# IDENTIFICATION OF NUTRITIONAL STATUS IN CHILDREN UNDER FIVE BASED ON THE WEIGHT/HEIGHT INDEX WITH SCREENING OF DELIVERY OUTCOME HISTORY

**Dewi Ayu Ningsih[1*], Sirlii Diana[2]**

[1]Bachelor of Midwifery Study Program, STIKes Panca Bhakti, Lampung
[2]Diploma of Midwifery Study Program, Muhammadiyah Pringsewu University, Lampung
E-mail Correcpondence : dean@pancabhakti.ac.id

**ABSTRAK IDENTIFIKASI STATUS GIZI ANAK BALITA BERDASARKAN INDEKS BB/TB MELALUI SKRINING RIWAYAT LUARAN PERSALINAN**

Latar Belakang:  Prevalensi malnutrisi pada anak balita secara global dan nasional masih tinggi. Secara nasional prevalensi stunting mencapai 30,79%, wasting 10,2%, underweight 17,7%, overweight 8,0% dan menurun ditahun 2022 menjadi 21,6% (stunting), 7,7% (wasting), 17,1% (underweight) dan 3,5% (overweight). Kasusnya ditemukan lebih banyak di kabupaten Pesawaran, Provinsi Lampung yaitu 25,1% (stunting), 9,4% (wasting), 20,6% (underweight). Angka ini masih jauh dari target Rencana Pembangunan Jangka Menengah Nasional (RPJMN) bidang kesehatan 2020-2024 dengan target 14% (stunting) dan 7% (wasting). Kabupaten Pesawaran menduduki posisi pertama dengan kasus wasting terbanyak.

Tujuan: Penelitian ini bertujuan untuk melihat hubungan riwayat luaran persalinan yaitu usia kehamilan dan berat badan lahir dengan status gizi anak balita berdasarkan indeks Berat Badan/Tinggi Badan (BB/TB).

Metode: Penelitian ini merupakan penelitian observasional analitik dengan pendekatan cross-sectional. Variable independen yang diteliti pada penelitian ini adalah riwayat luaran persalinan berupa usia kehamilan ibu dan berat badan lahir bayi dan variabel dependen pada penelitian ini adalah status gizi balita. Analisis pada penelitian ini menggunakan analisis bivariate dengan uji chi square.

Hasil Penelitian: Analisis bivariate menunjukan riwayat usia kehamilan dan riwayat Berat Badan Lahir terbukti secara statistik berhubungan dengan status gizi balita berdasarkan indeks BB/TB dengan nilai p masing-masing sebesar 0,001 dan 0,000.

Kesimpulan: terdapat hubungan riwayat usia kehamilan dan riwayat Berat Badan Lahir bayi dengan status gizi balita berdasarkan indeks BB/TB.

Saran: Hasil ini dapat digunakan sebagai parameter preventif dalam upaya pencegahan malnutrisi pada balita.

Keywords: Berat Badan Lahir, Gizi Kurang, Malnutrisi, Outcome Persalinan, Usia Kehamilan

***ABSTRACT***

Background: The prevalence of malnutrition among children under five remains high globally and nationally. Nationally, rates of stunting, wasting, underweight, and overweight are significant, with stunting at 30.79%, wasting at 10.2%, underweight at 17.7%, and overweight at 8.0%. Projections for 2022 indicate a decrease to 21.6% for stunting, 7.7% for wasting, 17.1% for underweight, and 3.5% for overweight.In Pesawaran district, Lampung Province, rates are notably higher, with 25.1% for stunting, 9.4% for wasting, and 20.6% for underweight children. These figures underscore a significant gap from the 2020-2024 National Medium Term Development Plan (RPJMN) health targets of 14% for stunting and 7% for wasting. Pesawaran Regency specifically reports the highest incidence of wasting cases among these areas.

Aims: This study aims to examine the relationship between birth outcomes, specifically gestational age and birth weight, and the nutritional status of children under five based on the Body Weight/Height (BW/TB) index.

Method: This research employs an analytical observational study with a cross-sectional approach. The independent variables investigated are maternal gestational age and infant birth weight, while the dependent variable is the nutritional status of toddlers. Bivariate analysis using the chi-square test was conducted for data analysis.

