



The Relationship Between Maternal Nutritional Intake During Aterm Pregnancy and Infant Birth Weight in The Working Area of Anak Air Public Health Center Padang City in 2025

Diniatul Hayati¹, Almurdi², Fitrayeni³, Nice Rachmawati Masnadi⁴, Hindun Mila Hudzaifah⁵, Zurayya Fadila⁶

^{1,2,3,4,5,6} Department of Midwifery, Faculty of Medicine, Andalas University, Indonesia

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CORRESPONDENCE

E-mail: dinaiatulhayati@gmail.com

A B S T R A C T

Infant birth weight is an important indicator of neonatal health status. Low maternal nutritional intake during pregnancy, especially in aterm pregnancy, has the potential to increase the risk of low birth weight (LBW). This study aims to determine the relationship between maternal nutritional intake during pregnancy, both macronutrients (carbohydrates, protein, fat) and micronutrients (vitamins and minerals) with infant birth weight. Quantitative research with a cross-sectional design on 59 postpartum mothers with a history of aterm pregnancy at Puskesmas Anak Air Padang City (January-May 2025). Data were collected through questionnaires and SQ-FFQ, analyzed univariately and bivariately using chi-square test (95% CI; $p < 0.05$). Results showed that most babies (81.4%) were born with normal weight and there was a significant relationship between birth weight and There was a significant relationship between birth weight and intake of carbohydrates ($p = 0.011$), protein ($p = 0.002$), fat ($p = 0.008$), vitamins ($p = 0.011$), and minerals ($p = 0.016$). The quality of pregnant women's nutritional intake, both macro and micronutrients, has a significant effect on infant birth weight. Nutrition education needs to be improved to prevent LBW.

INTRODUCTION

Pregnancy is the most important period in a woman's life cycle, because during pregnancy women not only fulfill nutrition for themselves but also for themselves and their fetuses (Sulistiyono et al., 2021). Good nutrition is useful for the growth and development of the fetus in the womb, this is influenced by the food intake consumed by the mother during pregnancy (Andarwulan et al., 2022). Chronic Energy Deficiency (CHD) is one of the nutritional problems of pregnant women and the most common disorders that occur in pregnant women (Temu Herawati, Sabtian Sarwoko, 2024).

WHO in 2022 reported that the global prevalence of chronic undernutrition in pregnancy is 35-75%. This prevalence is significantly higher in the third trimester than in the first and second trimesters of pregnancy (Febrika Usiyanti, Intan Sari, Arie Anggraini, 2023). The Indonesian Basic Health Survey (SDKI) reported that the prevalence of Chronic Energy Deficiency (CHD) among pregnant women in Indonesia was 16.9% (SDKI, 2023).

Factors that can cause a pregnant woman to experience SEZ, namely the nutritional intake of pregnant women (Kementrian Kesehatan, 2023). Nutrition of pregnant women is food or nutrients such as macronutrients (carbohydrates, protein, fat) and micronutrients (vitamins and minerals) needed by a pregnant woman both in the first trimester, second trimester and third trimester and must be sufficient in the amount needed, so that the fetus she is carrying can grow well, and has no disorders (D dan A, 2021).

In Padang City, data from the Health Office shows that the prevalence of pregnant women with SEZ is quite high, including in the Anak Air Health Center working area. In 2023, 12.9% of pregnant women in the area experienced LBW. This correlates with the high incidence of LBW, which reached 3.5% (Simbolon, 2018). This fact shows that interventions to fulfill the nutrition of pregnant women, especially in aterm pregnancy (≥ 37 weeks), are very important in reducing the prevalence of LBW and improving the quality of neonatal health.

Therefore, this study was conducted to further explore the relationship between nutritional intake of pregnant women at term and birth weight of infants in the working area of Puskesmas Anak Air Kota Padang.

METHOD

This study used a quantitative approach with a cross sectional design. This research was conducted in the working area of the Anak Air Health Center in Padang City in January - May 2025. The sample of this study was 59 new mothers with a history of aterm pregnancy who met the inclusion and exclusion criteria. Data were collected using a structured questionnaire and Semi Quantitative Food Frequency (SQ-FFQ) questionnaire. Data analysis used univariate and bivariate through chi-square test, with 95% CI ($p < 0.05$).

