

**DENTINO**  
**JURNAL KEDOKTERAN GIGI**  
**Vol VI. No 2. September 2021**

**RISK FACTORS OF ANGULAR CHEILITIS AT GUSTI HASAN AMAN  
DENTAL HOSPITAL SOUTH KALIMANTAN**

**Aulia Azizah<sup>1)</sup>, Selviana Rizky Pramitha<sup>2)</sup>, Maharani Laillyza Apriasari<sup>3)</sup>**

<sup>1)</sup>Departement of Dental Public Health, Faculty of Dentistry, Universitas Lambung Mangkurat

<sup>2)</sup>Department of Oral Medicine, Faculty of Dentistry, Universitas Lambung Mangkurat

<sup>3)</sup>Department of Oral Medicine, Faculty of Dentistry, Universitas Lambung Mangkurat

**ABSTRACT**

**Background:** The second highest burden of all diseases in world population includes infectious disease with a total of 28% cases. Angular cheilitis is an infectious condition on the corner of the mouth that may initiate masticatory, facial expression and speech dysfunction due to the involvement of orbicularis oris muscle surrounding the lips. The management of angular cheilitis comprises the elimination of causative microbes using antifungal agent. Therapeutic failure reveals the disregard of any related risk factor.

**Purpose:** To analyze the risk factors of angular cheilitis in Gusti Hasan Aman Dental Hospital year 2019. **Method:** This study resorted analytical descriptive design of quantitative approach using cross-sectional method. Samples were 65 dental statuses of patients in Oral Medicine Clinic of Gusti Hasan Aman Dental Hospital year 2019. **Result:** Univariate data analysis presented the distribution of children category aged  $\leq 18$  years old (75.8%), men (54.8%), not consuming vegetable and fruit behaviour (46.8%), duration of treatment 1-7 days (56.4%), and incidence of angular cheilitis (75.8%). Fisher exact test unveiled the relationship between age and angular cheilitis ( $p < 0.05$ ) in which age  $\leq 18$  years old was 4.266 fold higher to experience angular cheilitis, while the relationship between gender and angular cheilitis ( $p < 0.05$ ) demonstrates the predilection of male with 4.853 fold at risk than female. **Conclusion:** Age and gender are risk factors in the incidence of angular cheilitis at Gusti Hasan Aman Dental Hospital year 2019.

**Keywords :** Age, Angular Cheilitis, Behavior, Gender

**Correspondence:** Aulia Azizah; Department of Dental Public Health Faculty of Dentistry, Lambung Mangkurat University, Jl. Veteran 128 B, Banjarmasin, Kalimantan Selatan, Email: [aulia.azizah@ulm.ac.id](mailto:aulia.azizah@ulm.ac.id)

**INTRODUCTION**

Angular cheilitis is an inflammatory condition on the corner of the mouth caused by body's inability to compensate tissue destruction as the result of infection.<sup>1,2,3</sup> Clinically, skin and mucosal surface will reflect maceration, fissure, ulceration as well as crust which occur unilaterally or bilaterally.<sup>2,3</sup> Lesions develop at the junction of orbicularis oris muscle that forms the corners of the mouth so that it can interfere with mastication, facial expression and speech. The prevalence of angular cheilitis ranges from 0.7% to 3.8% in the global population, but has increased in certain population groups.<sup>3,4</sup> At the Oral Medicine Profession Clinic of Gusti Hasan Aman Hospital, South Kalimantan Province between the period of 2014-2017, angular cheilitis was the most

common disease (94.5%) treated in the infection group.<sup>5</sup>

Pathogenic microorganisms are the most common etiology of angular cheilitis in which *Candida* spp. shows implications for clinical lesion development. *Candida* spp. is a normal polymorphic microorganism of the oral cavity which presents in 80% of the population without signs and symptoms of disease.<sup>6</sup> *Candida* species were identified at the corners of the mouth with a frequency of 48.4%-70% in cases of angular cheilitis.<sup>3,7</sup> Strong signal transduction and sustainability was detected when *Candida* spp. undergo a transition from yeast form to hyphae and bind to the surface of the mucosal epithelium in response to the danger of invading microorganisms into the tissue. Adhesion to the mucosal surface initiates tissue destruction

through membrane degradation and recruitment of immune cells. There are two factors that affect the ability of *Candida* species to cause tissue damage, namely the characteristics of the host and the environment.<sup>8</sup>