Results: The bivariate analysis demonstrated statistically significant relationships between both gestational age (p = 0.001) and birth weight (p = 0.000) with the nutritional status of toddlers based on the BB/TB index.

Conclusion: There exists a significant association between gestational age and birth weight with the nutritional status of toddlers based on the BW/TB index.

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Suggestion: These findings suggest that these factors can serve as crucial indicators for preventive measures against malnutrition in toddlers.

Keywords: Birth Weight, Wasting, Malnutrition, Birth Outcome, Gestational Age

## INTRODUCTION

Human resource development and addressing poverty issues through improving children's nutrition is one of the key indicators of the government's flagship programs today (Kemenkes RI, 2022). A country's health indicators refer to the achievements of the Sustainable Development Goals (SDGs), with the focus on ending all forms of hunger and improving the nutritional status of the population (WHO, 2015). Globally, malnutrition issues, especially in children under five, include undernutrition (wasting, stunting, underweight), vitamin and micronutrient deficiencies, overweight, and obesity (WHO, 2024). In Indonesia, malnutrition remains a top priority of government programs. The occurrence of malnutrition in children under five is a multidimensional problem caused by maternal factors, neonatal factors, nutritional intake patterns, infectious diseases, environment, caregiving behavior, economy, and culture (WHO, 2024)(Usrina, Nora; Norisa, Nanda ;Zahara, Evi ; Raisah, 2024).

The global prevalence of malnutrition in children under five in 2022, specifically stunting, reached 149 million (22.3%), 45 million (6.8%) experienced wasting, and 37 million (5.6%) were overweight and/or obese. Almost all children with these nutritional issues were recorded in Asia (52%). Undernutrition contributes to nearly half of all child deaths. This condition occurs mostly in low- and middle-income countries (WHO, 2024) (The Joint Child Malnutrition Estimates (JME), 2023). Meanwhile, at the national level, the prevalence of stunting based on the 2018 Riskesdas results reached 30.79%, wasting 10.2%, underweight 17.7%, and overweight 8.0% (Kemenkes RI, 2018), and it decreased in 2022 to 21.6% (stunting), 7.7% (wasting), 17.1% (underweight), and 3.5% (overweight) (Kemenkes RI, 2022).

The incidence of wasting in Indonesia requires special attention as this case increased amid the decline in other malnutrition cases, from 7.1% to 7.7% (2021-2022) (Kemenkes RI, 2022). The highest cases were found in Pesawaran Regency, Lampung Province, with 25.1% (stunting), 9.4% (wasting), and 20.6% (underweight). These figures are still far from the target set by the National Medium-Term Development Plan (RPJMN) in the health sector for 2020-2024, which aims for 14% (stunting) and 7% (wasting). Pesawaran Regency ranks first for the highest number of wasting cases (Dinkes Prov. Lampung, 2022).

The nutritional status of children, especially during the toddler years, is a key indicator of cognitive development in adulthood. This is related to the fulfillment of nutrition during early childhood, which affects brain growth and development, and is aligned with an individual's productivity and quality in the future (Dinkes Prov. Lampung, 2022).

The various impacts of malnutrition cases in toddlers include a reduction in intellectual capacity (IQ) by up to 10%, increased susceptibility to infections (respiratory tract infections, diarrhea, and fever), and, in the worst case, death. Toddlers suffering from malnutrition may experience impaired mental, social, and cognitive development, as well as suboptimal growth (Sulfianti S, Sutrio S, Novela V, Saragih E, Junita D, 2021)(Rizyana, 2018). Malnutrition in toddlers, especially undernutrition, is influenced by birth outcomes (low birth weight), food intake, comorbid diseases, and social factors such as economic status, maternal knowledge, and maternal attitude (Afifah, 2019). Additionally, birth weight history is proven to be related to the nutritional status and development of toddlers (Tri purnani & Nur Afifi, 2023). Other research has shown that delivery history, such as the birthing process and gestational age, is also associated with the nutritional status of children aged 0-23 months (Aisy & Kurniasari, 2022)(Andini et al., 2020). Based on this situation, the issue of malnutrition, particularly undernutrition in toddlers, requires serious and specific attention to accelerate the reduction of cases of wasting, stunting, and underweight. This study links the association between history of gestational age and birth weight of the baby simultaneously as predictors of malnutrition cases in children under five. The nutritional status of children under five measures based on the Weight/Height (WH) index.

