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Nutrition Adequacy Level of Pregnant Women and Toddlers Aged 0 to 24 Months in Gianyar Regency

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Abstract

Stunting has become a national issue that has received a lot of attention recently, as stunting can affect the nation's productivity in the future. The adequacy of nutritional intake in months 0 up to 24 months, or 1000 days of life, is one of the key factors in preventing stunting. This study aims to determine the nutrition adequacy level of pregnant women and children aged 0 to 24 months in Gianyar Regency. This study was a household survey with a cross-sectional approach. The samples were households in Gianyar Regency in 2021 with pregnant women and young children (up to 24 months old), chosen using the cluster method with the census block serving as a cluster. From each selected census block, 5 samples of pregnant women, 5 samples of children aged 0–1 year, and 5 toddlers aged 1-2 years will be selected by a simple random method. Data was collected using the Semi-Quantitative Food Frequency Questionnaire (SQ-FFQ). Data analysis was performed using the NutriSurvey application. The total energy of pregnant women was moderately deficient; protein and fat adequacy were normal, while carbohydrates, calcium, and iron were severely deficient. Nutritional adequacy for toddlers aged 0–1 year in the form of energy, protein, fat, carbohydrates, calcium, and iron was classified as normal. Nutritional adequacy for toddlers aged 1-2 years in the form of energy, protein, fat, calcium, and iron was classified as normal, while carbohydrates were moderately deficient. The presence of nutrition deficiencies among pregnant women indicates that a public health program regarding carbohydrate, calcium, and iron deficiencies is urgently needed.

Keywords: intake, nutrition, pregnant women, children 0-24 months, Gianyar

INTRODUCTION

Nutrition problems, either undernutrition or overnutrition at the beginning of life, may have a serious impact on the quality of human resources in the future. Nutritional deficiency during pregnancy is a great contributor to babies born with low birth weight (LBW), premature birth, and stunting.(1) The problem of stunting has become a national issue that has received a lot of attention recently, as stunting can affect the nation's productivity in the future. Children with stunting may experience cognitive problems, decreased learning ability, and be more susceptible to disease, which may decrease their productivity. On the other hand, the overnutrition problem is also starting to increase in Indonesia. Overnutrition can have a negative impact as it is related to various non-communicable diseases in the long term.(2) Pregnant women are the population that is most vulnerable to malnutrition due to the increased nutritional demands of pregnancy. Women in developing countries are at higher risk of experiencing malnutrition during pregnancy compared to women in developed countries due to socio-economic constraints, poor diet, high work intensity, and reproductive cycles. The human reproductive process occurs when egg cells from a woman and sperm cells from a man unite and develop in the uterus to form a fetus. In other words, this ability is useful for producing offspring or breeding. The prevalence of nutritional deficiency in pregnant women based on the Recommended Dietary Allowance (RDA) in Indonesia is 86.8% for carbohydrates, 59.2% for protein, 78.0% for fat, 83.5% for calories, 55.0% for calcium, 29.5% for phosphorus, 45.2% for iron, 85.0% for thiamin, 19.2% for riboflavin, 3.8% for retinol, 43.2% for niacin, 0.8% for vitamin C, and 0.8% iodine.(3) This showed that the preva-

lence of nutritional inadequacy in pregnant women is still high. Maternal age, education level, gestational age, pre-pregnancy body mass index, and level of violence were the significantly associated factors with the aforementioned nutrient deficiencies.(3) The adequacy of nutrition depends on food consumption. A healthy and balanced diet is needed to achieve adequate levels of nutrition. There are several other factors that may impact food consumption in pregnant women and toddlers, including socioeconomic status, food supplies, environmental quality, knowledge regarding a balanced diet, and family support.(4) Insufficient nutritional intake for pregnant women can have various impacts on the mother and fetus. Fortunately, nutritional problems are still preventable. Assessment of nutritional adequacy in pregnant women and toddlers aged 0–24 months is important to evaluate the risk of undernutrition or overnutrition.(5,6) Gianyar is a regency with the highest stunting rate in Bali based on Basic Health Research for the Province of Bali in 2013, with a prevalence of 41%.(7), This study aims to determine the nutrition adequacy level of pregnant women and children aged 0–24 months in Gianyar Regency.

