



Research Article

Nutritional Status and Prevalence of *Angular Cheilitis* on Children in Jember Agroindustrial Environment

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Abstract

Insufficient dietary intake in school-age children can result in a weakened immune system, leading to susceptibility to illness. Children will easily be exposed to infectious diseases such as angular cheilitis. Jember has a large population of farmers, categorized as a low-paid occupation. The type of food consumed will affect each person's nutritional status. This study aims to identify the relationship between nutritional status and food intake with the prevalence of angular cheilitis in children grades I–III SDN 7 Nogosari in the agro-industrial setting of Jember. Analytical observation with a cross-sectional design was employed with 58 students as samples, whose nutritional health was assessed using the BMI/U index, visual examination angular cheilitis, and 24-hour recall method of food intake. The SPSS test was undertaken to investigate how variations in macronutrient and micronutrient consumption affect angular cheilitis in each nutritional status. Micronutrient intake that affected angular cheilitis had exceeded the RDA. Furthermore, the SPSS test showed no difference in the consumption of macronutrients and micronutrients in each nutritional status, supporting the occurrence of angular cheilitis at a rate of 0%. In the agro-industrial setting of Kebun Renteng, Jember Regency, students at SD Negeri 7 Nogosari grades I - III had a good nutritional profile with zero percent of angular cheilitis prevalence. It was impossible to determine the association between dietary status and the prevalence of angular cheilitis.

Keywords: 24-hours recall; *angular cheilitis*; body mass index; food intake; nutritional status

INTRODUCTION

A person's body condition can be affected by their nutrient intake and utilization, measured by their nutritional status as a health indicator.¹⁻³ Energy intake comes from the food consumed, whereas energy expenditure comes from our daily activities, basic metabolic processes, and food's thermic effect.^{4,5} Insufficient dietary intake in school-age children can result in a weakened immune system, leading to a weak body, easily drained energy and susceptibility to illness.^{6,7} Children will be easily exposed to

oral infectious diseases, such as angular cheilitis. Environmental factors, economic status, and children's eating habits impact malnutrition, which can result in oral cavity illness.⁸

Children are frequently affected by angular cheilitis, leading to the soft tissues of the oral cavity. It can interfere with children's activities and aesthetic function. Cracks in the corners of the lips are a characteristic of the disease, which is frequently accompanied by inflammation.⁹ Numerous aspects, including a lack of nourishment, physical harm, an infection,

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and allergies, can become the factors of this disease. Children are more likely to develop angular cheilitis, especially those with riboflavin, iron, folic acid, zinc, pyridoxine, biotin, and protein insufficiency, among other dietary deficiencies.

The incidence and prevalence of angular cheilitis sufferers in October-December 2015 at the RSGM University of Jember were 89.2 % of children cases, 52% of those with poor nutritional status, and 59% of patients from rural areas, 6.7% of the patients with three-month angular cheilitis disease.¹⁰

One of the regencies in the East Java area with agricultural and plantation products is Jember.¹¹ The agricultural and plantation sectors sustain the Jember community's economic structure (51.89 percent). Farming is equivalent to a low-paying occupation that impacts the family's socioeconomic condition. The primary factor influencing food consumption patterns is family income. The amount of food intake varies based on the family income level. If income increases, so will consumption patterns.¹² This research was conducted in the Renteng garden, an agro-industrial region, and the Rambi Puji sub-district of Jember.

MATERIALS AND METHODS

This research is an analytical observational study with a cross-sectional design. It was conducted from February to March 2022 in SD Negeri 7 Nogosari, Rambi Puji, Jember, with 58 students as the sample size.

Body Mass Index by Age (BMI/U) was employed to calculate each student's nutritional status based on height and weight measurements. Direct screening and interviews with parents or guardians of students concerned about the food consumed to determine daily micronutrient intake over the previous 24 hours and to identify angular cheilitis.

Data analysis with SPSS was conducted to investigate variations in micronutrient consumption in each nutritional status. As the result was neither evenly distributed nor homogeneous, the Kruskal Wallis non-parametric statistical test was employed.

RESULT

According to the research findings, no students had angular cheilitis. It is corroborated by the findings from tests on students' nutritional status and their daily intake of micronutrients.

The Shapiro-Wilk test ($p > 0.05$) and Levene's test ($p > 0.05$) as well as normality and homogeneity tests, were conducted. The results indicated that the data were both normally distributed and homogeneous. In contrast to the micronutrients that affected Angular Cheilitis, the results of the normality test and homogeneity test on daily macronutrient consumption were not normally distributed and homogeneous. Additionally, the Kruskal-Wallis and Anova tests on the macronutrient and micronutrient aspects, respectively, revealed no statistically significant differences between the nutritional status of thin, normal, and obese individuals in terms of the amounts of calories, protein, fat, and carbohydrates, as well as micronutrients like vitamin B2, vitamin B3, vitamin B6, vitamin B12, folic acid, iron, and zinc. Furthermore, this result was supported by the significance value of $p > 0.05$ in each nutritional category.

