24.3%. Based on data from the Sudiang Health Center, Makassar City in 2024, it shows that the birth length of babies <48 cm is 20.06% and the birth weight of babies <2500 grams is 8.84%.

Low nutritional status and inappropriate consumption patterns in pregnant women can cause various nutritional disorders, including anemia, underweight in pregnant women, fetal growth disorders, low birth weight (LBW), and short birth length[2]. The health and nutritional status of pregnant women affects fetal growth and pregnancy outcomes. Inadequate maternal nutrient intake can have a negative impact on fetal growth[1].

Insufficient maternal intake during pregnancy can interfere with fetal growth and potentially cause babies to be born with short birth length. The birth length of a baby is said to be normal if it is in the range of 48-52 cm[3]. The length of the baby's body at birth reflects the baby's linear growth during pregnancy. Low linear measurements generally indicate malnutri-

tion due to lack of energy and protein in the past, which begins with slow growth or developmental delays in the fetus[4]. Birth length is also a determining factor in delayed child growth and development[5].

Low birth weight and short birth length that are still high can be caused by a lack of energy and protein intake during pregnancy, which can actually be overcome by pregnant women[2]. Malnutrition during pregnancy will inhibit fetal growth and development, and inhibit the formation of brain function in the fetus. Malnourished fetuses are at risk of being born with low birth weight and when they grow up will be at higher risk of suffering from degenerative diseases such as diabetes, hypertension, heart disease, and stroke compared to those who are not malnourished[6].

The mother's eating pattern during pregnancy has an influence on the incidence of Low Birth Weight (LBW). This is proven by the consumption of foods rich in nutrients reducing the incidence of LBW[27]. Research conducted by Ali (2020) showed a significant relationship between the mother's eating pattern during pregnancy and the baby's birth weight in Wringinpitu Village, Tegaldlimo Banyuwangi Health Center working area.

METHOD

Type, Place, and Time of Research

This study is an observational study with a Cross-Sectional Study Retrospective approach where data containing maternal diet during pregnancy, baby's birth length, and baby's birth weight were taken at the same time. This study was conducted in the working area of the Sudiang Health Center, Biringkanaya District, Makassar City. Starting from December 2023 to March 2024.

Number and Method of Sampling

The population in this study were mothers of babies and babies aged 0-11 months in the period of February 2024 with a total of 401 babies in the working area of the Sudiang Health Center, Biringkanaya District, Makassar City.The sample in this study used the determination method using the Slovin formula so that the number of samples needed was 81 people with the addition of 10% dropout so that 90 people were obtained. Sampling was carried out using simple random sampling, where the samples selected according to the research objectives were individuals or personnel who were easy to find and met the criteria.

Types and Methods of Data Collection

The types of research data are primary data and secondary data. Primary data includes sample identity, mother's name, child's name, and gender. Data on maternal eating patterns during pregnancy were obtained through direct interviews using the Food Frequency questionnaire (FFQ). Secondary data includes anthropometric data on birth length and birth weight obtained from the KMS/KIA book as well as geographic location and demographic data obtained from related agencies.

Processing and analysis of data

The data from the questionnaire and interview results as well as the anthropometric data are processed and re-examined, if there are errors then they will be corrected. The data that has been collected is given a code or mark to make it easier to group the data. Furthermore, the data is processed manually using Microsoft Excel and grouped with the variables studied and presented in the form of a table so that it is easy to read and understand. Data on eating patterns are entered into the good and poor categories. Data on birth length are entered into the normal and short categories. Data on birth weight are entered into the normal and low categories. Data were analyzed using the SPSS application using statistical tests to test the hypothesis, namely by using the Chi-Square test with a p value <0.05.

Ethical Recommendations

This research before being implemented has received a recommendation from the Makassar Health Polytechnic Research Ethics Committee with the number: 1039/M/KEPK-PTKMS/VII/2024. There is also no conflict of interest between researchers and subjects involved.

RESULTS

Based on the table above, the results of the study in the Sudiang Health Center work area, Biringkanaya District,

Table 1. Analysis of Mother's Diet During Pregnancy with Baby's Birth Length

Mother's Diet During Pregnancy	Birth length				p
	Normal		Short		
	n	%	n	%	
Good	53	58,9	3	3,3	0,004
Less	24	26,7	10	11,1	
Total	77	85,6	13	14,4	

Table 2. Analysis of Maternal Diet During Pregnancy with Baby's Birth Weight

Mother's Diet During Pregnancy	Birth Weight				p
	Normal		Low		
	n	%	n	%	
Good	56	62,2	0	0,0	0,000
Less	26	28,9	8	8,9	
Total	82	91,1	8	8,9	

Makassar City showed that what was significantly related to the mother's diet during pregnancy was the birth length ($p < 0.05$) where mothers with good diets would give birth to babies with normal body lengths more, namely 58.9%. Likewise, between the mother's diet during pregnancy and the baby's birth weight, there was a significant relationship ($p < 0.05$) where a mother who had a good diet would give birth to a child with a normal birth weight of 62.2%.

DISCUSSION

The results of the study conducted using the ChiSquare statistical test showed that there was a significant relationship between maternal dietary patterns during pregnancy and the birth length of the baby at the Sudiang Health Center in Makassar City.

