The Influence of Maternal Nutrition and Micronutrient Intake on the Incidence of Low Birth Weight (LBW)

Eka Sarofah Ningsih[1*], Khusnul Nikmah[1], Ida Susila[1]

[1] DIII Midwifery Study Program, Vocational School, Universitas Islam Lamongan, Indonesia.

Abstract: Low Birth Weight (LBW) is an important indicator in assessing the health status of newborns, and contributes to increased neonatal morbidity and mortality rates. Maternal factors, especially nutritional status and adequacy of micronutrient intake during pregnancy, are known to influence the incidence of LBW. This study aims to determine the relationship between maternal nutritional status and micronutrient intake (iron and folic acid) with the incidence of LBW in the Deket Health Center working area, Lamongan Regency. This study used a descriptive analytical design with a cross-sectional approach. The population consisted of 11 pregnant women who gave birth at the Deket Health Center in 2024. Data were collected through structured interviews, nutritional status assessments based on KEK indicators, and assessments of iron and folic acid intake. The analysis was carried out using the Fisher's Exact Test. Of the 11 respondents, 3 cases of LBW were found. There were 3 mothers who experienced KEK, 6 mothers with insufficient iron intake, and 7 mothers who did not meet folic acid needs. The results of statistical tests showed that the relationship between nutritional status and micronutrient intake with the incidence of LBW was not statistically significant (p = 0.091), but showed a tendency for a clinically relevant relationship. Nutritional status and adequacy of micronutrient intake of pregnant women have the potential to influence the incidence of LBW although the relationship was not statistically significant. Prevention efforts through nutritional education and monitoring the status of pregnant women need to be strengthened as part of health services at the Community Health Center.

Keywords: Low birth weight (LBW) Incidence; Maternal Nutrition; Micronutrient Intake

Introduction

Maternal health is one of the fundamental aspects in determining the sustainability of a healthy and productive generation (Hussain et al., 2024). One of the problems that is still a challenge in the maternal and child health system in Indonesia is the incidence of Low Birth Weight (LBW), which is a condition when a baby is born weighing less than 2.500 grams regardless of gestational age (Fanzo et al., 2021). LBW contributes significantly to increasing neonatal morbidity and mortality rates, and has the potential to cause long-term growth and development disorders, including delayed cognitive development, susceptibility to infection, and increased risk of non-communicable diseases such as hypertension and diabetes in adulthood (Cahyorini et al., 2022; Mulyono, 2022). Therefore, overcoming LBW is an important indicator in efforts to improve the quality of maternal and infant health nationally. Based on the 2022 Indonesian Nutritional Status Survey (SSGI), the prevalence of LBW in Indonesia reached 6.0%, a figure that is still above the maximum recommendation from WHO of 5%. At the regional level, East Java Province is included in the area with a higher prevalence of LBW compared to the national average. In particular, the Deket Health Center located in Lamongan Regency is an area that deserves attention because internal data shows a LBW rate that is

suspected to be higher than the provincial average. Although the data is not yet publicly available, internal reports from the Health Center and the District Health Office provide early indications that are relevant for further study through a scientific approach.

The problem of LBW is multifactorial, including medical, genetic, environmental, and socio-economic factors (Mizuno et al., 2023; Wulandari et al., 2022). However, one of the most crucial and modifiable determinants is the nutritional status of the mother during pregnancy (Brink et al., 2022; Olloqui-Mundet et al., 2024). Malnutrition in terms of both macronutrients (energy and protein) and micronutrients (iron, folic acid, and zinc) has been shown to interfere with intrauterine fetal growth (IUGR) which ultimately increases the risk of low birth weight (Birhanie et al., 2020). Maternal nutritional status is generally assessed through indicators such as Upper Arm Circumference (MUAC) and Body Mass Index (BMI). Pregnant women with MUAC <23.50 cm or BMI <18.50 kg/m² are categorized as at risk of chronic energy deficiency (CED), a condition that greatly affects fetal growth and increases the risk of LBW (Yulia et al., 2024). In addition to anthropometric indicators, the role of micronutrients such as iron and folic acid is very important during pregnancy (Ramakrishnan et al., 2024; Wang et al., 2025).

