Sunan Kalijaga Journal of Applied Mathematics ISSN 1234-5678 (print)
October 2024, Vol. 2, No. 2, 58 – 66 ISSN 9876-5432 (online)

STATISTICAL DATA ANALYSIS OF THE NUMBER OF BABIES BORN, LOW BIRTH WEIGHT AND MALNUTRITION IN SOUTH SUMATRA IN 2023

Kaifa Firdausi Julianto[1], Adzra Nuri Navyalfha[2], Shofia Maulida Husna[3]
[1]Department of Biology Education, Universitas Islam Negeri Sunan Kalijaga, Yogyakarta, Indonesia, Email: firdausikaifa@gmail.com
[2]Department of Biology Education, Universitas Islam Negeri Sunan Kalijaga, Yogyakarta, Indonesia, Email: nvylfa03@gmail.com
[3]Department of Biology Education, Universitas Islam Negeri Sunan Kalijaga, Yogyakarta, Indonesia, Email: shofiamldahsna@gmail.com
Correspondence: Kaifa Firdausi Julianto

Abstract

Infant health is one of the main indicators used to assess the level of public health in a particular region. Infants born in healthy conditions have a greater opportunity to experience optimal growth and development, both physically, mentally, and socially. On the other hand, infants born with poor health conditions, such as low birth weight or malnutrition, have a higher risk of experiencing various health problems during their growth and development. Therefore, monitoring infant health from birth is very important as part of efforts to improve the overall quality of public health. This study aims to analyze statistical data on the number of live births, infants with low birth weight (LBW), and infants experiencing malnutrition in South Sumatra Province. The data used in this research were obtained from official publications issued by the Central Bureau of Statistics (BPS). The research method used is a quantitative method with a descriptive analytical approach utilizing secondary data. The collected data were analyzed through several stages, including data tabulation, percentage calculation, ratio analysis, and simple statistical interpretation. This analysis was conducted to determine the comparison between the number of live births and the number of infants with low birth weight and those experiencing malnutrition. Based on the results of the analysis, it was found that the total number of live births in South Sumatra Province reached 137,128 infants. Of this total, 2,288 infants were born with low birth weight and 6,749 infants experienced malnutrition. The ratio calculation shows that LBW cases account for approximately 1.67% of total births, while malnutrition cases account for about 4.92%. These findings indicate that although the number of births in South Sumatra Province is relatively high, there are still several issues related to infant health that require serious attention. Therefore, greater efforts are needed to improve maternal and child health. These efforts can be implemented through improving the quality of health services, ensuring adequate nutritional intake during pregnancy, and increasing public awareness of the importance of maintaining maternal and infant health from pregnancy through early childhood.

Keywords: Infant Health, Low Birth Weight (LBW), Malnutrition, Birth Statistics, South Sumatra.

1. INTRODUCTION

The birth rate is a crucial demographic indicator in social development and public health planning. Birth rate data not only reflects population growth dynamics but also forms the basis for formulating public policies, particularly in maternal and child health. A high birth rate must be balanced with adequate quality health services to ensure every newborn has the opportunity for optimal survival and growth. In addition to the number of births, the quality of newborn health is a crucial aspect in determining the health status of a region. Two key indicators

frequently used to assess neonatal health are Low Birth Weight (LBW) and malnutrition in infants. Low birth weight is defined as a baby weighing less than 2,500 grams at birth. This condition is a major risk factor contributing to high neonatal morbidity and mortality rates. (Central Bureau of Statistics, 2023).

Babies born with low birth weight are at greater risk of experiencing health problems, both in the short and long term. In the short term, LBW babies are susceptible to hypothermia, respiratory problems, infections, and difficulty breastfeeding. Meanwhile, in the long term, this condition can impact physical growth disorders, delayed cognitive development, and an increased risk of chronic diseases in adulthood, such as diabetes and cardiovascular disease. Thus, LBW is not only a temporary medical problem but also related to the quality of human resources in the future. On the other hand, malnutrition in infants is also a serious concern in health development. Malnutrition in early life can cause permanent growth disorders, including stunting and impaired brain development. These problems are often rooted in the mother's nutritional status during pregnancy, lack of adequate nutritional intake, and limited access to quality health services. Socioeconomic factors, the mother's education level, and environmental conditions also influence the nutritional status of babies born.