The structure of tissue on the corners of the mouth is a local defense that affects the individual's susceptibility to *Candida albicans* infection. Anatomically, the corner of the mouth is a direct meeting of the vermilion of the upper and lower lips to form a fold that is influenced by the height of the lower third of the face. This anatomical structure facilitates the accumulation of moisture from the surrounding salivary and sebaceous glands.<sup>9</sup> This structure is also directly adjacent to the oral mucosa, allowing the interaction of normal flora on the skin and oral cavity.<sup>10</sup>

Management of angular cheilitis with antifungal medicaments is reported as the first-line therapy, but treatment failure can occur if the predisposing factors that increase the risk of disease development have not been eliminated.<sup>3,11,12</sup> A person's risk to develop angular cheilitis increases in the pediatric age group, poor nutritional status, and those living in rural areas. The incidence of angular cheilitis is doubled in men.<sup>13</sup>

The incidence of angular cheilitis is relatively high, but studies on risk factors for angular cheilitis in South Kalimantan Province have never been performed so that factual data on risk factors that support the occurrence of angular cheilitis are not yet available. Identification of risk factors for angular cheilitis is an important step to identify the determinants that influence the incidence of disease as the basis for formulating health policies. Identification of risk factors can also be used in providing inclusive health promotion and Dental Health Education (DHE) to the community. Based on the above, it is necessary to analyze the risk factors for angular cheilitis at RSGM Gusti Hasan Aman

## MATERIALS AND METHODS

This research had obtained ethical approval No.123/KEPKG-FKGULM/EC/IV/2020 issued by the ethics commission of the Faculty of Dentistry, University of Lambung Mangkurat. This research is descriptive analytic study with quantitative approach using cross sectional method. The population of this study is the status card of patients treated by students at the Gusti Hasan Aman Hospital, South Kalimantan Province. The research sample was the patient status cards of the Gusti Hasan Aman Hospital in 2019. Simple random technique was conducted to determine

samples of the study comprising 62 documents in accordance with inclusion and exclusion criteria.

Secondary data were collected for this research. The collection of data was processed through several stages, namely: editing, coding, entry and processing, cleaning and tabulating.

Univariate analysis was performed to describe the variables of age, sex, behavior, duration of treatment and angular cheilitis were studied using the frequency distribution and percentage of each group. Bivariate analysis was conducted on the independent variables, namely the risk factors of age and sex with the dependent variable, namely angular cheilitis.

## RESULTS

Data comprised of age, gender, behaviour, duration of treatment and angular cheilitis were analyzed using SPSS computerized statistic.

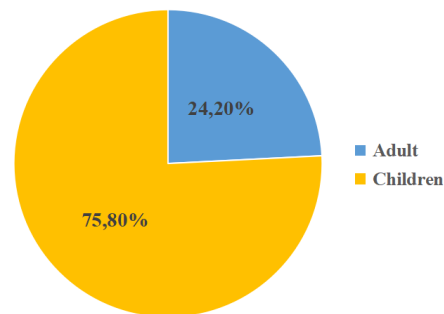


Figure 1. Distribution based on age

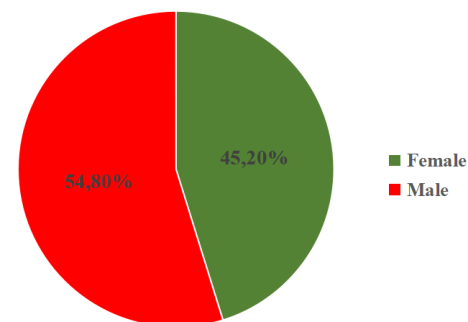


Figure 2. Distribution based on gender

Based on Figure 1, it can be observed that the highest distribution of age is in the category of children aged 18 years with a total of 47 sample (75.80%). The highest distribution of gender among research samples is male category with a total of 34 people (54.80%) based on Figure 2.

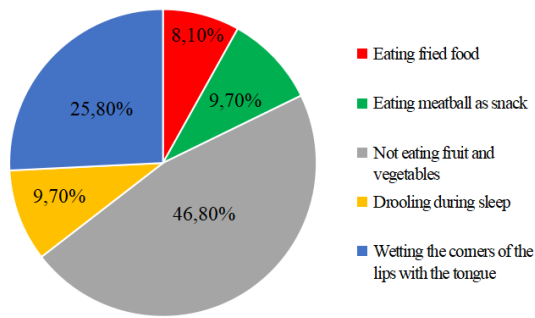


Figure 3. Distribution based on behaviour

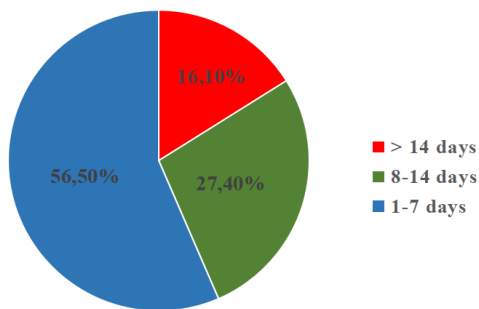


Figure 4. Distribution based on duration of treatment

The distribution of behavior based on Figure 3 is the highest in not eating vegetables and fruit group with a total of 29 people (46.80%). While the highest distribution of treatment duration based on Figure 4 is in 1-7 days with a total of 35 people (56.5%).