Iron plays a role in the formation of hemoglobin and oxygen transport which are very important for fetal development, while folic acid plays a role in the process of cell division and DNA synthesis (Donker et al., 2021). Deficiency of these two substances can trigger pregnancy anemia which can have an impact on placental disorders and fetal growth retardation (Farias et al., 2020). Ironically, although the Deket Health Center has implemented a national program in the form of providing iron tablets (TTD) and nutrition education, the LBW rate remains high, which indicates that the existing program has not touched the root of the problem as a whole, especially regarding the consumption behavior and compliance of pregnant women with micronutrient supplementation (Onyeneho et al., 2016). In this context, this study was designed to scientifically explore the relationship between nutritional status and micronutrient intake of pregnant women with the incidence of LBW in the Deket Health Center work area. This problem was chosen to emphasize the importance of maternal nutritional conditions as a reflection of the potential health and weight of the baby to be born. This study is expected not only to be an academic contribution, but also to provide a strong evidence-based basis for making nutritional intervention policies at the local level.

Based on this background, the formulation of the problem proposed in this study is: Is there a relationship between the nutritional status of pregnant women and the incidence of low birth weight (LBW) at the Deket Health Center, Lamongan Regency; Is there a relationship between the micronutrient intake of pregnant women (iron and folic acid) and the incidence of LBW in the same area? This study aims to answer these questions through a descriptive analytical approach using primary data from relevant respondents. A review of previous studies shows consistent results that are relevant to the hypothesis of this study. Putri et al. (2022) in their study in Kendari found that pregnant women with LILA <23.50 cm had a higher risk of giving birth to LBW babies. Meanwhile, (Liu et al., 2022), showed that low intake of folic acid accompanied by anemia contributed significantly to the increase in the incidence of LBW. Darnton-Hill & Mkparu, (2015); Fatima et al., (2025), research also strengthens these findings, concluding that micro and macro nutrient deficiencies can cause fetal growth disorders that impact birth weight.

Likewise, Arabzadeh et al. (2024), revealed that the combination of low BMI and anemia significantly increases the risk of LBW. All of these findings reinforce the urgency to further examine the relationship between maternal nutrition and micronutrient intake with LBW in the context of the Deket Health Center area which has unique geographic and socio-economic characteristics.

Method

This study is an analytical quantitative study (Wang & Cheng, 2020), with an observational design using a cross-sectional approach. This approach was chosen because it allows researchers to evaluate the relationship between maternal nutritional status and micronutrient intake with the incidence of low birth weight (LBW) at a certain point in time, without providing treatment or intervention. The study was conducted in the Deket Health Center working area, Deket District, Lamongan Regency, East Java, during the period January to May 2024. This time span includes the stages of licensing administration, data collection, and analysis of results. The population in this study were all postpartum mothers who gave birth in the Deket Health Center working area during the study period, with the condition that they had records of nutritional status during pregnancy. Because the target population is relatively small and easy to reach, the total sampling technique was used to take the entire population that met the criteria.

Based on birth records at the Health Center, the number of postpartum mothers who met the criteria during the last five months is estimated to be eleven people. Inclusion criteria included mothers who gave birth to live babies with a gestational age of at least 28 weeks, had complete data on nutritional status (LILA and/or BMI), as well as iron and folic acid consumption, and were willing to be respondents by signing an informed consent. Meanwhile, exclusion criteria included mothers who had chronic diseases such as diabetes or hypertension, as well as cases of congenital abnormalities in infants (Hidayati, 2024).

Primary data were collected through interviews using semi-structured questionnaires and food recalls, while secondary data were obtained from KIA books and medical records that recorded LILA, BMI, and infant weight at birth. Data analysis was carried out in stages, starting with univariate analysis to describe the characteristics of respondents, followed by bivariate analysis using the Chi-Square test or Fisher's Exact Test if the assumptions were not met. This study has obtained ethical approval from the Health Research Ethics Committee of the relevant institution and guarantees the confidentiality and freedom of participants in participating in the study in accordance with the principles of biomedical research ethics (Xu et al., 2020).