METHOD

This study was a household survey with a cross-sectional approach conducted at Gianyar Regency, Bali Province, Indonesia. The research samples were pregnant women and children aged 0–24 months in Gianyar Regency during 2021 who were selected using the cluster method. In Gianyar Regency, 30 census blocks (clusters) were selected using the probability proportional to size (PPS) method based on the data from the Central Bureau of Statistics for Bali Province. From each selected census block, 5 samples of pregnant women, 5 samples of children aged 0–1 year, and 5 children aged 1-2 years will be selected by a simple random method. The total sample size of the study is 450 samples. Food intake was collected using the Semi-Quantitative Food Frequency Questionnaire (SQ-FFQ). Nutritional adequacy was assessed using the NutriSurvey application. The criteria of nutrition adequacy level according to the Ministry of Health were less than 70% categorized as a severe deficiency, 70–79.9% categorized as a low deficiency, 80–89.9% categorized as a moderate deficiency, 90–119% were normal, and ≥120% categorized as overnutrition. Standard of adequacy did we use Indonesia RDA. This study was approved by the Institutional Review Board of Udayana University (Ref: 2082/UN14.2.2.VII.14/LT/2021).

RESULTS

Characteristics of Sample

Characteristics of the Sample From the results of the research that has been done, the characteristics of the subjects are as follows:

Table 1. Characteristics of the Research Sample

Characteristics	n	%
Pregnant Women	**n=150**	
• **Age**		
<18 years	0	0%
18 – 35 years	118	79%
>35 years	32	21%
• **Parity**		
Primiparous	66	44%
Multiparous	84	56%
• **Education**		
Elementary School	10	7%
Junior High School	52	35%
Senior High School	55	37%
University	33	22%

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• **Occupation**		
Housewife	58	39%
Merchant	12	8%
Civil Servant	6	4%
Entrepreneur	8	5%
Others	66	44%
• **Family Income**		
<2.5 million/month	111	74%
≥ 2.5 million/month	39	26%

Breastfeeding Mothers (Having toddlers aged 0-2 years)	**n=300**	**%**
• **Age**		
<18 years	0	0%
18 – 35 years	259	86%
>35 years	41	14%
• **Parity**		
Primiparous	223	74%
Multiparous	77	26%
• **Education**		
Elementary School	2	1%
Junior High School	17	6%
Senior High School	124	41%
University	157	52%
• **Occupation**		
Housewife	92	31%
Merchant	10	3%
Laborer	1	0%
Civil Servant	4	1%
Entrepreneur	93	31%
Others	100	33%
• **Family Income**		
<2.5 million/month	169	56%
≥ 2.5 million/month	131	44%

Toddler	**n=300**	**%**
• **Age**		
0-1 year	150	50%
1-2 years	150	50%
• **Gender**		
Male	153	51%
Female	147	49%
• **Birth**		
Normal	103	34%
Caesarean Section	197	66%
• **Birth Weight**		
Normal	288	96%
Low Birth Weight	12	4%