Therefore, the availability of accurate, systematic, and sustainable official data is essential to understand patterns and trends in birth rates, low birth weight (LBW), and cases of malnutrition. This data serves as a crucial foundation for developing intervention programs, evaluating policies, and planning more effective prevention strategies. Without strong data support, efforts to improve maternal and infant health will be difficult to implement in a targeted and sustainable manner. Based on this background, a comprehensive analysis of the number of births, cases of low birth weight, and malnutrition is highly relevant. This analysis is expected to provide a comprehensive picture of neonatal health conditions and serve as a basis for formulating policies that are more responsive to community needs.

Maternal and child health is a key indicator of the success of health development. Babies born healthy have a greater chance of optimal growth and development. Conversely, babies born with poor health, such as low birth weight or malnutrition, are at risk of experiencing various health problems during their later growth and development. (World Health Organization, 2020).

2. LITERATURE REVIEW

2.1. Low Birth Weight (LBW) Babies

Low Birth Weight (LBW) is an important indicator in assessing the quality of maternal and infant health. According to the World Health Organization, LBW is defined as a condition where a baby is born weighing less than 2,500 grams regardless of gestational age. This limit is set because babies weighing below this figure have a much higher risk of health problems and death in the neonatal period compared to babies with normal birth weight. LBW can be caused by two main conditions, namely premature birth (gestational age less than 37 weeks) and intrauterine growth restriction. Both conditions are often closely related to the mother's health status during pregnancy. Mothers who experience malnutrition, anemia, hypertension, infection, or other pregnancy complications have a higher risk of giving birth to a low birth weight baby. In addition to medical factors, maternal age that is too young (teenage) or too old also increases the likelihood of LBW. (World Health Organization, 2014).

Socioeconomic factors also play a significant role in influencing low birth weight (LBW) rates. Limited access to healthcare, low maternal education, a lack of understanding of balanced nutrition, and unhealthy environmental conditions can worsen the health status of pregnant women. Irregular antenatal care also contributes to this.

Reducing the opportunity for early detection of risk factors, thereby increasing the likelihood of low birth weight. The impact of LBW is not only short-term but also has long-

term consequences. During the neonatal period, LBW babies are more susceptible to hypothermia, respiratory distress, infection, and difficulty breastfeeding. In the long term, various studies show that babies with LBW have a higher risk of growth disorders, delayed cognitive development, and an increased likelihood of developing chronic diseases such as diabetes and cardiovascular disorders in adulthood. Thus, LBW is not only a clinical problem but also a strategic issue in developing the quality of human resources.

Nationally, the LBW trend in Indonesia has fluctuated with a slight downward trend in recent years, although it remains at a level that requires serious attention. The National Life Statistics Report notes that the LBW percentage decreased from 4.26% in 2019 to 4.16% in 2023. Although the decline is relatively small, the absolute number of babies born with low birth weight remains significant, given the high annual birth rate. This indicates that maternal and child health interventions need to be continuously strengthened and implemented sustainably. By considering various risk factors and their impacts, LBW is a key indicator in evaluating the success of maternal and child health programs. Preventive efforts through improving maternal nutrition, regular prenatal checkups, reproductive health education, and increasing access to health care facilities are strategic steps in reducing LBW rates at the national and regional levels.

2.1. Malnutrition in Newborns

Newborn malnutrition is a condition of severe nutritional deficiencies that can seriously impact a child's survival and quality of growth and development. This condition generally reflects chronic problems during pregnancy, particularly related to the mother's nutritional status, the adequacy of nutritional intake, and the quality of health care during the antenatal period. Infants born with malnutrition are often the result of prolonged energy and protein deficiencies during fetal development. According to the World Health Organization, early malnutrition is a major factor in child morbidity and mortality in developing countries. In newborns, malnutrition can be associated with low birth weight for gestational age, low body fat reserves, and metabolic disorders that affect the immune system. As a result, infants are more susceptible to infections such as pneumonia, diarrhea, and other respiratory tract infections.

3. RESEARCH METHODS

3.1. Data Source

This study uses a quantitative approach, utilizing secondary data sourced from official publications of the Central Statistics Agency of South Sumatra Province. The data analyzed comes from a statistical table titled "Number of Babies Born, Low Birth Weight, and Malnutrition," which contains information on the number of live births, the number of babies with low birth weight (LBW), and the number of cases of malnutrition in infants in South Sumatra Province. This data is part of a sectoral statistical data collection system compiled through collaboration between local government agencies, health care facilities, and other related institutions. The information presented reflects factual conditions based on verified and officially published health administration reports. Therefore, the data used in this study has a level of credibility and validity that can be academically accounted for the data analysed covers a specific time period (e.g., 2021-2023), allowing for trend analysis and inter-year comparisons. The main variables used in this study include:

a) Number of babies born (live births) per year.
b) Number of babies with Low Birth Weight (LBW).
c) Number of babies with malnutrition.

