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# Morbidity and Immunity levels of Children Aged 6-23 Months in South Central Timor of East Nusa Tenggara Province, Indonesia

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**Abstract**

Infant malnutrition affects the immune status. Thus malnutrition can be a main cause of immune deficiency. The impact of nutrient deficiency is may increase the incidence of disease and death in children and mostly in Indonesia today. Feeding with proper nutrition able to prevent morbidity of children through prevention of malnutrition. Purpose of this study is to see the level of child morbidity and immunity status as measured by levels of immunoglobulin and albumin. This research was conducted in South Central Timor East Nusa Tenggara province. Samples for research Morbidity as many as 687, Albumin 357 respondents, while for total immunoglobulin examination as many as 150 respondents. The study design used is cross sectional. The results showed as much as 99% of children have been immunized, in addition to the 61% who were exclusively breastfed. For a history of pain status, 66.9% had suffered from coughing and only 9.0% had ever experienced shortness of breath. For the immunity status of the sample, both levels of immunoglobulin and albumin which is above the normal threshold is 61.3% and 59.4%.

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On average immunoglobulin levels was 0.91 ± samples 0:21 g / dl, while albumin 4:05 ± 0:46 g / dl. Adequate nutrition intake both macro and micro can improve the immune status of children, so as to prevent the occurrence of various types of diseases or lowering child morbidity. It can be concluded that the morbidity rate of children aged 6-23 months in the district. TTS is very high, there were also many children who have low immunity status or below normal. This means there is a problem of chronic malnutrition caused by lack of food intake, causing a decrease in the immune system and the occurrence of the disease in children. Highly recommended children can be given food according to age groups as it relates to the optimal absorption in digestion and can increase the optimal nutritional status.

***Keywords***: Albumin; Immunoglobulin and Morbidity.

## 1. Introduction

Malnutrition is a common problem that can occur in infants and women of childbearing age in areas with poor resources. The increase of malnutrition will impact the risk of morbidity and mortality, and hinder the development of motor and cognitive skills, lowers school performance, increasing the risk of chronic diseases later in life as well as lower economic productivity [1]. Mall nutrition in infants is very influential on immune status. Humans require six basic components of food materials used for the growth and maintenance of health. Sixth components, namely: protein, carbohydrates, fats, vitamins, minerals and water. Adequate and balanced nutrition is very important for the normal functioning of the immune system. Thus malnutrition can be a major cause of immune deficiency [2]. The impact of nutrient deficiency is may increase the incidence of disease and death in children and mostly in Indonesia is currently occurring in the neonatal period 19 per thousand and at the age of 2 to 12 months and 15 per thousand, while the age of one year to five years 10 per thousand [3].

A direct relationship between malnutrition and mortality primarily due to immunodeficiency and in the end very susceptible to disease or decreased immunity. Nonetheless, malnutrition itself can cause death, the data indicate that malnutrition epidemiology greatly increases susceptibility and severity of infections. Causes about 300,000 deaths per year and is indirectly responsible for half of the total deaths in infants. A direct correlation between high rates of malnutrition and high mortality risk supported by the observation that very malnourished infants run the risk of mortality is very high [4]. More than 3.5 million women and children under the age of five die every year in poor countries caused by malnutrition. Around 178 million children aged less than five years old have short stature and 55 million are underweight. Of the children who body is short, 160 million (90%) live in 36 countries, showed nearly half of the children in these countries and many of the children are also deficient micronutrients. Deficiency of vitamin A, iron, zinc and iodine are the most common, approximately 11% of the global disease [5].