Research conducted by Wahyuningrum states that birth length describes the linear growth of the baby while in the womb. Low linear size indicates a state of malnutrition due to lack of energy and protein intake that occurs over a long period of time, starting with slowing or retardation of fetal growth. Inadequate maternal nutritional intake during pregnancy can cause growth disorders in the fetus, which can cause babies to be born with short birth lengths[3]. Low birth length indicates that the child experienced a lack of nutritional intake while in the womb, which resulted in suboptimal child growth, indicating a lack of nutritional status and maternal health during pregnancy, causing the child to be born with a low birth length[8].

Maternal weight is determined by the nutritional intake consumed by the mother during pregnancy which can be related to the nutritional status of the fetus. Pregnant women must maintain nutritional intake in order to achieve optimal body weight for the formation, growth and development of the fetus. All nutrients needed for fetal growth are found in the food consumed by the mother which is stored regularly and continuously as glycogen, protein and excess as fat. Nutritional intake is useful for meeting the needs of the mother during pregnancy and fetal growth and development[9].

The results of the study conducted using the ChiSquare statistical test showed that there was a significant relationship between maternal diet during pregnancy and the birth weight of babies at the Sudiang Health Center in Makassar City.

This study is in line with the research conducted by Robit Nur Ali (2020) which states that there is a significant relationship between maternal diet during pregnancy and the birth weight of babies in Wringinpitu Village, Tegaldlimo Banyuwangi Health Center. The amount of maternal food intake during pregnancy is one of the factors that can affect the birth weight of babies[7].

Low Birth Weight (LBW) is most commonly found in postpartum mothers with poor diet during pregnancy, this means that there is an influence of postpartum mothers diet during pregnancy on the incidence of low birth weight. Poor diet will cause the nutritional intake of pregnant women to be insufficient, thus contributing to babies being born with low birth weight[4,9].

Insufficient maternal nutrient intake during pregnancy results in the weight of the baby to be born to the mother and may be at risk of LBW (Low Birth Weight), namely, the weight of the baby born is less than 2500 grams[10,11].

Maternal diet during pregnancy plays an important role in determining birth outcomes, especially the baby's birth length and birth weight. Both of these parameters are important health indicators for both the baby and the mother.

Macro and Micronutrients Consumed by the Mother. The main building blocks for fetal growth. Adequate protein intake during pregnancy supports fetal tissue and muscle growth, which contributes to optimal birth weight and length. Research shows that protein deficiency can lead to low birth weight (LBW) and shorter birth length. Folic acid plays a role in the formation of new cells and tissues, while iron is essential for hemoglobin synthesis. Folic acid deficiency can cause neural tube defects and also contribute to suboptimal fetal growth, including birth length and weight. Adequate iron prevents maternal anemia, which if it occurs, can negatively impact fetal oxygenation and nutrition, potentially reducing birth weight. Zinc is needed for DNA and protein synthesis, as well as cell division. Zinc deficiency in pregnant women is associated with fetal growth retardation, which can impact low birth

length and weight. Calcium and Vitamin D, both of these nutrients are essential for fetal bone development. Adequate intake of calcium and vitamin D supports fetal bone growth, which affects birth length. Deficiency can result in stunted bone growth[12].

An unbalanced diet, namely chronic energy deficiency in pregnant women with insufficient energy intake, is at risk of giving birth to babies with LBW and shorter birth length. This is because the energy needed for fetal development is not met, so that fetal growth is hampered. Consumption of ultra-processed foods is usually low in nutrients but high in calories, sugar, and saturated fat. Consumption of these foods during pregnancy can have a negative impact on fetal growth, increasing the risk of LBW and less than optimal birth length.Calorie intake and birth weight, sufficient calorie intake is important to support fetal weight gain. Mothers who consume calories in accordance with their needs tend to give birth to babies with higher birth weight. Conversely, calorie intake that is too low or too high can cause LBW or even macrosomia (very high birth weight). Healthy fats, namely essential fatty acids such as omega-3, play an important role in the development of the fetus' brain and eyes, and also contribute to a healthy birth weight. Deficiency of essential fatty acids can affect the baby's birth weight[13].

Socioeconomic status, mothers from lower socioeconomic backgrounds are often malnourished, which contributes to low birth weight and length. This factor is compounded by limited access to nutritious food and adequate health services. Stress and Mental Health: Maternal stress and mental health can also affect diet and nutritional status during pregnancy. Chronic stress can affect fetal growth through hormonal mechanisms, which in turn impacts birth weight and length[12,14].

Insulin-Like Growth Factor (IGF-1) hormone, maternal diet affects the levels of IGF-1, a hormone that is important for fetal growth. Adequate nutrition increases IGF-1 levels, which contributes to increased birth weight and length. Finally, nutritional supplements where interventions in the form of providing nutritional supplements such as folic acid, iron, and multivitamins during pregnancy have been shown to increase birth weight and length of babies from several research results, as well as nutritional education programs also help pregnant women understand the importance of a balanced diet for their health and that of their babies[12].

CONCLUSION AND RECOMMENDATIONS

The mother's diet during pregnancy is closely related to the birth length and birth weight of the baby. Based on the results of this study, it is recommended that the quantity and quality of diet during pregnancy should be increased and that pregnant women continue to receive education from the government and the community about foods with high nutritional value.

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