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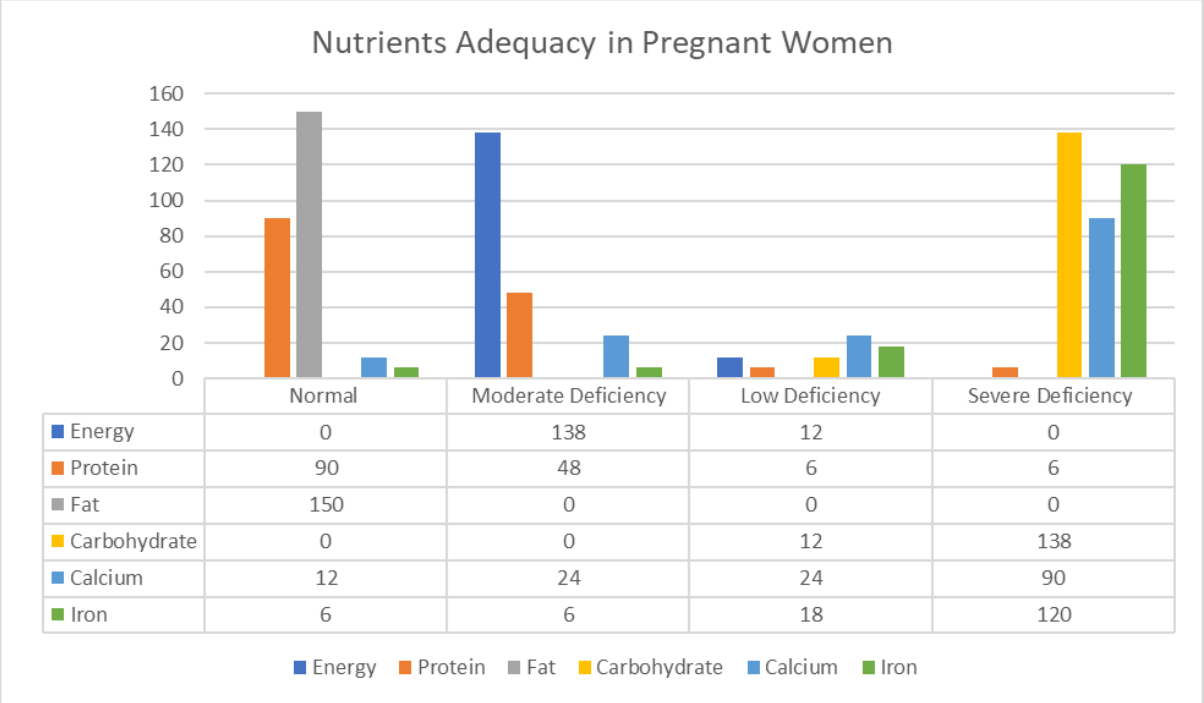
Based on the characteristics above, it was found that for the group of pregnant women, the majority were aged 18-35 years (86%) and were primiparous (74%). Most respondents were from Bukian Village, with 37% being high school graduates, and 37% had an average family income of less than 2.5 million per month. For the group of mothers with children aged 0-2 years, the majority of respondents were aged 13-35 years (86%) and primiparous (74%). Most of the respondents were from Singakerta Village, with 52% being university graduates and 56% had an average family income of less than 2.5 million per month. The toddlers characteristics were dominated by male gender (51%) and born by caesarean delivery (66%). Most toddlers were born with a normal birth weight (96%).

Nutrition Adequacy

The nutrition adequacy among pregnant women were shown in Figure 1. Most pregnant women had severe deficiency in carbohydrate, calcium, and iron.



	Normal	Moderate Deficiency	Low Deficiency	Severe Deficiency
Energy	0	138	12	0
Protein	90	48	6	6
Fat	150	0	0	0
Carbohydrate	0	0	12	138
Calcium	12	24	24	90
Iron	6	6	18	120

Figure 1. Nutrition Adequacy in Pregnant Women

The nutrition adequacy among children aged 0-1 year old were shown in Figure 2. Most of the nutrient intakes including energy, protein, fat, calcium and iron were classified as normal. There was no overnutrition in any subjects.