RESULT

Table 1. Characteristics of respondents

Characteristics of respondents	f (n = 59)	%
Age		
At risk (<20 and >35)	9	15,3
Not at risk (21-35)	50	84,7
ANC		
0-5 times	0	0,0
≥ 6 times	59	100,0
Parity		
>3 (at risk)	8	13,6
≤ 3 (not at risk)	51	86,4
Education		
Low	7	11,9
High	52	88,1
Occupation		
Not working	46	78,0
Working	13	22,0
Family Income		
Below the minimum wage	32	54,2
Above the minimum wage	27	45,8
Family Dependents		
Large dependents (≥ 5)	1	1,7
Small dependents (<5)	58	98,3

Lila		
KEK	3	5,1
Normal	56	94,9
Gender of the baby		
Male	34	57,6
Female	25	42,4

Based on Table 1. it can be seen that 84.7% of respondents were not at risk (aged 20–35 years), while 15.3% were at risk (<20 and >35 years). All respondents received antenatal care (ANC) at health facilities regularly (≥ 6 times) during pregnancy (100%). the majority of respondents had a parity of ≤ 3 (non-risk group) at 86.4%, the majority of respondents had a high level of education (high school and university) at 88.1%, and the majority of respondents were unemployed at 78.0%, the majority of respondents came from families with incomes below the minimum wage (Rp2,994,193.47) at 54.2%, with 98.3% of respondents' family dependents falling into the category of small family dependents, the majority of respondents had normal birth weight at 94.9%, and the majority of newborns were male at 57.6%

Table 2. Frequency Distribution of Infant Birth Weight

Infant Condition	f	%
LBW	11	18,6
Not LBW	48	81,4
Total	59	100

Based on table 2. above shows that respondents with babies who have normal birth weight are more, namely 48 (81.4%) respondents. While respondents with LBW babies were only 11 (18.6%).

Table 3. Frequency Distribution of Macronutrient and Micronutrient Intake of Mother during aterm pregnancy

Variable	f (n=59)	%
Carbohydrate Intake		
Not fulfilled	28	47,5
Met	32	52,5
Protein intake		
Not met	29	49,2
Met	30	50,8
Fat Intake		
Not Met	27	45,8
Met	32	54,2
Vitamin intake		
Not Met	28	47,5
Met	31	52,5
Mineral intake		
Not Met	29	49,2
Met	30	50,8

Based on table 3. above, it can be seen that out of 59 respondents there were 32 people (52.5%) with fulfilled carbohydrate intake, 28 people (47.5%) with unfulfilled carbohydrate intake, 30 people (50.8%) with fulfilled protein intake, 29 people (49.2%) with unfulfilled protein intake, 32 people (54.2%) with fulfilled fat intake and 27 people (45.8%) with unfulfilled fat intake, 28 people (47.5%) with unfulfilled

vitamin intake, 31 people (52.5%) with fulfilled vitamin intake, 29 people (49.2%) with unfulfilled mineral intake and 30 people (50.8%) with fulfilled mineral intake.

Table 4. Relationship between Maternal Carbohydrate Intake during Aterm Pregnancy and Infant Birth Weight

Carbohydrate Intake	Infant Birth Weight				Total		P Value
	LBW		Not LBW				
	f	%	f	%	f	%	
Not fulfilled	9	32,1	19	67,9	28	100	0,028
Fulfilled	2	6,5	29	93,5	31	100	
Total	11	21,2	48	78,8	59	100	

Based on Table 4. it can be seen that out of 28 respondents with inadequate carbohydrate intake, 9 respondents (32.1%) had low birth weight babies and 18 respondents (67.9%) had normal birth weight babies. Meanwhile, among the 31 respondents with adequate carbohydrate intake, 2 respondents (6.5%) had babies with low birth weight (LBW) and 29 respondents (93.5%) had babies without LBW. The statistical test yielded a p-value of 0.028 ($p < 0.05$), indicating a significant association between carbohydrate intake and infant birth weight.

