

## The Correlation of Giardiasis with Nutritional Status in Primary School at SD INPRES 104222 and SDN 101828 in Sei Glugur Village, Pancur Batu District

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### **ABSTRACT.**

**Background.** *Giardia lamblia* is a protozoan that causes an intestinal infection called giardiasis. This infection can cause the process of absorption of nutrients is not optimal. Giardiasis can result in a decrease in nutritional status. The aim of study is to determine the relationship between giardiasis and nutritional status at the age of elementary school children.

**Method.** This is cross-sectional study of 114 students at SD INPRES 104222 and 101828 in Sei Glugur Village in Pancur Batu District. Primary data collection was carried out by anthropometric examination and examination of stool samples using the formol ether concentration technique at the Parasitology Laboratory of the Faculty of Medicine, Universitas Sumatra Utara.

**Results.** From 114 children who met the inclusion criteria, the incidence of *Giardia lamblia* infection was 7%. Based on the weight for height index, 8 (7%) people had poor nutritional status, 61 (53.5%) people with underweight nutritional status 27 (23.7%) people with moderate nutrition and 12 (10,5%) people with good nutrition. Overweight by 1 (0.9%) person and obese 5 (4.4%) people. There is no correlation between giardiasis infection with weight for height ( $p>0.05$ ).

**Conclusion.** The incidence of *Giardia lamblia* infection was low and there was no correlation between giardiasis with nutritional status in primary school-age children.

**Keyword:** weight for height, giardiasis, elementary school, nutritional status

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**ABSTRAK.**

**Latar.** *Giardia lamblia* adalah protozoa yang menyebabkan infeksi usus yang disebut giardiasis. Infeksi ini dapat menyebabkan proses penyerapan nutrisi yang tidak optimal dan dapat mengakibatkan penurunan status gizi. Tujuan penelitian adalah untuk mencari hubungan antara giardiasis dan status gizi pada usia anak-anak sekolah dasar.

**Metode.** Studi ini bersifat potong lintang dari 114 siswa di SD INPRES 104222 dan 101828 di Desa Sei Glugur di Kecamatan Pancur Batu. Pendataan secara primer dilakukan dengan pemeriksaan antropometri dan pemeriksaan sampel tinja dengan menggunakan teknik konsentrasi formol eter di Laboratorium Parasitologi Fakultas Kedokteran Universitas Sumatera Utara.

**Hasil.** Dari 114 anak yang memenuhi kriteria inklusi, kejadian infeksi *Giardia lamblia* adalah 7%. Berdasarkan indeks berat untuk tinggi badan, 8 (7%) orang memiliki status gizi buruk, 61 (53,5%) orang dengan status gizi kurang berat badan, 27 (23,7%) orang dengan nutrisi sedang dan 12 (10,5%) orang dengan nutrisi yang baik. Kelebihan berat badan pada 1 (0,9%) orang dan obesitas 5 (4,4%) orang. Tidak ada korelasi antara infeksi giardiasis dengan berat badan untuk tinggi ( $p > 0,05$ ).

**Kesimpulan.** Kejadian infeksi *Giardia lamblia* rendah dan tidak ada korelasi antara giardiasis dengan status gizi pada anak usia sekolah dasar.

**Kata kunci:** berat untuk tinggi badan, giardiasis, sekolah dasar, status gizi

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## 1 Introduction

The prevalence of protozoan infections is still high and is widespread in tropic and subtropical regions including Indonesia.[1] Environmental and socioeconomic conditions influence the incidence of protozoan infections.[2] One of the most common protozoa is *Giardia lamblia* which is also called *Lambliia intestinalis* or *Giardia duodenalis*. [3,4]

Children are very vulnerable to infection, due to poor personal hygiene, and eating habits without paying attention to hygiene. For this reason, monitoring and assessment of the nutritional status of school-age children is needed. Assessment of nutritional status can be assessed according to 3 indices: weight for age, height for age, weight for height.[5]

In Africa, Asia and Latin America, an estimated *G. lamblia* infects 200 million people. Preschoolers in Ghana are infected with *G. lamblia* as much as 18.2%. *Giardia lamblia* infection is more common in children, the prevalence of age under 10 years is more infected than age over 10 years.[6-8] In West Sumatra giardiasis occurred as much as 37.9%. [9]

Infection and nutritional status are interconnected. Some factors that affect nutritional status are balanced, adequate nutritional food, and infections in children. Infection can inhibit children's growth and development.[10,11] Based on the results of nutrition monitoring in 2017, nationally the incidence of malnutrition still occurs in the North Sumatra region.[5]

## **2 Method**

This research is an analytical observational study with cross sectional design. This research was conducted at SD INPRES 104222 and SDN 101828 in Sei Glugur Village, Pancur Batu District. The total number of research samples was 114 people selected by the stratified random sampling method . The inclusion criteria in this study are willing to become respondents and collecting sample, and students in grades I, II, III. The exclusion criteria are if the student did not return the stool sample tube and took anti-parasitic drugs or worm medication 6 months earlier. Based on the calculation of the Lemeshow formula obtained a minimum of 91 people sampled in this study, the number of samples that collected samples back was 114 respondents. The final number of respondents was 114 people.