The selection of BPS as a data source was based on the consideration that this institution is an official government institution mandated to provide national and regional statistical data. The published data has undergone a standardization process, making it suitable for use as a basis for scientific analysis and public policy formulation. Using aggregate and official secondary data, this study focuses on descriptive analysis to describe macroeconomic patterns and trends in infant health in South Sumatra Province. This approach allows researchers to present an objective empirical picture of the dynamics of birth rates, low birth weight (LBW) cases, and malnutrition during the study period.

3.2. Variables Analyzed

This study analyzes several key variables related to newborn health conditions in South Sumatra Province. These variables were selected because they are directly relevant to maternal and child health indicators and can quantitatively describe the quality of neonatal health. The variables analyzed in this study include:

a. Number of Babies Born

This variable refers to the total number of live births recorded in a given year in South Sumatra Province. Birth rate data is used as a baseline indicator to assess birth dynamics and as a benchmark for calculating the proportion of low birth weight (LBW) and malnutrition cases. Analysis of this variable allows researchers to identify year-over-year trends in birth growth.

b. Number of Babies with Low Birth Weight (LBW)

This variable includes the number of babies born weighing less than 2,500 grams, according to standard health definitions. LBW data were analyzed to determine the level of neonatal health risk in the study area. In addition to looking at absolute numbers, this study also examined

Trends in changes in LBW rates between years as an indicator of the effectiveness of maternal health services during pregnancy.

a. Number of Malnourished Babies

This variable refers to the number of infants categorized as severely malnourished at birth or in the early neonatal period. This indicator reflects the mother's nutritional status during pregnancy and the quality of the nutritional intake received by the fetus. Analysis of this variable is important for assessing the extent to which nutritional issues remain a challenge to regional health development.

b. Proportion of Low Birth Weight and Malnutrition to Total Births

In addition to analyzing absolute numbers, this study also calculated the proportion or percentage of low birth weight (LBW) and malnutrition cases compared to the total number of babies born during the same period. This proportion calculation aims to provide a more comprehensive picture of the prevalence of cases within the birth population. With this approach, the analysis focuses not only on the number of cases but also on the relative risk level within the context of total births. Overall, the combination of absolute number and percentage analysis allows researchers to gain a deeper understanding of infant health conditions in South Sumatra Province. This approach also supports the evaluation of annual trends and helps formulate more accurate interpretations of neonatal health dynamics in the region.

4. RESULTS AND DISCUSSION

Based on statistical data on the number of babies born, Table 1, babies with low birth weight (LBW), and babies suffering from malnutrition in South Sumatra Province in 2021-2023, there are visible changes in the number of births and the health conditions of babies each year. In 2021, 146,637 babies were born. Of this total, 3,189 babies were born with low birth weight (LBW) and 686 babies were malnourished. As a percentage, the LBW rate in 2021 reached approximately 2.17% of all births. Meanwhile, the number of babies with malnutrition was approximately 0.47% of the total number of babies born in 2021.

Table 1. Number of Babies Born, Low Birth Weight, and Malnutrition in South Sumatra 2021 – 2023

Year	Number of Babies Born (people)	Low Birth Weight (soul)	Malnutrition
2021	146,637	3,189	689
2022	162,019	2,372	354
2023	152,646	3,387	1,317

Source: Central Statistics Agency of South Sumatra Province

The entering 2022, the number of births increased to 162,019. Despite the increase in births, the number of babies with low birth weight (LBW) decreased to 2,372. The LBW percentage this year was approximately 1.46%, indicating a decrease compared to the previous year. Furthermore, the number of babies suffering from malnutrition also decreased to 354, or approximately 0.22% of total births. This decrease indicates an improvement in the quality of maternal and child health services, as well as increased public awareness of the importance of adequate nutrition during pregnancy.

In 2023, the number of births was recorded at 152,646, a slight decrease compared to 2022. However, the number of babies born with low birth weight (LBW) increased again to 3,387. Calculated as a percentage, the LBW rate in 2023 reached approximately 2.22% of total births. Furthermore, the number of babies experiencing malnutrition also increased significantly to 1,317, or approximately 0.86% of the total number of babies born that year (Ministry of Health of the Republic of Indonesia, 2022).