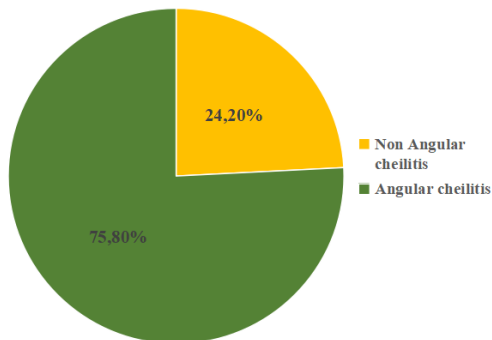


Figure 5. Distribution of angular cheilitis

The distribution of the incidence of angular cheilitis in this study based on Figure 5 was 47 (75.8%), while non-angular cheilitis was 15 (24.2%).

Analysis of the relationship between age and angular cheilitis using a 2x2 table with the Fisher Exact test can be seen in table 1.

Table 1. Relationship between age and angular cheilitis

Age	Angular Cheilitis		Total	Sig.
	Angular Cheilitis	Non Angular Cheilitis		
Children	39 (83%)	8 (17%)	47 (100%)	0,035
Adult	8 (53,3%)	7 (46,7%)	15 (100%)	
Total	47 (75,8%)	15 (24,2%)	62 (100%)	

Based on table 1, it is revealed that the significance value is 0.035 ( $p < 0.05$ ), which means that the data were statistically significant and there is a difference in the proportion between age and angular cheilitis. Statistical tests show that there is a relationship between age and angular cheilitis at RSGM Gusti Hasan Aman Banjarmasin in 2019. The OR in this study is 4.266, so it can be interpreted that age 18 years has a 4.266 times chance of angular cheilitis compared to age > 18 years.

The analysis of the relationship between gender and angular cheilitis using a 2x2 table with the Chi-Square test ( $\chi^2$ ) can be seen in table 2.

Table 2. Relationship between gender and angular cheilitis

Gender	Angular Cheilitis		Total	Sig.
	Angular Cheilitis	Non Angular Cheilitis		
Male	30 (88,2%)	4 (11,8%)	34 (100%)	0,017
Female	17 (60,7%)	11 (39,3%)	28 (100%)	
Total	47 (75,8%)	15 (24,2%)	62 (100%)	

Table 2 shows that the significance value is 0.017 ( $p < 0.05$ ), which means that it is statistically significant, there is a difference in the proportion between sex and angular cheilitis. Statistical tests show that there is a relationship between gender and angular cheilitis at Gusti Hasan Aman Hospital Banjarmasin in 2019. The OR in this study is 4,853 which can be interpreted that male gender has a 4.853 times chance of angular cheilitis compared to the female.

DISCUSSION

Angular cheilitis (angular stomatitis or *parleche*) is the term used for an inflammation that occurs in the corners of the mouth. This term consists of the word '*angulus*' which means angle in Latin, the word '*cheil*' which means lips, and '*itis*' which means inflammation in Greek.<sup>1,2,3</sup> Angular cheilitis is the most common disease (94.5%) in the group of infectious diseases treated

at the Oral Medicine Profession Clinic of Gusti Hasan Aman Hospital, South Kalimantan Province for the period 2014-2017.<sup>5</sup>

The results of this study based on Figure 1 reveals that the highest distribution for age is in the category of children aged 18 years with a total of 47 sample (75.8%). Statistical tests show that there is a relationship between age and angular cheilitis at Gusti Hasan Aman Hospital Banjarmasin in 2019 with an OR of 4.266. This is in line with Sriwahyuni's research (2017) which shows that the risk of patients developing angular cheilitis increases in the pediatric age group<sup>13</sup>.