## **3 Result**

Table 1 shows that male-gender was the most respondents, as many as 72 (63.2%) people who participated in this study and the age group of 7 years as many as 38 (33.3%) people constituted the largest age group. The majority of respondents' parents have the highest education level of 75 (65.8%) people, the majority work as farmers as many as 41 (36%) people with the most income in the range of Rp 500.000-1.000.000 (46.5%)

**Table 1** Characteristic Samples

| Characteristics        |                               | n     | Percentage (%) |
|------------------------|-------------------------------|-------|----------------|
| Sex (m/f)              |                               | 42/72 | 36.8/63.2      |
| Age (years)            | 5                             | 2     | 1.8            |
|                        | 6                             | 26    | 22.8           |
|                        | 7                             | 38    | 33.3           |
|                        | 8                             | 19    | 16.7           |
|                        | 9                             | 24    | 21.1           |
|                        | 10                            | 5     | 4.4            |
| School                 | SDN 101828                    | 42    | 36.8           |
|                        | SDN 104222                    | 72    | 63.2           |
| Class                  | First Grade Elementary School | 43    | 37.7           |
|                        | Second Grade School           | 38    | 33.3           |
|                        | Third Grade School            | 33    | 28.9           |
| Parents Last Education | Elementary School             | 6     | 5.3            |
|                        | Junior High School            | 22    | 19.3           |
|                        | Senior High School            | 75    | 65.8           |
|                        | Bachelor/Master Degree        | 11    | 9.6            |
| Parent Job             | Daily Labor                   | 38    | 33.3           |
|                        | PNS                           | 11    | 9.6            |
|                        | Farmer                        | 41    | 36             |
|                        | Entrepreneur                  | 24    | 21.1           |
| Parents Income( Rp)    | ≤ 500.000                     | 41    | 36             |
|                        | 500.000-1.000.000             | 53    | 46.5           |
|                        | 1.000.000-2.000.000           | 15    | 13.2           |
|                        | 2.000.000-3.000.000           | 5     | 4.4            |
| Total                  |                               | 114   | 100            |

In table 2 shows that based on the weight for age index of children with moderate and good nutritional status as many as 31 people (27.2%). Based on the height for age index of children with normal status of 85 people (74.6%).

**Table 2** Distribution data of Samples Based on Weight for Age , Height for Age, and Weight for Height Index

| <b>Nutritional Status</b> | <b>n</b> | <b>Percentage (%)</b> |
|---------------------------|----------|-----------------------|
| <b>Weight For Age</b>     |          |                       |
| Severe Malnutrition       | 17       | 14.9                  |
| Moderate Malnutrition     | 26       | 22,8                  |
| Mild Malnutrition         | 31       | 27,2                  |
| Normal                    | 31       | 27,2                  |
| Overweight                | 6        | 5.3                   |
| Obese                     | 3        | 2.6                   |
| <b>Height For Age</b>     |          |                       |
| Short                     | 29       | 25.4                  |
| Normal                    | 85       | 74.6                  |
| Tall                      | 0        | 0                     |
| <b>Weight For Height</b>  |          |                       |
| Severe Malnutrition       | 1        | 0.9                   |
| Moderate Malnutrition     | 40       | 35.1                  |
| Normal                    | 61       | 53.5                  |
| Overweight                | 7        | 6.1                   |
| Obese                     | 5        | 4.4                   |

In table 3 based on the weight for age index, respondents who were positive for giardiasis had 2 nutritional status (25%), moderate nutrition were 3 people (37.5%), good nutrition were 3 people (37.5%). Based on height for age, the nutritional status of short respondents was 1 person (12.5%), normal was 7 people (87.5%). Based on the weight for height index of respondents who have underweight nutritional status as many as 5 people (62.5%), normal as many as 3 people (37.5%).