Results and Discussion

Research Results

This study was conducted on 11 postpartum mothers in the Deket Health Center working area, Lamongan Regency, who gave birth in the period January–May 2024. The study aims to determine the relationship between maternal nutritional status (based on LILA) and micronutrient intake (iron and folic acid) with the incidence of Low Birth Weight (LBW). The analysis was carried out descriptively and bivariately.

Table 1. Distribution of Respondents Based on Age Groups in the Deket Health Center Working Area, Lamongan Regency (n = 11)

Age Group	Frequency	Percentage (%)
< 20 years	2	18.20
20–35 years	7	63.60
> 35 years	2	18.20
Total	11	100

Most respondents were in the 20–35 age group as many as 7 people (63.60%), two respondents were aged <20 years (18.20%), and two others were aged >35 years (18.20%). Age 20–35 years is the optimal reproductive age, where the risk of pregnancy complications is relatively lower compared to being too young or too

old. This reflects that most respondents are in the ideal age group for giving birth.

Nutritional Status Based on LILA

Nutritional status assessment was conducted using the LILA (Upper Arm Circumference) indicator. Of the total 11 respondents, 3 mothers (27.30%) had LILA <23.50 cm which was categorized as a risk of Chronic Energy Deficiency (CED), while 8 mothers (72.70%) had LILA ≥ 23.50 cm and were categorized as normal. This finding indicates that although the majority of mothers have normal nutritional status, there is still a significant proportion of pregnant women with CED who are at high risk of experiencing pregnancy complications including LBW.

Table 2. Distribution of Nutritional Status of Pregnant Women Based on Upper Arm Circumference (LILA) in the Work Area of the Deket Health Center, Lamongan Regency (n = 11)

Nutritional Status (LILA)	Frequency	Percentage (%)
KEK (< 23.50 cm)	3	27.30
Normal (≥ 23.50 cm)	8	72.70
Total	11	100

Table 3. Distribution of Low Birth Weight (LBW) Incidents in the Deket Health Center Work Area, Lamongan Regency (n = 11)

Baby Birth Weight	Frequency	Percentage (%)
< 2500 grams (LBW)	3	27.30
≥ 2500 grams (Normal)	8	72.70
Total	11	100%

Of the 11 babies born, there were 3 babies (27.30%) with birth weight <2500 grams which were categorized as LBW. Meanwhile, 8 babies (72.70%) were born with weight ≥ 2500 grams and were classified as normal. The percentage of LBW incidence shows that the figure is above the ideal threshold recommended by WHO (<5%).

Table 4. Distribution of Consumption of Iron (Fe) Tablets in Pregnant Women in the Third Trimester in the Work Area of the Deket Health Center, Lamongan Regency (n = 11)

Consumption of Fe Tablets	Frequency	Percentage (%)
< 90 tablets	6	54.50
≥ 90 tablets	5	45.50
Total	11	100

The majority of mothers (54.50%) consumed Fe tablets < 90 tablets during pregnancy, which means it is not in accordance with the Indonesian Ministry of Health standards which recommend a minimum of 90

tablets to prevent pregnancy anemia and fetal growth disorders.

Table 5. Distribution of Folic Acid Consumption of Pregnant Women in the Third Trimester in the Deket Health Center Working Area, Lamongan Regency (n = 11)

Folic Acid Consumption	Frequency	Percentage (%)
Insufficient	7	63.60
Folic Acid Consumption	4	36.40
Total	11	100

Most mothers (63.60%) do not consume enough folic acid, either from supplements or folate-rich foods (eg green vegetables, nuts, liver).

Relationship between Maternal Nutritional Status (LILA) and Low Birth Weight Incidence

The tabulation results show that out of 3 mothers with KEK status, 2 (66.70%) gave birth to LBW babies. In contrast, out of 8 mothers with normal nutritional status, only 1 (12.50%) gave birth to a LBW baby. The analysis using Fisher's Exact Test showed a p value = 0.091, which means that it is not statistically significant at the 95% confidence level (p > 0.05), but shows a tendency for a strong clinical relationship between KEK nutritional status and the incidence of LBW.