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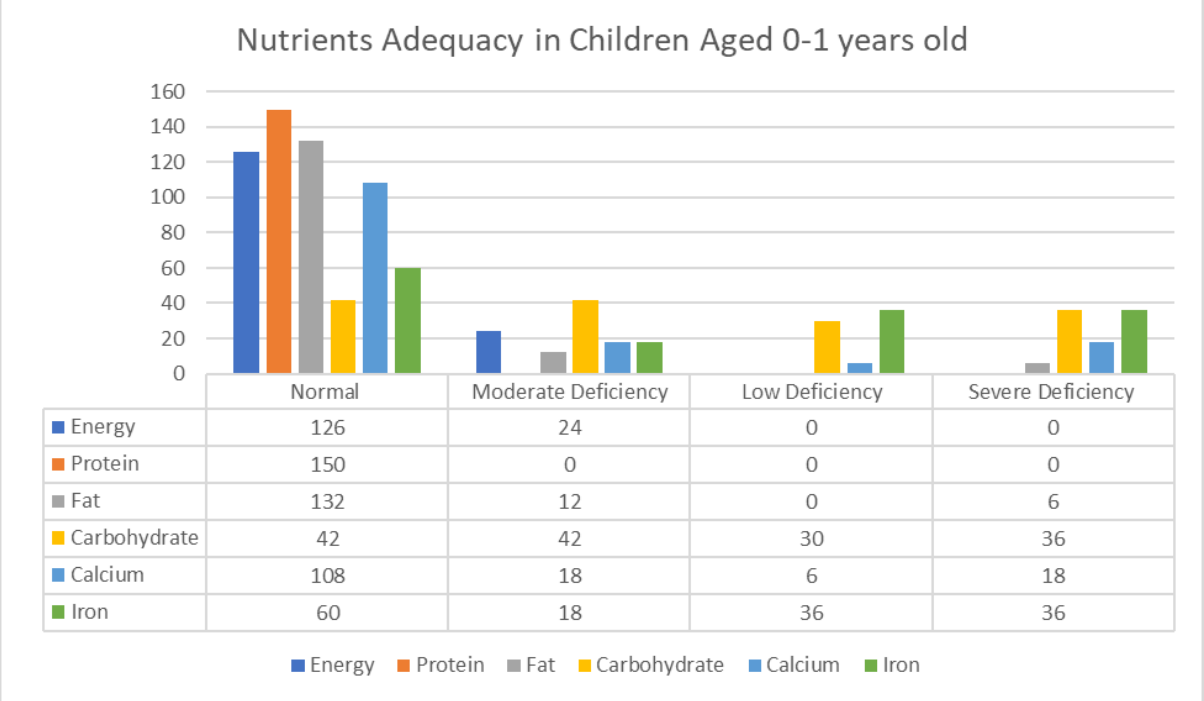
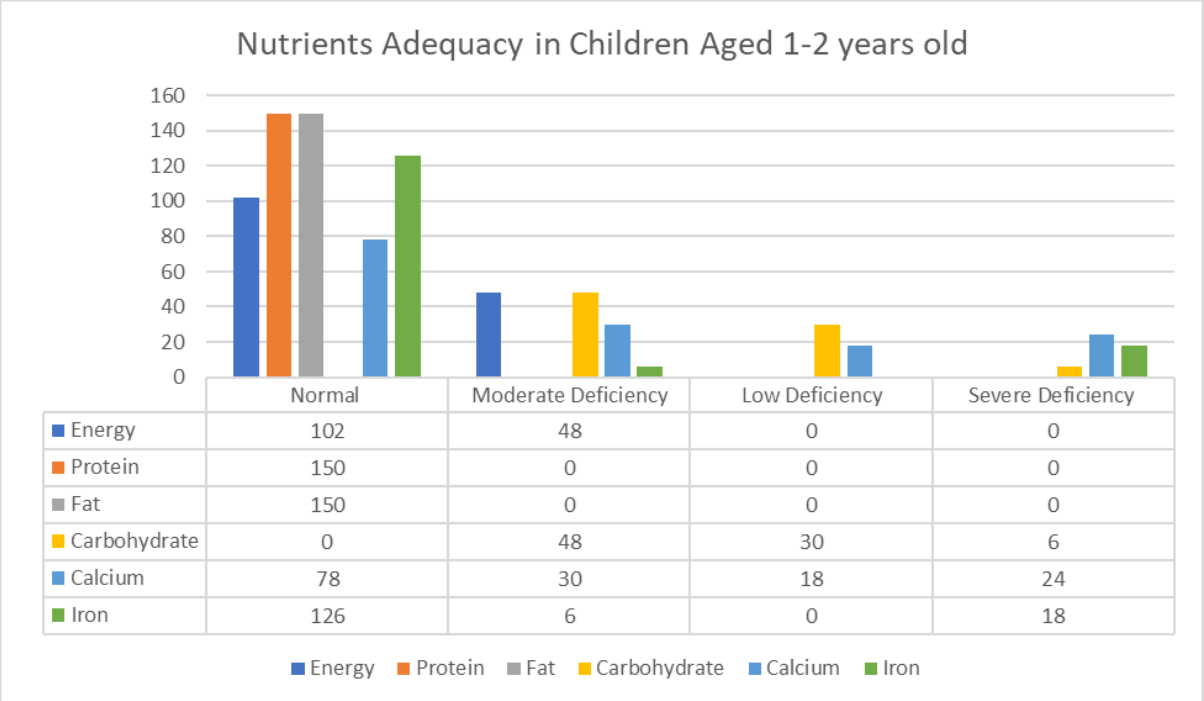


	Normal	Moderate Deficiency	Low Deficiency	Severe Deficiency
Energy	126	24	0	0
Protein	150	0	0	0
Fat	132	12	0	6
Carbohydrate	42	42	30	36
Calcium	108	18	6	18
Iron	60	18	36	36

Figure 2. Nutrition Adequacy in Children Aged 0-1 years old

The nutrition adequacy among children aged 1-2 years old were shown in Figure 3. Most of the nutrient intakes including energy, protein, fat, carbohydrates, calcium and iron were classified as normal. There was no overnutrition in any subjects.