**Table 3** Overview of Nutritional Status of Respondent with Giardiasis

| <b>Nutritional Status</b> | <b>Category</b>       | <b>n</b> | <b>%</b> |
|---------------------------|-----------------------|----------|----------|
| <b>Weight ForAge</b>      | Severe Malnutrition   | 0        | 0        |
|                           | Moderate Malnutrition | 2        | 25       |
|                           | Mild Malnutrition     | 3        | 37.5     |
|                           | Normal                | 3        | 37,5     |
|                           | Overweight            | 0        | 0        |
|                           | Obese                 | 0        | 0        |
| <b>Height For Age</b>     | Short                 | 1        | 12,5     |
|                           | Normal                | 7        | 87,5     |
|                           | Tall                  | 0        | 0        |
| <b>Weight For Height</b>  | Severe Malnutrition   | 0        | 0        |
|                           | Moderate Malnutrition | 5        | 62,5     |
|                           | Normal                | 3        | 37,5     |
|                           | Overweight            | 0        | 0        |
|                           | Obese                 | 0        | 0        |
| <b>Total</b>              |                       | 8        | 100      |

In table 4, and there was no correlation between giardiasis with nutritional status in primary school-age children.

**Table 4** Relationship with Giardiasis with Nutritional Status Based on Weight for Age, Height for Age, and Weight for Height

| Nutritional Status       | Result   |          |       | P value |
|--------------------------|----------|----------|-------|---------|
|                          | Positive | Negative | Total |         |
| <b>Weight ForAge</b>     |          |          |       |         |
| Severe                   | 0        | 17       | 17    | 0.586   |
| Underweight              | 2        | 24       | 26    |         |
| Moderate                 | 3        | 28       | 31    |         |
| Normal                   | 3        | 28       | 31    |         |
| Overweight               | 0        | 6        | 6     |         |
| Obese                    | 0        | 3        | 3     |         |
| <b>Height ForAge</b>     |          |          |       |         |
| Stunting                 | 1        | 28       | 29    | 0.388   |
| Normal                   | 7        | 78       | 85    |         |
| High                     | 0        | 0        | 0     |         |
| <b>Weight For Height</b> |          |          |       |         |
| Severe                   | 0        | 1        | 1     | 0.091   |
| Underweight              | 0        | 35       | 40    |         |
| Normal                   | 3        | 58       | 61    |         |
| Overweight               | 0        | 7        | 7     |         |
| Obese                    | 0        | 5        | 5     |         |

#### 4 Discussion

This research was conducted to find out how the picture of the incidence of *Giardia lamblia* infection affects the nutritional status of primary school-age children based on weight for height. This study is in accordance with the research of M. Al-Mekhlafi and his colleagues in Malaysia. Statistically *Giardia lamblia* infection did not affect the nutritional status of children ( $p = 0.059$ ) which means the results of the study were not significant. The prevalence of giardiasis in developing countries ranges from 20-30%, while in developed countries it is 2-7%. Mortality is rare in cases of giardiasis. The risk of mortality may increase in infant, elderly, or malnourished patients due to dehydration complications.[12,13] In this area incidence of giardiasis was low (7%).

In this study has similar criteria for respondents where the age of respondents is more than 10 years.[6] This is not in accordance with Shalaby's et al study in Saudi Arabia where the results showed that children infected with the parasite had statistically significant low weight for age, weight for height, and BMI ( $p = 0.001$ ) which means that there were a significant relationship between infection and the nutritional status of children.[14]

In this study, there was no high incidence of *Giardia lamblia* infection in Sei Glugur village, Pancur Batu District. This might be influenced by other risk factors such as endemic areas for giardiasis, clean drinking water and water sources, children's play areas, and risk of contact with infected animals.[15,16] Distance of water sources to latrines and access to latrines can also affect the prevalence of giardiasis because *Giardia lamblia* infections occur fecal-orally. Other risk factors like this need to be considered in assessing the incidence of giardiasis. Thus, the possibility of the prevalence of giardiasis can be influenced by many factors, including the respondent's environmental conditions, personal hygiene.

The nutritional status of children can be influenced by several factors both directly and indirectly. The direct causes that will affect the nutritional status of children are food consumption and infection, but there are other factors, such as parenting, family food security, health services and environmental sanitation. There is an assessment of nutritional status that must indirectly be considered, namely food consumption surveys, health statistics, ecological factors, such as climate, soil, etc. Nutritional status is also influenced by a balanced intake of macronutrient and micronutrient nutrition so far.[11]

## 5 Conclusion

The incidence of *Giardia lamblia* infection was low and there is no correlation between giardiasis with nutritional status in primary school-age children.

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