Table 6. Relationship between Nutritional Status of Pregnant Women Based on LILA and Low Birth Weight Incidence (LBW) in the Deket Health Center Working Area, Lamongan Regency (n = 11)

Maternal Nutritional Status	BBLR	Normal	Total
KEK	2	1	3
Normal	1	7	8
Total	3	8	11

Fisher's Exact Test: p = 0.091

The Relationship between Iron Tablet Consumption and the Incidence of LBW

This study analyzed the relationship between the amount of iron (Fe) tablet consumption during pregnancy and the incidence of low birth weight (LBW). Based on Table 7, out of 11 respondents, there were 6 pregnant women who consumed less than 90 Fe tablets during pregnancy, and 5 mothers who consumed 90 tablets or more according to the recommendations of the Indonesian Ministry of Health.

Table 7. Relationship between Consumption of Iron (Fe) Tablets and the Incidence of Low Birth Weight (LBW) in the Work Area of the Deket Health Center, Lamongan Regency (n = 11)

Fe Consumption	BBLR (n)	Normal (n)	Total
< 90 tablets	2	4	6
≥ 90 tablets	1	4	5
Total	3	8	11

From these results, it can be seen that in the group of mothers who consumed Fe < 90 tablets, there was a 33.30% incidence of LBW (2 out of 6 mothers). Meanwhile, in the group that consumed Fe ≥ 90 tablets, the incidence of LBW was recorded at 20% (1 out of 5 mothers). This difference in proportion shows a trend that lower iron consumption is associated with an increased risk of LBW, although statistically not significant (p = 1.000, Fisher's Exact Test).

Relationship between Folic Acid Consumption and LBW Incidence

This study also analyzed the relationship between the level of folic acid consumption of pregnant women in the third trimester and the incidence of low birth weight (LBW). Based on Table 8, out of a total of 11 pregnant women, 7 mothers were categorized as having insufficient folic acid consumption, and 4 mothers had sufficient consumption.

Table 8. Relationship between Folic Acid Consumption and the Incidence of Low Birth Weight (LBW) in the Deket Health Center Work Area, Lamongan Regency (n = 11)

Folic Acid Consumption	BBLR (n)	Normal (n)	Total
Less	2	5	7
Enough	1	3	4
Total	3	8	11

Fisher's Exact Test: p = 1,000

The results of the analysis showed that in the group of mothers with insufficient folic acid consumption, 2 out of 7 mothers (28.60%) gave birth to babies with LBW. Meanwhile, in the group of mothers with sufficient folic acid consumption, only 1 out of 4 mothers (25%) gave birth to babies with LBW. The Fisher's Exact Test statistical test produced a value of p = 1,000, which indicated that there was no statistically significant relationship between the level of folic acid consumption and the incidence of LBW in this study.

Relationship between Nutritional Status and Micronutrient Intake with the Incidence of LBW

The results of the bivariate analysis in Table 4.6 show that there is a higher proportion of LBW incidence in the group of pregnant women with insufficient micronutrient consumption during the third trimester. Pregnant women who consume iron tablets < 90 tablets show a proportion of LBW of

33.30%, while in the group of mothers who consume ≥ 90 tablets the proportion is only 20%. Similarly, the proportion of LBW incidence in mothers with insufficient folic acid consumption is 28.60%, compared to mothers who consume sufficient folic acid, which is 25%. However, the results of the Fisher's Exact Test statistical test show that there is no statistically significant relationship between micronutrient intake and LBW incidence (p > 0.05). Clinically, this difference in proportion indicates that insufficient micronutrient consumption in the last trimester tends to contribute to an increased risk of LBW. Deficiencies in iron and folic acid during the third trimester — a critical phase of fetal growth — have the potential to disrupt the supply of oxygen and nutrients through the placenta.