Table 5. Association between Maternal Protein Intake during Aterm Pregnancy and Birth Weight

Protein Intake	Infant Birth Weight				Total		P Value
	LBW		Not LBW				
	f	%	f	%	f	%	
Not fulfilled	10	34,5	19	65,5	29	100	0,006
Fulfilled	1	3,3	29	96,7	30	100	
Total	11	18,6	48	81,4	59	100	

Based on Table 5. it can be seen that out of 29 respondents with inadequate protein intake, 10 respondents (34.5%) had LBW babies and 19 respondents (65.5%) had non-LBW babies. Meanwhile, among the 30 respondents with adequate protein intake, 1 respondent (3.3%) had a low birth weight (LBW) infant, and 29 respondents (96.7%) had infants without LBW. The statistical test yielded a p-value of 0.006 ($p < 0.05$), indicating a significant association between protein intake and infant birth weight.

Table 6. Association between Maternal Fat Intake during Aterm Pregnancy and Birth Weight

Fat Intake	Infant Birth Weight				Total		P Value
	LBW		Not LBW				
	f	%	f	%	f	%	
Not fulfilled	9	33,3	18	66,7	27	100	0,020
Fulfilled	2	6,3	30	93,8	32	100	
Total	11	18,6	48	81,4	59	100	

Based on Table 5.7, it can be seen that out of 27 respondents with insufficient fat intake, 9 respondents (33.3%) had LBW babies and 18 respondents (66.7%) had non-LBW babies. Meanwhile, among the 32 respondents with adequate fat intake, 2 respondents (6.3%) had babies with low birth weight (LBW) and 30 respondents (93.7%) had babies without LBW. The statistical test yielded a p-value of 0.020 ($p < 0.05$), indicating a significant association between fat intake and infant birth weight.

Table 7. Association between Vitamin Intake during Aterm Pregnancy and Birth Weight

Vitamin Intake	Infant Birth Weight				Total		P Value
	LBW		Not LBW				
	f	%	f	%	f	%	
Not fulfilled	9	32,1	19	67,9	28	100	0,028
Fulfilled	2	6,5	29	93,5	31	100	
Total	11	18,6	48	81,4	59	100	

Based on Table 5.8, it can be seen that out of 28 respondents with inadequate vitamin intake, 9 respondents (32.1%) had LBW babies and 19 respondents (67.9%) had non-LBW babies. The statistical test yielded a p-value of 0.028 ($p < 0.05$), indicating a significant association between vitamin intake and infant birth weight.

Table 8. Association between Maternal Mineral Intake during Aterm Pregnancy and Birth Weight

Mineral Intake	Infant Birth Weight				Total		P Value
	LBW		Not LBW				
	f	%	f	%	f	%	
Not fulfilled	9	31,0	20	69,0	29	100	0,039
Fulfilled	2	6,7	28	93,3	30	100	
Total	11	18,6	48	81,4	59	100	

Based on Table 5.9, it can be seen that of the 29 respondents with inadequate mineral intake, 9 respondents (31.0%) had LBW babies and 20 respondents (69.0%) had non-LBW babies. The statistical test resulted in a p-value of 0.039 ($p < 0.05$), so it can be concluded that there is a relationship.

DISCUSSION

Relationship between Carbohydrate Intake and Infant Birth Weight

Based on the results of the research conducted, it was found that of the 28 respondents with unmet carbohydrate intake, there were 9 people (32.1%) respondents with LBW babies and 18 people (67.9%) respondents with babies who were not LBW. The results of the Chi-square statistical test obtained a p value of 0.028 (< 0.05), this indicates that there is a significant relationship between carbohydrate intake and infant birth weight in the Anak Air Health Center Working Area of Padang city.

These results are in line with research conducted by Dila F (2024) that there is a significant relationship between carbohydrate consumption and the incidence of LBW in the West Pasaman Ophir Health Center Work Area, with the results of the Chi-square statistical test, namely p value 0.000 (Dila, 2024). The results of research conducted by Fathurrahman, et al showed the opposite results with the result that there was no correlation between carbohydrate intake and infant birth weight ($p=0.938$, $r=0.006$) (Fathurrahman Ramadhana Akbar, Nur Indrawaty Lipoeto dan Syahrul, 2024). This is because macronutrient intake such as carbohydrates is not the main predilection in determining length and birth weight. However, there are

several other factors that affect the length and birth weight of infants such as maternal education, maternal age, gestational age, sex of the newborn (Dila, 2024).