This study aims to examine the relationship between delivery outcomes history, specifically gestational age and birth weight, with the nutritional status of children under five based on the Weight/Height (WH) index.

## RESEARCH METHODS

This study is an analytical observational study with a cross-sectional approach. The independent

variables examined in this study are delivery outcomes history, specifically the mother's gestational age at birth and the birth weight. The dependent variable in this study is the nutritional status of children under five based on the Weight/Height (WH) index. Data analysis was conducted using bivariate analysis with the chi-square test. This study was conducted from January to February 2024 in Babakan Loa Village, Kedondong Subdistrict, Pesawaran Regency. The population in this study consists of all mothers with children under five who life  in Babakan Loa Village, Kedondong Subdistrict, Pesawaran Regency. The sampling technique used was total sampling, resulting in a sample of 102 children. The instruments in this study included a questionnaire, a weight scale, and a stadiometer. The questionnaire

was used to gather information on delivery outcomes history, the weight scale to measure the child's weight, and the stadiometer to measure the child's height. The measurement data were recorded on observation sheets and interpreted to assess the child's nutritional status. The inclusion criteria for this study are mothers who have children, possess a maternal and child health (MCH) handbook, reside in Babakan Loa Village, Kedondong Subdistrict, Pesawaran Regency, and are willing to participate as respondents in this study. The exclusion criteria are incomplete data or information provided.

## RESEARCH RESULT
### Univariate analysis

The characteristics of the respondents in this study are as follows,

**Table 1.**
**Characteristics of Study Respondents**

| Characteristics | n | % |
|---|---|---|
| **Age** | | |
| 1 Year old | 18 | 17,6 |
| >1-2 Years old | 26 | 25,5 |
| >2-3 Years old | 31 | 30,4 |
| >3-4 Years old | 11 | 10,8 |
| >4-5 Years old | 16 | 15,7 |
| **Sex** | | |
| Male | 52 | 51 |
| Female | 50 | 49 |
| **Gestational Age** | | |
| Preterm | 6 | 5,9 |
| Aterm | 96 | 94,1 |
| **Birth Weight** | | |
| Abnormal | 12 | 11,8 |
| Normal | 90 | 88,2 |
| **Nutrisional Status** | | |
| Malnutrition (Wasting & Stunting) | 27 | 26,5 |
| Normal | 75 | 73,5 |

The table above shows that, based on the age of toddlers, the majority are aged over 2-3 years, accounting for 30.4%. Most of the respondents are male, with the majority being born aterm (94.1%), most having a normal birth weight (88.2%), and the majority with nutritional status in the normal category (73.5%).

**Bivariate Analysis**

**Table 2**
**Bivariate Analysis Results**

| Variabel | Nutritional Status | | | | n | P-value |
|---|---|---|---|---|---|---|
| | Malnutrisi (Wasting & Stunting | % | Normal | % | | |
| Gestational Age | | | | | | |
| Preterm | 6 | 5,9 | 0 | 0 | 6 | 0,000 |
| Aterm | 21 | 20,6 | 75 | 73,5 | 96 | |
| Birth Weight | | | | | | |
| Abnormal | 8 | 7,8 | 4 | 3,9 | 12 | 0,001 |
| Normal | 19 | 18,6 | 71 | 69,6 | 90 | |

Based on the data analysis results using the chi-square test, it was found that the p-value for the gestational age variable is 0.000 and for the birth weight variable is 0.001, with a significance level (α) of 0.05. Since the p-value < α, the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted, indicating that there is a relationship between gestational age and birth weight with the nutritional status of children under five in Babakan Loa Village, Kedondong Subdistrict, Pesawaran Regency.

The analysis results of the relationship between gestational age history and the nutritional status of children under five based on the Weight/Height (WH) index show a p-value of 0.000. This data proves that, statistically, there is a relationship between gestational age history and the nutritional status of children under five based on the Weight/Height index in Babakan Loa Village, Kedondong Subdistrict, Pesawaran Regency, Lampung Province.