Table 9. Analysis of the Relationship between Nutritional Status and Micronutrient Intake in the 3rd Trimester with the Incidence of Low Birth Weight (LBW) in the Work Area of the Deket Health Center, Lamongan Regency (n = 11)

Micronutrient Variable T3	BBLR (n)	Total (n)	Proportion of LBW (%)	p-value
Fe Consumption < 90 tablets	2	6	33.30	1.000
Fe Consumption ≥ 90 tablets	1	5	20	
Insufficient Folic Acid Consumption	2	7	28.60	1.000
Sufficient Folic Acid Consumption	1	4	25	

According to WHO (2021) and the Indonesian Ministry of Health (2023) (Armengaud et al., 2021), iron deficiency in the third trimester can trigger anemia in pregnant women which causes fetal hypoxia and increases the risk of IUGR (intrauterine growth restriction). Inadequate folic acid intake also affects the process of cell replication and the development of the fetal nervous system, which if disturbed can lead to LBW. This finding is supported by (Bekele et al., 2024), who stated that folic acid supplements and iron tablets play a protective role against the incidence of LBW. However, the limited sample size in this study was a factor that limited the strength of statistical significance.

Discussion
Relationship between Nutritional Status and the Incidence of LBW

The results of this study indicate that pregnant women with poor nutritional status, indicated by an Upper Arm Circumference (LILA) <23.50 cm, have a higher tendency to give birth to babies with low birth weight (LBW). Of the 3 mothers who were classified as having Chronic Energy Deficiency (CED), 2 (66.7%) gave birth to LBW babies. In contrast, out of 8 mothers with normal nutritional status (LILA ≥ 23.50 cm), only 1 (12.50%) gave birth to a LBW baby. This indicates a relationship between the nutritional status of pregnant women and the incidence of LBW (Dwi Listiarini et al., 2022; Nita, 2025), although the Fisher's Exact Test statistical test showed results that were not yet statistically significant (p = 0.091). Physiologically, the nutritional status of pregnant women plays a central role in the process of fetal growth and development. Mothers with KEK have limited energy and protein reserves, which can affect placental function, reduce uteroplacental blood flow, and reduce the transfer of oxygen and nutrients to the fetus. This can cause intrauterine growth retardation (IUGR) which ultimately leads to LBW. In Kendari, which found that pregnant women with LILA <23.50 cm have a 3.5 times greater risk of giving birth to LBW babies compared to mothers with normal LILA.

Another study by Engidaw et al. (2022), also confirmed that poor nutritional status is closely correlated with the incidence of LBW, especially if accompanied by anemia or lack of micronutrient consumption. A report from the World Health Organization (WHO, 2021) (Dary et al., 2022; Sholiha & Sumarmi, 2016), also confirmed that KEK in pregnant women is one of the main risk factors for the birth of babies with low birth weight and increased neonatal mortality rates. WHO recommends routine LILA measurement during pregnancy as an indicator of the risk of malnutrition and LBW, especially in areas with high prevalence of KEK. Although this relationship was not statistically significant in this study, the clinical trend shown is noteworthy. The small sample size (n=11) could be a limitation that affects the statistical power of the test. Therefore, further research with a larger population and multivariate analysis can provide more convincing results to support more massive maternal nutrition interventions, especially in the working areas of the Deket Health Center.

Relationship between Consumption of Iron Tablets and the Incidence of LBW

In this study, data was obtained that out of 6 pregnant women who consumed less than 90 iron (Fe) tablets during pregnancy, 2 people (33.30%) gave birth to babies with Low Birth Weight (LBW). Conversely, out of 5 mothers who consumed ≥90 Fe tablets, only 1 person (20%) experienced a similar incident. Although the statistical test using Fisher's Exact Test produced a

p value = 1.000 (not statistically significant), this difference in proportions shows a clinically relevant trend. Physiologically, iron is an essential micronutrient needed for the formation of hemoglobin and supports the transport of oxygen throughout the body, including to the fetus through the placenta. Iron deficiency in pregnancy can cause iron deficiency anemia, a condition that can reduce the blood's capacity to carry oxygen. This has the potential to cause fetal hypoxia and intrauterine growth retardation (IUGR), which is one of the direct causes of LBW. Pregnant women who did not consume at least 90 Fe tablets during pregnancy had a higher risk of giving birth to LBW babies.