Table 1. The distribution of nutritional status by age (BMI/U)

Categories	Frequency	Percentage
Thin	2	3.
Normal	43	74.1
Fat	13	22.5
Total	58	100

Table 2. Daily Macronutrient Consumption Distribution

Categories	Energy (kcal)	Protein (g)	Fat (g)	Carbohydrate (g)
Thin	1761.9	54.05	60	254.7
Normal	1831.27	69.525	60.425	256.625
Fat	1870.825	62.36	67.5	256.425
Mean	1821.3	61.483	62.641	255.91
RDA Recommendation	1650	40	55	250

Table 3. The distribution of daily macronutrient intake that affects angular cheilitis

Nutritional Status	Vit. B2 (mg)	Vit. B3 (mg)	Vit. B6 (mg)	Vit. B12 (mcg)	Zink (mg)	Iron (mg)	Folic Acid (mcg)
Thin	1.2	11.3	1.3	5.8	6.35	13.75	309.1
Normal	1.5	13.1	1.55	12.35	8.03	15.45	350.13
Fat	1.15	11	1.25	3.2	7.25	13.55	358.025
Mean	1.28	11.8	1.36	7.11	7.21	14.24	335.75
RDA Recommendation	0.9	10	1	2	5	10	300

DISCUSSION

The distribution of nutritional status can be seen clearly in the data on the nutritional status of students in grades I - III at SD Negeri Nogosari 7, Rambli Puji, Jember. The illustration of healthy eating habits impacts the absence of respondents with angular cheilitis. A strong correlation between a child's nutritional status and the incidence of angular cheilitis in children in the Sumompo dump site in Manado City. The children with normal nutritional status are less likely to have angular cheilitis, which supports the study's findings.¹³ Angular cheilitis is more prevalent in BMI in the very thin group by up to 79.9 percent, also supported the findings of this study.¹⁴ A lack of nutrients, particularly protein, indicated a poor nutritional status. The oral epithelium is one epithelial cell vulnerable to bacterial and fungal infections. Protein deficiency can interfere with protein and carbohydrate metabolism, causing a drop in amino acids and adenosine phosphate (ATP), limiting cell repair and regeneration.^{6,15}

The child's immune system is also influenced by nutritional status. In children with poor nutritional conditions, immunity is weakened due to fewer T cells, disruption of the phagocytosis process, and immature immunologic memory. This disease prevents the body's defense mechanism,

cytokines, and mediators, from being produced by the T cells in the core of the immune system.¹⁰

Furthermore, energy, protein, and fat have an impact on children's nutritional status.^{16,17} An energy imbalance may cause children's weight loss due to certain macronutrient inadequacy.^{18,19} The immune system depends on essential nutrients, such as iron, folic acid, and vitamin B complex. The immune system will deteriorate if these nutrients are lacking, and normal oral flora like candida Albicans may proliferate and infect. The mucocutaneous junction is between the mucosal skin and the mucosal epithelium, which is thinner than the skin epithelium and more prone to infection.⁵ The study's finding also aligns with research conducted by Batta et al. in India, revealing that Angular Cheilitis patients had deficiencies in several types of vitamin B complex, with 153 (18%) children having these deficiencies and 78 having Angular Cheilitis (50.9 percent).²⁰

The research findings showed that, despite the parents of students in the Renteng Jember gardens' agro-industrial environment working primarily as farm laborers, family consumption patterns, particularly in children from a nutritional aspect, are still fulfilled. It can be seen from the picture of good nutrition in children. The Renteng garden area is located in

Rambi Puji, next to Jember; therefore, its residents live a lifestyle nearly identical to that of the city. Furthermore, this study adds a new insight regarding the dietary profile and angular cheilitis in children living in Kebun Renteng.¹¹

By comparing the current and the previous data, no more statistical or other mathematical symbols were revealed in the discussion. The discussion concerned the explanation of the research hypothesis. Emphasis was placed on similarities, differences, or the findings' uniqueness. Besides, the implications of the results were presented to clarify the impact of the results on knowledge advancement. The discussion ended with a number of limitations of the study.

CONCLUSION

Based on the result of this study, it can be concluded that in the agro-industrial setting of Kebun Renteng Jember Regency, the nutritional status of the students grade I-III at SD Negeri 7 Nogosari was in a good category. Furthermore, angular cheilitis was not common in children. Food consumption on the macronutrient and micronutrient aspects had exceeded the prescribed AKG for children grade I-III SD Negeri 7 Nogosari. The children consumed the same amount of food in each area. As no samples were found with angular cheilitis, it was impossible to determine the association between nutritional status and the prevalence of angular cheilitis in children grade I-III at SD Negeri 7 Nogosari in the agro-industrial environment of Kebun Renteng, Jember Regency.