Based on national reports Health Research Association, the prevalence of infant malnutrition (children have less weight) nationally is 17.9% of which 4.9% were malnourished. The highest prevalence of infant malnutrition is 58.4% NTT Province, NTB 30.5%, 22.5% Yogyakarta province, the province of Jambi 20% [6]. The result the Ministry of Health survey showed that one of the causes of growth disorders in children under five in Indonesia is the low quality of side food of breast milk (MP-ASI) given that some nutrients do not meet the particular

needs of energy, protein and other micro-nutrients. [7], therefore the problem of malnutrition will have an impact on the increase in morbidity and mortality in children under five, it will be very many risks that can occur in children in Indonesia. Kupang as the region located in the province of NTT have a common geographic, cultural, social and community with other regions in the province, encourages the study of the region to see the problems of nutrition and morbidity. Due to geographical and climatic conditions are quite extreme, in the area of NTT there is famine and drought makes people difficult to get food there (in connection with access or capacity issues), so that the children under five in the region have experienced a very high risk of nutritional problems acute moderate (moderate acute of malnutrition) [8]. There have been many ways to combat malnutrition in NTT, especially the provision of complementary feeding for children aged 6-23 month. But, it is not enough to have a significant impact on the decline in morbidity in the region. In fact, many studies show that feeding supplements or complementary foods may reduce the risk of morbidity through improved child nutrition. This study aims to look at morbidity and immune system of children aged 6-23 months in South Central Timor East Nusa Tenggara Province ".

## 2. Material and Method

### *2.1 Research Design*

This research is a descriptive study with cross sectional design which is to provide an overview of morbidity incidence rate and the immune system of children aged 6-23 months in NTT.

### *2.2 Location Research*

This study was conducted in South Central Timor East Nusa Tenggara province in nine sub-district (Soe, West Amanuban, Kuanfatu, South Molo, Batu Putih, Kuatnana, East Amanuban, Kualin and Polen). Initial data collection (Baseline) starting from October till November 2013.Kab. TTS is a region with a number of children with malnutrition status highest among all districts in the province of NTT.

### *2.3 Population and Sample Research*

Based on the research objectives to be achieved, then the population in this study were all babies who are in South Central Timor regency of 9 (nine) districts in South Central Timor NTT province, amounting to 3600. Samples were infants aged 6-23 months who are in the Middle East region amounted to 687 South with children. For the measurement of biomedical samples, obtained the number of children examined for immunoglobulin as many as 150 children, while for inspection a total of 357 children albumin.

### *2.4 Research groove*

The research process begins by identifying a large study population and obtained as many as 3,600 infants in South Central Timor spread over nine districts, namely Sub Soe, West Amanuban, Kuanfatu, South Molo, Batu Putih, Kuatnana, East Amanuban, Kualin and Polen. After that, the selection of samples for interviews, examination of albumin and immunoglobulins. Prior to the data collection and inspection of biomedical,

enumerators and volunteers conducted training companion.

### *2.5 Data analysis*

Data analysis was done using descriptive approach Univariate analysis. Univariate analysis used to determine descriptive overview of the data collected, especially basic data about the levels of albumin, total immunoglobulin and child morbidity. Univariate analysis was also used to describe the data are nominal and ordinal scale such as the distribution of educational subjects according to the mother and the father, the mother and father work, family's socioeconomic circumstances, child age , sex of child, child immunization and exclusive breastfeeding. The data processing is presented in tabular form of distribution, frequency and narration.

### *2.6 Quality control*

Quality control is carried out on the overall operational aspects in this research process, from initial recruitment to the stage of field data management so that data collected in this study is expected to have a value of high accuracy and reliability.

## 3. Results

### *3.1 Characteristics of Parents*

Table 1 provides an overview of the characteristics of the parents baduta. Can be seen, based on the type of work, that 88.5% Capital does not work (Housewife), and 66.1% father as a farmer. Neither the mother nor the father most have education levels only up to primary level is 72.1% and 71.0% mom dad. A total of 92.6% had incomes below $ 1,000,000.

### *3.2 Characteristics of Children*

Based on the characteristics, see Table 2, most of the samples kid male sex (52.3%) and aged 12-23 months (95.1%). As many as 99% of children have been immunized, in addition to the 61% who were exclusively breastfed. For a history of pain status, 66.9% had suffered from coughing and only 9.0% had ever experienced shortness of breath.