Overall, the data shows that the number of births in South Sumatra Province is relatively high each year. However, infant health still fluctuates from year to year. Although there was a decrease in cases of low birth weight (LBW) and malnutrition in 2022, these numbers increased again in 2023.

This situation demonstrates that efforts to improve maternal and child health still require continuous improvement. The increase in low birth weight (LBW) and malnutrition cases can be influenced by various factors, including maternal health during pregnancy, nutritional status, availability and access to health services, and family socioeconomic conditions. Therefore, more optimal efforts are needed, such as improving maternal and child health services, ensuring adequate nutrition during pregnancy, and increasing public awareness of the importance of regular prenatal checkups.

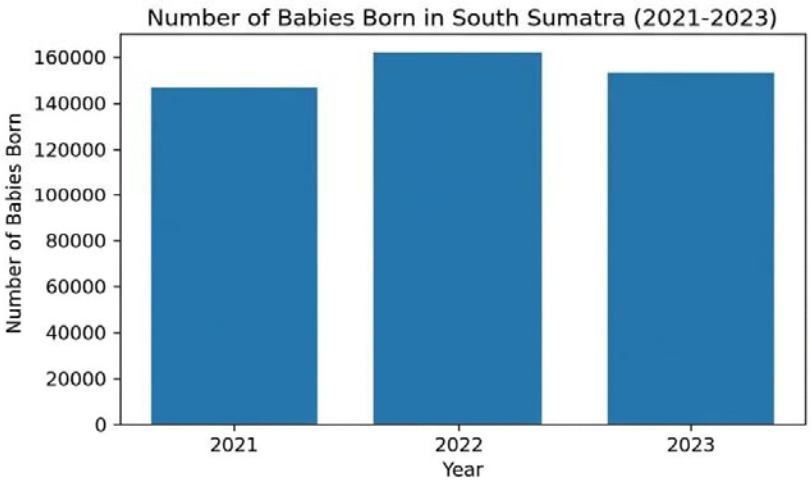

Figure 1. Number of Babies Born in South Sumatra (2021 – 2023)
Source: Central Statistics Agency of South Sumatra Province

Based on data published by the Central Statistics Agency of South Sumatra Province, there has been significant dynamics in the number of births, as well as cases of low birth weight (LBW) and malnutrition in South Sumatra Province during the period 2021-2023. The data shows fluctuations reflecting changes in demographic and public health conditions during this period.

The number of births increased from 146,637 in 2021 to 162,019 in 2022. This increase indicates an increase in the birth rate, likely influenced by demographic factors and the stabilization of social conditions following the previous crisis. However, in 2023, the number of births decreased to 152,646. This decline can be interpreted as a natural fluctuation in the birth rate or as the impact of economic, social, or health policy factors that influence people's reproductive decisions.

From the perspective of infant health quality, the number of Low Birth Weight (LBW) cases shows an unstable pattern. In 2021, 3,189 cases of LBW were recorded, then decreased to 2,372 cases in 2022. This decrease can be attributed to improved maternal health services, more optimal antenatal care, and effective nutritional intervention programs. However, in 2023, the number of LBW cases rose again to 3,387. This increase indicates that the LBW problem is not yet fully under control and remains a serious challenge to efforts to improve neonatal health. A more striking trend is seen in cases of infant malnutrition. In 2021, 686 cases were recorded, then decreased significantly in 2022 to 354 cases. This decrease indicates a temporary improvement in nutrition management. However, in 2023, there was a sharp spike, reaching 1,317 cases. This increase indicates a potential decline in the effectiveness of nutrition intervention programs or an increase in risk factors affecting the nutritional status of mothers and babies, such as family economic conditions, food price inflation, and limited access to health services.

Overall, the analysis shows that despite a period of improvement in 2022, infant health in South Sumatra Province remains unstable. Fluctuations in low birth weight (LBW) rates and a significant increase in malnutrition cases in 2023 emphasize the need for sustainable, integrated, and data-driven maternal and child health interventions. Without a consistent strategy and

regular evaluation, neonatal health issues have the potential to recur and impact the quality of human resources in the future.

Figure 2. Batik Motif

Philosophy of Batik: "The Flow of Life and the Continuity of Generations"

1. Parang Motif: Unending Waves

   Traditionally, this batik motif, consisting of repeating diagonal lines, symbolizes the never-ending movement of ocean waves. In the context of the birth chart:

   Sustainability: Just as the batik lines continue to flow, the birth rate (over 140,000 per year) demonstrates that the "flow" of life in South Sumatra continues to flow.