Relationship between Protein Intake and Infant Birth Weight

Based on the results of the research conducted, it was found that of the 29 respondents with unmet protein intake, there were 10 people (34.5%) respondents with LBW babies and 19 people (65.5%) respondents with babies who were not LBW. The results of the Chi-square statistical test obtained a p value of 0.006 (<0.05), this indicates that there is a significant relationship between protein intake and infant birth weight in the Anak Air Health Center Working Area of Padang city.

These results are in line with research conducted by Dila F (2024) that there is a significant relationship between protein consumption and the incidence of LBW in the West Pasaman Ophir Health Center Working Area, with the results of the Chi-square statistical test, namely p value 0.000 (Dila, 2024). The results of research conducted by Marwang, et al showed opposite results with the results of the Chi-square statistical test obtained p value 0.342 greater than the p value <0.05 . So it can be concluded that there is no significant relationship between maternal protein intake and infant birth weight (Amrang et al., 2020).

Relationship between Fat Intake and Infant Birth Weight

Based on the results of the research conducted, it was found that of the 27 respondents with unmet fat intake there were 9 people (33.3%) respondents with LBW babies and 18 people (66.7%) respondents with babies who were not LBW. The results of the Chi-square statistical test obtained a p value of 0.020 (<0.05), this indicates that there is a significant relationship between fat intake and the birth weight of babies in the Working Area of the Anak Air Health Center in Padang.

The results of this study are in line with research conducted by Dila F (2024) that there is a significant relationship between fat consumption and the incidence of LBW in the West Pasaman Ophir Health Center Working Area, with the results of the Chi-square statistical test, namely p value 0.000 (Dila, 2024). Research conducted by Fathurrahman, et al (2024), showed opposite results with the results of statistical tests found p value 0.885, meaning that there was no correlation between fat intake with baby birth weight or with baby birth length (Fathurrahman Ramadhana Akbar, Nur Indrawaty Lipoeto dan Syahrul, 2024).

Relationship between Vitamin Intake and Infant Birth Weight

Based on the results of the research conducted, it was found that of the 28 respondents with unmet vitamin intake, there were 9 people (32.1%) respondents with LBW babies and 19 people (67.9%) respondents with babies who were not LBW. The results of the Chi-square statistical test obtained a p value of 0.028 (<0.05), this indicates that there is a significant relationship between vitamin intake and infant birth weight in the Anak Air Health Center Working Area of Padang city.

Vitamin components that are mostly fulfilled by pregnant women in this study are vitamins A, B6, C and folic acid. However, there are still babies with LBW conditions found. This is in line with research conducted by Marwati, et al (2017) which showed a relationship between the level of vitamin A intake and infant birth weight (Marwati, Lestari dan Afa, 2017). research conducted by Nurul (2023) shows the results of the chi-square statistical test obtained a p value of 0.016 (<0.05), meaning that there is a significant relationship between vitamin A intake and the incidence of LBW. Pregnant women with unmet vitamin A intake have a 3.3 times chance of giving birth to LBW babies compared to mothers with met vitamin A intake (Nasution, 2023).

Relationship between Mineral Intake and Infant Birth Weight

Based on the results of the research conducted, it was found that out of 29 respondents with unmet mineral intake there were 9 people (31.0%) respondents with LBW babies and 20 people (69.0%) respondents with babies who were not LBW. The results of the Chi-square statistical test obtained a p value of 0.039 (<0.016), this indicates that there is a significant relationship between mineral intake and the birth weight of babies in the Anak Air Health Center Working Area of Padang city.

Mineral components that are mostly fulfilled by pregnant women in this study are iron, calcium, zinc and phosphorus. However, there are still babies with LBW conditions found. This is in line with research conducted by Dila F (2024), showing that iron consumption with the incidence of LBW has a significant relationship. In accordance with the results of the chi-square statistical test obtained a p value of 0.001 (Dila, 2024).