### *3.3 Inflammation Biomarkers due to Disease*

Table 3 shows the results of the biomarker hemoglobin, ferritin, retinol, CRP, and RBP sample.

### *3.4 Immunity level*

In Table 4 it can be seen that more than half of the samples had higher levels of immunoglobulin and albumin which is above the normal threshold is 61.3% and 59.4%. The average levels of immunoglobulin sample was 0.91 g / dl, while albumin 4:05 g / dl.

**Table 1:** the characteristics of the parents baduta

| Variables | Total |
|---|---|
| **Mother Occupation** | |
| Farmer | 27 (3.9) |
| Business | 16 (2.3) |
| Civil servant | 16 (2.3) |
| House hold mother | 608 (88.5) |
| Other | 20 (2.9) |
| **Mother Education** | |
| Basic | 495 (72.1) |
| Medium | 192 (27.9) |
| **Father Occupation** | |
| Farmer | 454 (66.1) |
| Business | 160 (23.3) |
| Civil servant | 26 (3.8) |
| Other | 47 (6.8) |
| | |
| **Father Education** | 488 (71.0) |
| Basic | 199 (29.0) |
| Medium | |
| **Income** | |
| <Rp. 1.000.000,- | 636 (92.6) |
| ≥Rp. 1.000.000,- | 51 (7.4) |

## 4. Discussion

Intake of complete and balanced nutrition in the first 1,000 days of life or the first 2 years of life is the most important year for the optimal development of the child as stock future, at this age is a golden opportunity to optimize growth and development. Malnutrition in this period will result in the long-term effects of growth disorders and cognitive decline accompanied irreversible risks of experiencing a variety of infectious diseases. So that efforts are made to optimize the nutritional intake. The intake of energy and nutrients is not balanced would interfere with the immune system because of energy restrictions will reduce cytokines and enhance T cell proliferation whereas protein deficiency will lower circulating IgG. In addition to macro-nutrients known also that micronutrients such as iron and zinc affects the immune response. What if there is deficiency of these micro it will damage the immune system [9]. Results of the study explained that some 61.3% of the sample had abnormal immunoglobulins. According Kresno, nutrition in addition needed for public use, is also needed to maintain the immune system functioning properly. Lymphocyte cells is one component of the immune system that is very active in the process of metabolism. Therefore, each time releasing the molecules of surfaces,

including immunoglobulin molecules. For sintesi molecules instead of being released, needed nutrition and special quality. If this is not met, as well as on malnutrition, there arises a secondary immune deficiency. However, malnutrition mainly affects the cellular immune response, humoral immune response although also influential [10].Malnutrition on a person greatly affect a person's immune status. Humans require six basic components of food materials used for the growth and maintenance of health. Sixth component, namely: protein, carbohydrates, fats, vitamins, minerals and water. Adequate and balanced nutrition is very important for the normal functioning of the immune system. Thus malnutrition can be a major cause of immune deficiency (immuno Deficiency) [11].

**Table 2:** Characteristics of the Child

| Variables | Total (N = 687) |
|---|---|
| **Sex** | |
| Male , n(%) | 359 (52.3) |
| Female , n(%) | 328 (47.7) |
| **Age** | |
| 6-11 month, n(%) | 34 (4.9) |
| 12-23 month , n(%) | 653 (95.1) |
| **Immunization Status** | |
| No Immunization, n(%) | 7 (1.0) |
| Immunization, n(%) | 680 (99.0) |
| **Exclusive breast milk** | |
| No , n(%) | 268 (39.0) |
| Yes, n(%) | 419 (61.0) |
| **Illness** | |
| Fever , n(%) | 236 (65.9) |
| cough , n(%) | 240 (66.9) |
| Diarrhea, n(%) | 119 (34.0) |
| Diff. to breath, n(%) | 31 (9.0) |