REFERENCES

1. Uce L. Pengaruh Asupan Makanan Terhadap Kualitas Pertumbuhan dan Perkembangan Anak Usia Dini. *Bunayya: Jurnal Pendidikan Anak*. 2018;4(2):79-92. <http://dx.doi.org/10.22373/bunayya.v4i2.6810>
2. Hafiza D, Utami A, Niriyah S. Hubungan Kebiasaan Makan Dengan

- Status Gizi Pada Remaja SMP YLPI Pekanbaru. *Jurnal Medika Utama* 2020;2(1): 332-342.
3. Oetomo KS. *Obesity Control and Treatment*. Malang: Tim UB Press; 2011
4. Qamariyah B, Nindya TS. Hubungan antara asupan energi, zat gizi makro dan total energy expenditure dengan status gizi anak sekolah dasar. *Amerta Nutrition*, 2018;2(1):59-65 <https://doi.org/10.20473/amnt.v2i1.2018.59-65>
5. Diniyyah SR, Nindya TS. Asupan Energi, Protein dan Lemak dengan Kejadian Gizi Kurang pada Balita Usia 24-59 Bulan di Desa Suci, Gresik. *Amerta Nutrition*, 2017;1(4): 341. <https://doi.org/10.20473/amnt.v1i4.7139>
6. Seprianty V, Tjekyan RMS, Thaha M. Athuf. Status Gizi Anak Kelas III Sekolah Dasar Negeri 1 Sungaililin. *Jurnal Kedokteran dan Kesehatan: Publikasi Ilmiah Fakultas Kedokteran Universitas Sriwijaya*, 2015;2(1): 129-134.
7. Welis W, Sazeli RM. *Gizi Untuk Aktifitas Fisik dan Kebugaran*. Padang: Sukabina Press. 2013.
8. Cerfina D. Prevalensi Angular Cheilitis pada Anak SD Kelas 3 dan 4 di Kecamatan Sukajadi Kota Bandung. Jakarta: Prenadamedia. 2014.
9. Fajriani F. Management of angular cheilitis in children. *Journal of Dentomaxillofacial Science*, 2017; 2(1):1-3. <https://doi.org/10.15562/jdmfs.v2i1.461>
10. Hernawati S. Insidensi dan Distribusi Penderita Angular Cheilitis pada Bulan Oktober-Desember Tahun 2015 di RSGM Universitas Jember (Incidence and Distribution of Angular Cheilitis on October-December 2015 at Dental Hospital of Jember University). *Jurnal Pustaka Kesehatan*. 2017;5(1): 121
11. Sulistiyani, Setyorini D, Mubarak AS. Dental Health Status of Children in the

- Jember Regency's Agroindustry Environment. *Insisiva Dental Journal: Majalah Kedokteran Gigi Insisiva*, 2022;11(1):7-11
<https://doi.org/10.18196/di.v11i1.14367>
12. Ilery C, Mintjelungan, CN, Soewantoro J. Hubungan status gizi dengan kejadian Angular cheilitis pada anak-anak di lokasi pembuangan akhir Sumopmo kota Manado. *e-GiGi*. 2013;1(1):32-37.
<https://doi.org/10.35790/eg.1.1.2013.1927>
 13. Alamsyah RM, Yanti GN, Pratiwi I. Hubungan status gizi dengan prevalensi angular cheilitis di panti asuhan Sos Childrens Village dan panti asuhan Al-Jamiatul Wasliyah Medan. *Dentika Dental Journal*, 2013; 17(4):357-361.
<https://doi.org/10.32734/dentika.v17i4.1787>
 14. Lubis WH, Serelady. Angular Cheilitis Patients Profiles and Demographic Data at Fkg Usu Dental Hospital In 2016. *Dentika Dental Journal*, 2016; 19(2):138-141
<https://doi.org/10.32734/dentika.v19i2.417>
 15. Ekarisma, VM, Mintjelungan CN, Supit ASR, Khoman JA. Angular Cheilitis pada Anak yang Mengalami Defisiensi Nutrisi. *e-GiGi*, 2021;9(2): 196-203
<https://doi.org/10.35790/eg.v9i2.34871>
 16. Diniyyah SR, Nindya TS. Asupan energi, protein dan lemak dengan kejadian gizi kurang pada balita usia 24-59 bulan di Desa Suci, Gresik. *Amerta Nutrition*, 2017;1(4): 341-350.
<https://doi.org/10.20473/amnt.v1i4.2017.341-350>
 17. Prijatmoko, D. Sulistiyani, Setyorini D, Hadnyanawati A, Misrohmasari EAA, Syabila AN. The Influence of Various Food Intake on Body Fat Distribution among Young Healthy Population. *Health Notions Journal*. 2022;6(8): 368-372
<https://doi.org/10.33846/hn60803>
 18. Juliningrum PP. Asupan Zat Gizi Makronutrien Pada Toddler. *The Indonesian Journal of Health Science*, 2019;11(1):40-46
<https://doi.org/10.32528/ijhs.v11i1.2236>
 19. Dwiningsih PA. Differences in Intake of Energy, Protein, Fat, Carbohydrates, and Nutritional Status in Adolescents Living in Urban and Rural Areas. 2013;232-241.
 20. Batta M, Gupta N, Goyal G, Jain A. Vitamin deficiency prevalence in primary school children in Punjab, India. *Int J Res Med Sci*. 2016, 4(12): 5176-9.
<https://doi.org/10.18203/2320-6012.ijrms20164011>