Research conducted by Aprisia and Demsa (2022), showed that the consumption of Fe tablets was associated with the birth weight of babies. Mothers who consume Fe tablets not according to recommendations are at risk of giving birth to babies with LBW compared to mothers who consume Fe tablets according to recommendations (Aprisia dan Simbolon, 2022).

Research conducted by Nurul (2023), showed that there was a significant relationship between zinc intake and the incidence of LBW. In accordance with the results of the chi-square statistical test, the p value was 0.001 (<0.05) (Nasution, 2023).

CONCLUSION

Based on the findings of this study, most infants born to mothers in the working area of Anak Air Health Center, Padang City, had normal birth weight (NBW), while among the nine mothers with inadequate carbohydrate, protein, and fat intake, five gave birth to low birth weight (LBW) infants and four gave birth to infants with normal birth weight. More than half of the respondents had adequate macronutrient and micronutrient intake during term pregnancy. The findings also demonstrated a significant association

between maternal macronutrient and micronutrient intake during term pregnancy and infant birth weight in the working area of Anak Air Health Center, Padang City.

REFERENCES

- Akbar, F. R., Lipoeto, N. I., & Syahrul, M. Z. (2024). Korelasi konsumsi makronutrien selama hamil dengan panjang dan berat badan lahir bayi. *SENTRI: Jurnal Riset Ilmiah*, 3(10), 4725–4736.
- Amrang, M., Nurmadilla, N., Pramono, S. D., Ananda, F., & Rasfayanah, R. (2020). Hubungan asupan protein ibu hamil trimester III dengan BB lahir bayi RSIA Kota Makassar. *Wal'afiat Hospital Journal*, 1(2), 91–99. <https://doi.org/10.33096/whj.v1i2.48>
- Andarwulan, S., Anjarwati, N., Alam, H. S., Aryani, N. P., Afrida, B. R., Bintanah, S., Citrawati, N. K., Erlinawati, N. D., Susilawati, D., Arlym, L. T., Jauharany, F. F., Kartikaningtiyas, C., & Nilakesuma, N. F. (2022). *Gizi pada ibu hamil*. Media Sains Indonesia.
- Aprisia, B., & Simbolon, D. (2022). Konsumsi tablet tambah darah kaitannya dengan berat lahir bayi di Indonesia. *Journal of Nutrition College*, 11(4), 294–302. <https://doi.org/10.14710/jnc.v11i4.33750>
- Badan Kebijakan Pembangunan Kesehatan. (2024). *Survei Kesehatan Indonesia (SKI) 2023*. Kementerian Kesehatan Republik Indonesia.
- Dila, F. A. (2024). *Faktor-faktor yang berhubungan dengan kejadian berat badan lahir rendah (BBLR) pada ibu yang memiliki bayi usia 0–12 bulan di wilayah kerja Puskesmas Ophir Pasaman Barat tahun 2024* [Skripsi, Universitas Perintis Indonesia].
- Marwati, M., Lestari, H., & Afa, J. R. (2017). Hubungan tingkat asupan energi, protein, zat besi (Fe), seng (Zn), asam folat, dan vitamin A ibu hamil dengan kejadian berat badan lahir bayi di wilayah kerja Puskesmas Puuwatu Kota Kendari tahun 2017. *JIMKESMAS: Jurnal Ilmiah Mahasiswa Kesehatan Masyarakat*, 2 (7), 1–12. <https://doi.org/10.37887/jimkesmas.v2i7.3425>
- Rohmawati, D., Kusumawati, E., & Rahmawati, A. (2021). Litelatur review: Faktor faktor yang berhubungan dengan kekurangan energi kronik (KEK) pada ibu hamil. *Prosiding Seminar Nasional Unimus*, 4, 1672–1678.
- Simbolon, D., Jumiyati, & Rahmadi, A. (2018). *Pencegahan dan penanggulangan kurang energi kronik (KEK) dan anemia pada ibu hamil*. Deepublish.
- Temu Herawati, T., Sarwoko, S., & Melyanti, F. (2024). Faktor-faktor yang berhubungan dengan kejadian kekurangan energi kronik (KEK) pada ibu hamil. *Jurnal Penelitian Perawat Profesional*, 6 (2), 517–526. <https://doi.org/10.37287/jppp.v6i2.2174>