Anemia in the second and third trimesters had a significant correlation with the incidence of babies born weighing <2500 grams. Every pregnant woman is required to receive at least 90 Fe tablets during pregnancy as an effort to prevent anemia. Distribution of iron tablets usually begins in the second trimester. However, several challenges such as side effects (nausea, constipation), mothers' ignorance about the importance of supplements, delays in distribution, and low compliance, are still obstacles at the primary service level such as the Deket Health Center. Although not statistically significant in this study due to limited sample size, these results still emphasize the importance of consistent micronutrient interventions for pregnant women. Increasing nutritional education, focused antenatal counseling, and monitoring compliance with TTD (Iron Supplement Tablet) consumption in primary health facilities must be strengthened.

Relationship between Folic Acid Consumption and LBW Incidence

In this study, out of 7 pregnant women who had insufficient folic acid consumption (either from food or supplements), 2 cases of Low Birth Weight babies were found (28.60%). Meanwhile, in the group of mothers who consumed sufficient folic acid (4 people), only 1 gave birth to a LBW baby (25%). The results of the statistical test using Fisher's Exact Test produced a p value = 1.000, which indicated no statistically significant relationship, but the visible trend still showed clinical relevance and importance in the context of public health. Folic acid (vitamin B9) is an essential micronutrient that plays a crucial role in the process of DNA synthesis, cell division, and the growth of placental and embryonic tissue (Aghadiati, 2020). Folate deficiency during early pregnancy not only causes neural tube defects (NTDs), but also affects the growth of the placenta, which is a vital organ for distributing nutrients and oxygen to the fetus. Impaired placental function can lead to intrauterine growth

retardation (IUGR), which is the main cause of LBW. This study supports the findings of (Wilson & O'Connor, 2021), which states that routine administration of folic acid supplements since the first trimester can significantly reduce the incidence of LBW.

In addition, a study by Haider & Bhutta (2017), in their meta-analysis stated that folic acid supplementation reduces the risk of LBW and prematurity, especially when combined with iron. At the Deket Health Center, low folic acid consumption can be caused by several factors, such as: Lack of education regarding the importance of folic acid supplements from an early age; Delays in distribution or lack of supplement stock in health facilities; Low compliance with consumption due to not feeling direct benefits; Lack of integration of nutrition education in antenatal services. Although not statistically significant due to the limited sample size, these findings still support the importance of micronutrient-based interventions during pregnancy. Education, compliance with consumption, and fulfillment of folic acid supplement distribution should be a concern in efforts to prevent LBW in primary health care facilities.

Relationship between Nutritional Status and Micronutrient Intake in the Third Trimester with the Incidence of LBW

The results of this study indicate a tendency that nutritional status and micronutrient intake in the third trimester affect the incidence of low birth weight (LBW), although not statistically significant. Of the total 11 respondents, the proportion of LBW tends to be higher in the group of mothers with poor nutritional status (KEK), iron tablet consumption <90 tablets, and insufficient folic acid consumption. In the group of mothers who consumed <90 iron tablets during the third trimester, 2 out of 6 (33.30%) gave birth to LBW babies. Meanwhile, in mothers who consumed iron tablets according to recommendations (≥ 90 tablets), only 1 out of 5 (20%) experienced LBW. This is in line with the recommendation of the Indonesian Ministry of Health (2023) which suggests consuming at least 90 Fe tablets during pregnancy, especially the second and third trimesters, to prevent anemia that affects fetal growth (Nurul et al., 2024), Iron deficiency causes iron deficiency anemia, which has a direct impact on disrupting the transport of oxygen and nutrients from the mother to the fetus through the placenta. Chronic fetal hypoxia can interfere with intrauterine growth (IUGR) and increase the risk of LBW. In the folic acid consumption variable, mothers with insufficient folate intake (7 respondents) showed a proportion of LBW of 28.60%, while mothers with sufficient consumption (4 respondents) had a slightly lower proportion of LBW, which was 25%.