	Normal	Moderate Deficiency	Low Deficiency	Severe Deficiency
Energy	102	48	0	0
Protein	150	0	0	0
Fat	150	0	0	0
Carbohydrate	0	48	30	6
Calcium	78	30	18	24
Iron	126	6	0	18

Figure 3. Nutrition Adequacy in Children Aged 1-2 years old

DISCUSSION

This study revealed that there is a nutrition deficiency among pregnant women and children aged 0–2 years old, especially in terms of carbohydrates, calcium, and iron. Nutrition deficiency is higher among children aged 1-2 years compared to children 0–1 years old, probably due to the reduction of breastfeeding in older children. As we know, breast milk contains high amounts of nutrients, which can help meet the nutritional needs of toddlers. Breastmilk is rich in protein, carbohydrates, vitamins, and minerals, including iron, zinc, and calcium. Breastmilk also contains hormones, growth factors, enzymes, and live cells.(8) Breastmilk could stop being produced after a period of weaning or due to hormonal changes when the mother gets pregnant. After weaning, children need to fulfill their nutritional needs with complementary foods. This highlights the importance of education regarding the benefits of breastfeeding and proper birth spacing so that children can get adequate nutrition.(9,10)

The level of nutrition deficiency is high among pregnant women due to the increased nutritional demands of pregnancy. Pregnant women need to meet the nutritional intake for themselves and the infant inside their womb.(11) The nutrition from food intake was used for the in-utero growth and development of the infant. In addition, nutrition is required for the preparation of breast milk. Inadequate nutrition in pregnant women may impact unproduced breast milk, which may further reduce nutrition adequacy among toddlers. (12) The micronutrients with high levels of severe deficiency in this study are calcium and iron, which emphasize the importance of calcium and iron supplementation. The current Indonesian government program is only giving free iron and folic acid supplementation to pregnant women, but without calcium or other minerals. Calcium is needed for bone development and the prevention of preeclampsia. The high level of calcium micronutrients in this study showed the importance of calcium intake, such as through milk or a calcium supplement, in pregnant women. Iron deficiency in pregnancy may cause anemia, which can contribute to postpartum bleeding, infection, and maternal mortality. This shows the importance of evaluating adherence to taking iron tablets in pregnant women.(13)

Malnutrition during pregnancy is also associated with low birth weight (LBW), premature birth, and stunting. Stunted children experience slow and short skeletal growth. Unmet food needs and an increase in morbidity over time are the root causes of this condition. Stunting is not only caused by a deficiency of nutrition but also by an increase in requirements. The influence of genetic and ethnic differences is taken into consideration when evaluating height for age. To achieve good growth and development, adequate nutrition is needed. Poor food, both in quality and quantity, will lead to malnutrition. Undernutrition can cause growth and development disorders; specifically, development can result in changes in the structure and function of the brain.(14) The human brain undergoes extraordinary structural and functional changes between the 24th and 42nd weeks after conception. This development continues after birth until 2 or 3 years of age, with the fastest period being the first 6 months of life. Thus, the growth of brain cells lasts until the age of 3 years.(15)

Nutritional disorders in toddlers under five generally never decrease in quantity. The causes of malnutrition in children under five can be seen in several causal factors, including direct and indirect causes. Indirect causes include food security in the family, parenting patterns, health services, and environmental health.(16) Health and environmental health services are facilities and infrastructure for basic health services that are accessible to families, as well as the availability of clean water. Inadequate nutrient intake from food and the presence of infectious diseases are two direct causes of malnutrition, a health issue. The direct cause is influenced by three factors, namely low family food availability, health behavior, including improper parenting of mothers and children, as well as low health services and an unhealthy environment.(17–19)

The limitation of this study is the risk of recall bias as we used a food frequency questionnaire. Further studies can investigate the serum micronutrient levels through laboratory studies to confirm the nutrition adequacy among pregnant women and children aged 0–24 months old. Further studies can also investigate other related micronutrients such as zinc, potassium, magnesium, iodine, and vitamins.

CONCLUSION

The total energy of pregnant women was moderately deficient; protein and fat adequacy were normal, while carbohydrates, calcium, and iron was severely deficient. Nutritional adequacy for toddlers aged 0–1 year in the form of energy, protein, fat, carbohydrates, calcium, and iron was classified as normal. Nutritional adequacy for toddlers aged 1-2 years in the form of energy, protein, fat, calcium, and iron was classified as normal, while carbohydrates were moderately deficient. The presence of nutrition deficiencies among pregnant women indicates that a public health program regarding carbohydrate, calcium, and iron deficiencies is urgently needed.

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