**Table 3:** Inflammation Biomarkers due to Disease

| Variabel | Total |
|---|---|
| Hemoglobin, g/L | 10.61 ± 1.79 (n=687) |
| Serum Ferritin µg/L | 146.77 ± 82.71 (n=652) |
| Serum retinol µg/dl | 13.16 ± 2.16 (n=641) |
| CRP, mg/L | 2.03 ± 1.09 (n=646) |
| RBP, mg/dl | 284.01 ± 171.81 (n=641) |

**Table 4:** Average values and the prevalence of abnormal levels of Immunoglobulin and Albumin Children ages 6-23 Months

| Variabel | Total |
|---|---|
| Imunoglobulin(g/dl) | 0.91 ± 0.21 (n=150) |
| Prevalensi imunoglobulin tidak normal | |
| < 1,5 &> 3 g/dl | 61.3% |
| Albumin(g/dl) | 4.06 ± 0.46 (n=357) |
| Prevalensi albumin tidak normal | |
| < 4,4 &> 5,4 g/dl | 59.4% |

A direct relationship between malnutrition and mortality is mainly due to immunodeficiency and in the end very susceptible to disease or decreased immunity. Nonetheless, malnutrition itself can cause death, the data indicate that malnutrition epidemologis greatly increases susceptibility and severity of infections. Causes about 300,000 deaths per year and is indirectly responsible for half of the total deaths in infants. A direct correlation between high rates of malnutrition and high mortality risk supported by the observation that very malnourished infants run the risk of mortality is very high [4,10].

In addition to malnutrition due to deficiency of macro-nutrients, deficiencies of certain micronutrients can also cause a decrease in the immune status of a person. Eg vitamin A deficiency which is one of the main causes of immunodeficiency that occurs among children and women around the world. Consequences of vitamin A deficiency including high morbidity and mortality caused by many infectious diseases. Vitamin A deficiency also causes night blindness, xerophthalmia, growth block, poor reproductive capacity and anemia. Vitamin A plays an important role in maintaining the mucosal surface, having antibody response, normal hematopoiesis and function of T and B lymphocytes, natural killer cells, monocytes and neutrophils. Essential properties of vitamin A and related metabolites as modulators of gene transcription at the level of a congenital molecular. Immunity first line of defense against infection. Cells and soluble molecules in innate immunity contained in a fully functional state [11,12,13].

The quality and quantity of nutrients influence the growth and development of children in an effort to prevent morbidity. So the nurse's role in the provision of education in nutrition is needed. Nurses help families in improving their health through the provision of knowledge related to the fulfillment of the nutritional needs of children, as educators, nurses can also provide health education to the high risks of family group, health volunteers, and others. Nurse educators play a role in teaching the sciences to individuals, families, communities and health workers [14]. Nurses carry out its role as an educator in an effort to improve health through support for health behaviors [15]. Nurses as educators must have the ability to assess the strength and the impact of the provision of information and the desired behavior by individuals [16].

Nurse's role in the handling of sick children under five integrated management termed the illness (IMCI), this program is one of a toddler who suffered pain management, which aims to improve the health of children and the quality of child health care. Form is implemented in an integrated management are not separate, said integrated as a separate form of management is carried out which includes the management of sick children, nutrition, immunization, disease prevention, and the promotion of growth and development. In the implementation of the integrated management of sick children, the strategy used is curative, promotive and preventive. At the integrated management of sick children is a model management can include; assessment of signs and symptoms of an illness, making the classification with decisive action, especially a disease diagnosis, determine actions and treatment, provide counseling and provide follow-up services on repeat visits [17]. It was concluded that in addition to nutrition needed for public use are also needed to maintain the function of the immune system. Malnutrition will give rise to a secondary immune deficiency. However, malnutrition mainly affects the cellular immune response. As well as CTF decline cellular immune response so it is very easy to get an infection mycobacteria, viruses and fungi. With adequate nutrition both macro and micro can improve the immune status of children, so as to prevent the occurrence of various types of diseases or lowering child morbidity. Highly recommended children can be given food according to age groups as it relates to the optimal absorption in digestion and can increase the optimal nutritional status.

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