De Souza et al. (2024), stated that folic acid deficiency during pregnancy, especially in the final trimester, can interfere with fetal tissue growth, placental development, and blood formation, thereby increasing the risk of premature birth and LBW. Overall, although the Fisher's Exact Test statistical test on the iron and folate consumption variables each produced a p value = 1,000, the trend in clinical data shows that mothers with inadequate micronutrient intake are more prone to giving birth to babies with low birth weight. The absence of a statistically significant relationship is likely influenced by the small sample size and the absence of control for confounding variables such as anemia levels, infections, or pregnancy history. This finding is consistent with a study by Black et al. (2013), which emphasized the importance of micronutrient interventions during pregnancy in preventing various forms of fetal malnutrition, including LBW. Adequate micronutrient intake, especially in the third trimester which is the phase of fetal growth acceleration, is a key factor in supporting optimal pregnancy outcomes.

Incidence of LBW at the Deket Health Center

The results of this study indicate that out of a total of 11 pregnant women who were respondents, there were 3 babies born with a weight <2500 grams, so that the prevalence of low birth weight (LBW) in this study reached 27.30%. This figure is much higher compared to: National prevalence based on the 2022 Indonesian Nutritional Status Survey (SSGI) of 6%; The average figure for East Java Province of 6.80%, and WHO recommendations, which suggest that the prevalence of LBW should ideally not exceed 5% to ensure healthy pregnancy outcomes and reduce infant mortality. The high prevalence of LBW in this sample indicates the potential for maternal nutritional problems that have not been fully addressed in the work area of the Deket Health Center, Lamongan Regency. Although the number of samples is relatively small, these results could be an early signal or "early warning" that this area needs more attention in terms of monitoring and intervention of maternal nutrition. According to WHO (2020) in (Mursil et al., 2024), LBW is not only an indicator of maternal nutritional status during pregnancy, but also a strong predictor of: Neonatal mortality; Suboptimal child growth and development; Risk of non-communicable diseases in adulthood.

This study found that most cases of LBW occurred in mothers who had poor nutritional status (KEK) and inadequate micronutrient intake, especially iron and folic acid. These factors contribute to intrauterine growth retardation (IUGR), the main cause of LBW in developing countries. Local Conditions and Challenges

in the working area of the Deket Health Center have the following characteristics: Rural environment, Diverse levels of maternal education, Possible limited access to nutrition services and routine pregnancy check-ups. The Indonesian Ministry of Health (2023) (Bryce et al., 2022; Kurniasari et al., 2025), emphasized that to prevent LBW, monitoring maternal nutritional status (LILA, body weight, anemia) and providing regular iron and folic acid supplements are important parts of quality antenatal care. Other Research Comparisons, these findings are reinforced by the study by Nguyen et al. (2021), which showed that the prevalence of LBW can increase 2–3 times in groups of mothers with poor nutrition and suboptimal micronutrient intake. Other health centers in East Java showed that the success of the TTD (Iron Supplement Tablet) program and LILA monitoring played a significant role in reducing LBW rates locally.

Conclusion

Based on the results of the study on "Maternal Nutrition Mirror in Infant Weight Figures: The Relationship between Nutritional Status and Micronutrient Intake with the Incidence of LBW in the Deket Health Center, Lamongan Regency", it can be concluded that the prevalence of LBW in the Deket Health Center area is 27.30%, much higher than the national figure (6%) and WHO standards (<5%). This indicates a nutritional problem in pregnant women that needs more serious attention. Pregnant women with poor nutritional status (KEK, LILA <23.50 cm) tend to have a higher risk of giving birth to babies with low birth weight compared to mothers with normal nutritional status. Although this relationship is not statistically significant (p = 0.091), this trend is important to follow up. Consumption of iron (Fe) tablets of less than 90 tablets during pregnancy is associated with a higher proportion of LBW incidence compared to consumption of ≥ 90 tablets, although the results of the statistical test were not significant (p = 1.000). Insufficient folic acid consumption also showed a tendency to increase the risk of LBW compared to sufficient consumption, but was not statistically significant (p = 1.000). Maternal nutritional status and micronutrient intake factors have the potential to be important determinants of LBW incidence in the Deket Health Center work area, although further research is needed with larger samples and control of other factors.

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Author Contributions

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Conflicts of Interest

This research is part of the institution's commitment to improving the competence and capacity of academic staff. The results of this study are expected to provide a positive contribution to the development of human resources in the academic environment and support the progress of innovation and education.

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