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## The Relationship between Nutritional Status and Shortness of Breath in Children with Pneumonia at Mappi General Hospital, Indonesia

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### ABSTRACT

The relationship between nutritional status and shortness of breath in childhood pneumonia is an important concern in the management and management of this disease. Poor nutritional status in children can influence their immune system, making them more susceptible to infections such as pneumonia. This study aimed to determine the relationship between nutritional status and the incidence of shortness of breath in children with pneumonia at Mappi General Hospital, Indonesia. This study is a cross-sectional analytic observational study. A total of 49 research subjects were included in this study. Data analysis was carried out using SPSS using univariate and bivariate relationships between nutritional status and the incidence of shortness of breath in pneumonia patients. The majority of pneumonia patients with malnutrition experienced symptoms of shortness of breath compared to pneumonia patients with normal nutrition,  $p < 0.05$ . There is a significant relationship between poor nutritional status and the incidence of shortness of breath in pediatric patients with pneumonia.

### 1. Introduction

Pneumonia is a serious and life-threatening infectious disease, especially in children. One of the common symptoms experienced by children with pneumonia is shortness of breath. Shortness of breath can be caused by various factors, including nutritional conditions or the nutritional status of the child. Pneumonia is still the leading cause of death in children worldwide. In 2019, it is estimated that there will be around 2.5 million deaths of children under the age of 5 caused by pneumonia. The prevalence of pneumonia in children is higher in developing countries, especially in areas with limited access to adequate health care.<sup>1-5</sup>

The relationship between nutritional status and shortness of breath in childhood pneumonia is an

important concern in the management and management of this disease. Poor nutritional status in children can influence their immune system, making them more susceptible to infections such as pneumonia. Children with poor nutritional status often have weak immunity, so they are unable to fight infection effectively. In addition, poor nutritional status can also affect children's lung function. Malnutrition can cause a decrease in lung elasticity, a reduction in tidal volume, and an increase in airway resistance. This can cause more severe shortness of breath in children with pneumonia. In contrast, children with good nutritional status tend to have stronger immune systems and healthier lungs. They have a better ability to fight infection and overcome inflammation in the respiratory tract. Therefore, they

tend to experience milder symptoms of shortness of breath when they have pneumonia.<sup>6-8</sup>

It is important to understand that the nutritional status of children can affect the severity of pneumonia and their recovery prognosis. Therefore, it is important to carry out a comprehensive nutritional evaluation and provide adequate nutrition to children with pneumonia. By improving children's nutritional status, we can help increase their ability to fight infection and minimize the risk of severe shortness of breath. In order to reduce morbidity and mortality due to pneumonia in children, attention to nutritional status must be increased. Prevention efforts, such as the provision of nutritious food and appropriate care, must be carried out to ensure that children have a good nutritional status. In addition, education to parents or caregivers about the importance of balanced nutrition and the importance of preventing malnutrition is also very important.<sup>9-11</sup> This study aimed to determine the relationship between nutritional status and the incidence of shortness of breath in children with pneumonia at Mappi General Hospital, Indonesia.

## 2. Methods

This study is an analytic observational study with a cross-sectional approach. This study used secondary data obtained from medical records of pediatric patients with pneumonia at Mappi General Hospital, Indonesia. A total of 49 research subjects participated in this study, where the research subjects met the inclusion criteria. The inclusion criteria in this study were children aged less than 5 years who were treated at Mappi General Hospital for the period April 3<sup>rd</sup> - May 3<sup>rd</sup>, 2023, with a diagnosis of pneumonia and had to get consent from parents or guardians to participate in this study. This study was approved by the medical and health research ethics committee.

This study made observations on the sociodemographic data of the research subjects. This study also made observations on the nutritional status of the research subjects. Assessment of nutritional

status is carried out by comparing height and weight according to WHO criteria. Observation of shortness of breath was carried out using secondary data in the form of data from anamnesis and physical examination in the medical records of research subjects. Data analysis was carried out using SPSS software version 25. Data analysis was performed using univariate and bivariate methods. Univariate analysis was performed to present the frequency distribution of each data variable test. Meanwhile, bivariate analysis was carried out to present the relationships and interrelationships variable test, where  $p < 0.05$ .

## 3. Results and Discussion

Table 1 presents the frequency distribution of research subjects. The results of the study show that the majority of research subjects are female. The results of the study also showed that the majority of research subjects were aged 49-60 months. Table 2 shows the relationship between nutritional status and shortness of breath in children with pneumonia at Mappi General Hospital. The majority of pneumonia patients with malnutrition experience symptoms of shortness of breath compared to pneumonia patients with normal nutrition. There was a significant relationship between malnutrition status and the incidence of shortness of breath in pediatric patients with pneumonia,  $p < 0.05$ .

The relationship between poor nutritional status and shortness of breath in pneumonia patients is very close. Poor nutritional status or malnutrition can affect various aspects related to respiratory function, including the respiratory muscles, the immune system, and lung health. This can lead to an increased risk and severity of shortness of breath in pneumonia patients. Malnutrition can cause decreased immune system function. A weak immune system reduces the body's ability to fight infections, including pneumonia. As a result, patients with poor nutritional status are more susceptible to pneumonia and have a higher risk of developing severe breathlessness.<sup>12-14</sup>

Table 1. Frequency distribution of research subjects.

Characteristics	n	%
<b>Gender of child</b>		
Male	18	36.7
Female	31	63.3
<b>Child age</b>		
0-12 Months	8	16.3
13-24 Months	8	16.3
25-36 Months	10	20.4
37-48 Months	9	18.4
49-60 Months	14	28.6
Total	49	100

Table 2. Relationship of shortness of breath with nutritional status.

Nutritional status	Shortness of breath					
	Shortness of breath		No shortness of breath		Total	
	n	%	n	%	n	%
Malnutrition	11	22,4	2	4,1	13	26,5
Normal	18	36,7	18	36,7	36	73,5
Total	29	59,2	20	40,8	49	100
P value = 0,03						

Malnutrition often causes a decrease in overall body muscle mass, including the respiratory muscles. Weak respiratory muscles can interfere with the patient's ability to breathe effectively, especially when they have pneumonia. This can cause more severe shortness of breath in patients with poor nutritional status. Malnutrition can cause a decrease in lung elasticity and changes in lung structure which can affect respiratory function. This can lead to decreased tidal volume and increased airway resistance, which in turn increases breathing difficulties and causes shortness of breath in pneumonia patients.<sup>15-17</sup>

Malnutrition can affect the production and function of antibodies, which are important in fighting infection. When patients with poor nutritional status develop pneumonia, their body's ability to produce and use antibodies effectively can be impaired. This can exacerbate inflammation in the airways and cause more shortness of breath. Improving nutritional status in pneumonia patients is very important to reduce the risk of shortness of breath and improve the prognosis of recovery. Through adequate nutrition and meeting the patient's nutritional needs, it can help improve immune system function, strengthen respiratory muscles, and improve lung health. This can reduce the

severity of shortness of breath and speed up the recovery process in pneumonia patients.<sup>18-20</sup>

#### 4. Conclusion

There is a significant relationship between malnutrition status and the incidence of shortness of breath in pediatric patients with pneumonia at Mappi General Hospital, Indonesia.

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