   Struggle Spirit: The Parang motif symbolizes the unbroken connection in the effort to improve oneself. Babies born in 2021-2023 symbolize new hope to continue the nation's struggle.

2. Fluctuation Dynamics (Data Fluctuations)

   If we look at the bar chart, there was an increase in 2022 and a slight decrease in 2023. This aligns with the visual rhythm of this batik:

   Rhythm of Life: This batik has a visual rhythm that fluctuates but remains harmonious. The birth chart is similar; although the numbers change annually, they form a unified data set that illustrates a healthy and natural population dynamic.

   Balance: The slight decrease in 2023 can be seen as a form of natural "braking" or balance, similar to the empty spaces between batik motifs that provide space to keep the pattern looking beautiful and orderly.

3. Red and Black: Courage and Strength

The dominant red colour on the cloth symbolizes blood, life, and courage, while black symbolizes steadfastness.
Vitality: The high birth rate (over 140,000) reflects the vitality and energy of the people of South Sumatra (symbolized by the colour red).
Foundation of the Future: Each bar in the diagram represents a "pillar" supporting the future. Just as the black emphasizes the red motif, this data emphasizes that the best investment for the region is in the new generation.

5. CONCLUSION

Based on the analysis of statistical data on the number of babies born, babies with low birth weight (LBW), and babies suffering from malnutrition in South Sumatra Province, it can be concluded that the number of babies born in the region reached 137,128 babies. Of the total births, there were 2,288 babies born with low birth weight and 6,749 babies who suffered from malnutrition. These data indicate that although the birth rate in South Sumatra Province is quite high, various problems related to infant health conditions remain. The existence of cases of babies with low birth weight and babies suffering from malnutrition indicates that the condition of maternal health during pregnancy and meeting the nutritional needs of babies still require more serious attention.

Furthermore, these conditions can also be influenced by various factors, such as the mother's nutritional status, the quality of health services during pregnancy, the family's socioeconomic conditions, and the level of public awareness of the importance of regular maternal and child health check-ups. Therefore, more optimal efforts are needed to improve the quality of health services, particularly maternal and child health services. These efforts can be achieved through increasing access to health facilities, enhancing education about the importance of nutritional fulfillment during pregnancy, and increasing public awareness of the importance of regular health check-ups. With these efforts, it is hoped that

The health conditions of infants in South Sumatra Province can continue to improve so that the number of cases of low birth weight and malnutrition can be minimized in the future.

6. ACKNOWLEDGEMENTS

Praise be to God Almighty for all His grace, guidance, and blessings, so that the author can complete the preparation of this research paper entitled "Data Analysis of Babies Born, Low Birth Weight (LBW), and Malnutrition" on time.

This research was compiled as a dedication to understanding the dynamics of public health, particularly regarding the crucial issue of infant and toddler growth, which is the foundation for the nation's future. The author fully acknowledges that the preparation of this paper was a long process that involved assistance, guidance, and support from various parties. Therefore, through this paper, the author would like to express his deepest appreciation and gratitude to:

1. The Central Statistics Agency of South Sumatra, which has provided access to accurate, transparent, and valid secondary data, so that the analysis of low birth rates and malnutrition can be scientifically accounted for.
2. Colleagues, for the productive discussions, technical assistance in data processing using statistical software, and the encouragement always given during the difficult times of the compilation process.
3. My beloved parents and extended family, who always provide moral and spiritual support and endless prayers, which are the greatest motivation for the author to complete this academic assignment as well as possible.

We realize that this paper is far from perfect, both in terms of analytical depth and writing style. Therefore, we sincerely welcome constructive criticism and suggestions from readers for future improvements. We sincerely hope that this analysis of the link between low birth weight

and malnutrition will contribute to our thinking, serve as a reference for further research, and inform public health policies aimed at reducing stunting rates and improving the quality of life for future generations.

7. REFERENCES

Central Statistics Agency. (2023). Health Statistics of South Sumatra Province.
Palembang: BPS from *https://sumsel.bps.go.id/id/statistics-table/2/Mzcxlzl=/jumlah-bayi-lahir-berat-bayi-lahir-rendah-dan-bergizi -buruk.html*

Ministry of Health of the Republic of Indonesia. (2022). Indonesian Health Profile 2022. Jakarta: Ministry of Health of the Republic of Indonesia.

World Health Organization. (2014). Global Nutrition Targets 2025: Low Birth Weight Policy Brief. Geneva: WHO.

World Health Organization. (2020). Infant and Young Child Feeding. Geneva: WHO.