Prematurity is an important factor in determining the health quality of newborns. Premature birth causes several disadvantages, including poor coordination of breastfeeding reflexes, limited ability to digest glucose, a tendency for smaller stomach capacity, and inadequate immunity. As a result, there are various barriers to the absorption of necessary nutrients in the body, along with a higher nutritional demand compared to normal-term pregnancies. A study found that mothers who give birth to preterm children have lower levels of fat and lactose compared to mothers who give birth to term children, while protein levels are higher in mothers who give birth to preterm children compared to those who give birth to term children (Zoleko-Manego et al., 2021), (Borah & Baruah, 2014), (Raghavan et al., 2019).

The results of this study are supported by the findings of Lestari et al. (2020), who demonstrated that the status of prematurity at birth is statistically related to the nutritional status of children under three years old (Eka Puji Lestari & Villasari, 2020). Factors that can influence a child's growth and development, particularly physical growth including weight, include genetic factors, nutritional intake, prematurity, low birth weight, comorbid diseases in infancy, family factors, socioeconomic factors (types of economic activities, income, education level, type of residence, and position in the organization), and environmental factors (Gusti & Kasih, 2019), (Santosa et al., 2022).

Children born prematurely also have a high rate of nutritional deficiency. Stunting cases were found in children with a history of premature birth, with a prevalence of 41% among rural children in Rwanda. Meanwhile, cases of wasting and underweight were found to be more than three times higher (Eka Puji Lestari & Villasari, 2020), (Sania et al., 2015).

The analysis results of the relationship between birth weight history and the nutritional status of children under five based on the Weight/Height (WH) index show a p-value of 0.001. This data proves that, statistically, there is a relationship between birth weight history and the nutritional status of children under five based on the Weight/Height index in Babakan Loa Village, Kedondong Subdistrict, Pesawaran Regency, Lampung Province.

The results of this study are consistent with research conducted by Khayati and Sundari (2019), which also demonstrated a statistically significant relationship between birth weight and nutritional status based on the measurement of the Weight/Height (WH) index ) (Khayati, Y.N. dan Sundari, 2019)). The findings of this study are also supported by the findings of Nengsih and colleagues (2016), which proved that there is a relationship between birth weight and growth processes based on the Weight/Height index. Infants with a history of low birth weight (LBW) tend to have slower growth (Nengsih, U., Noviyanti, Djamhuri, 2016).

Children with a history of low birth weight are at a higher risk of infections because their immune systems are not as strong as those of children with normal birth weight (Rahman, M.S., Howlader, T., Masud, M.S., Rahman, n.d.). In addition, the digestive systems of children with a history of low birth weight often experience functional problems, which hinder the process of nutrient absorption. This condition results in suboptimal nutrient absorption, which is closely related to growth disorders in the future (Dewi, N.K., Widyasih, H., 2016).

Birth weight is the most important determinant of subsequent growth status during infancy. Birth weight and length are the most critical factors for infant nutritional status. This condition reflects health status during the prenatal period. Therefore, it can be said that maternal health status during pregnancy is an important aspect to consider over postnatal factors in preventing child malnutrition. Children with a history of low birth weight (LBW) may have a higher risk of developing chronic diseases in the future, such as coronary heart disease, cardiovascular diseases, and diabetes mellitus. Children with a history of LBW experience slower growth followed by rapid weight gain, thus increasing the risk of obesity (Rokhimawaty et al., 2021),(Jana et al., 2023),(Marshall et al., 2022),(Stoody et al., 2019),(Jana et al., 2023),(Ntenda, 2019; Rahman et al., 2016).

Low birth weight (LBW) is indeed a significant risk factor for a child's growth and development later on. The lack of nutritional reserves in the body is caused by the digestive system of LBW infants, which is often not fully developed (Nasution et al., 2014), including issues with protein digestion and fat absorption. Children may experience stunting if accompanied by malnutrition, repeated infections, and conditions below the standard of medical care (Monita et al., 2016). This study has demonstrated the relationship between gestational age history and birth weight history with the nutritional status of children under five based on the Weight/Height (WH) index. However, in categorizing the weight of children, the unit of measurement is still in grams. It would be better to categorize using parameters down to the smallest units for more accuracy.

## CONCLUSION

There is a relationship between gestational age history and birth weight history with the nutritional status of children under five based on the Weight/Height (WH) index.

## SUGGESTION

These results can be used as a preventive parameter by healthcare professionals, especially midwives, in efforts to prevent malnutrition in young children.

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