Angular cheilitis often affects children, especially when their condition is poor. The activity of the immune system in children is inferior to adults because immune cells are still in the maturation stage. Induction of cytokines and pro-inflammatory chemokines was reported to be lower in children because the number of myeloid dendritic cells was still low where the expression of HLA, CD80 dan CD86 was lower than adults. Children get the body's defense from IgG which is obtained through breast milk thus becoming susceptible to infection after the period of breastfeeding.<sup>14</sup> Angular cheilitis in children also frequently occurs due to nutritional deficiencies such as lack of vitamin B complex (riboflavin), iron and folic acid.<sup>15</sup>

The results for gender distribution of sample in this study are presented in Figure 2. The highest distribution was male 34(54.8%). The result of this study is in line with the research of Sriwahyuni (2017) which showed that the risk of patients developing Angular cheilitis was increased in men.<sup>13</sup> Human gender is divided into male and female structurally at the chromosomal level. Female have two X chromosomes while male have one Y chromosomes and one X chromosomes. The X chromosomes has been widely associated with the non-specific and adaptive immune system.<sup>16</sup>

Risk factors based on gender are also influenced by reproductive hormones which have different levels between men and women. Men have higher testosterone levels, while women show higher levels of estrogen and progesterone based on ovarian cycle.<sup>17</sup> Hormones were also reported as one of the factors that significantly correlated with maturation and keratinization of oral epithelial cells where an increase estrogen hormone in women can accelerate the metabolism and growth of epithelial cells.<sup>18,19</sup> Higher estrogen levels in women cause women to be more resistant to microbial infections and show a higher defense response during pathogen invasion, but it also affects the estrogen receptors present in *Candida albicans*.<sup>6,9,20</sup>

The highest behavior of the sample based on Figure 3 is not eating vegetables and fruits by 29 samples (46.8%). Vegetables and fruits contain nutrients and vitamins that keep the body healthy. Lack of consumption of vegetables and fruits can lead to nutritional deficiencies which are certainly bad for the body. Micronutrients play a vital role, for example iron is important for the differentiation and growth of epithelial tissue. Vitamin A and zinc are important for the integrity of skin and mucous cells. Vitamin C is important for synthesis of collagen in epithelial cells and supports the differentiation of keratinosis, lipid synthesis, the proliferation and migration of fibroblasts.<sup>21</sup> Epithelial integrity can be compromised if the supply of oxygen and nutrient intake are insufficient for the synthesis of nucleic acids and amino acids, which are the basic structure of epithelial cells and mucosal tissue, is not met. Meanwhile, the intake of B vitamins and iron affects the production of cytokines and T lymphocyte cells so that patients with nutritional deficiencies become susceptible to infection.<sup>22</sup>

The sample in this study also had frequent snacking behavior (skewered meatballs) 6(9.70%) and like to eat fried food 5(8.10%). The group of children who like to eat snacks experienced more angular cheilitis due to the consumption of less nutritious food.<sup>23</sup>

Wetting the corners of the lips with the tongue was done by 16 (25.80%) samples in this study and 6 (9.70%) were affirming excessive salivation during sleep. This habit can support the occurrence of angular cheilitis through a mechanism that allows the accumulation of moisture in the corners of the lips. Excessive saliva will be trapped in the corners of the lips creating a moist environment so that it is the perfect environment for fungus or bacteria to grow and thrive.<sup>13</sup>

Angular cheilitis is an inflammatory condition that can last several days or become a chronic problem. Based on Figure 4, the distribution of treatment duration for the highest study sample was 1-7 days by 35(56.5%). The distribution of duration of treatment in the other categories was 8-14 days by 17(27.4%) and >14 days by 10(16.1%). Treatment of Angular cheilitis includes repair of painful macerated lesions, ulceration, crusts and fissures. Ulcers and fissures are lesions that involve the loss of all layers of the epidermis and part of the dermis with clinical differences in the form of vertical lesions in the fissures and lesions in the form of craters on the ulcers.<sup>24</sup> In lesions involving partial loss of the dermis layer in healthy individuals, the healing process will take between 5 and 7 days.<sup>25</sup>

Fajriani (2017) reported that clinical symptoms of angular cheilitis occur within 3-21 days, known as the incubation period. Most severe infections occur between day 10 and 14.<sup>15</sup> A study by Lubis and Serelady (2016) showed the healing time of angular cheilitis can generally be more than seven days.<sup>26</sup> The length of this healing time can be influenced by various local factors such as the amount of exudate causing maceration, local infection, the presence of foreign bodies that increase the inflammatory response, oxygenation, pressure, friction, strain, repetitive trauma and wound care options. Negligence in eliminating factors that affect the wound healing process can cause wounds to heal with a longer duration.<sup>11,27</sup> It can be concluded that age and gender are risk factors for angular cheilitis at Gusti Hasan Aman Hospital Banjarmasin in 2019.

#### REFERENCE

1. Apriasari ML & Baharuddin EM. 2013. Penyakit Infeksi Rongga Mulut. Surakarta: Yuma Pustaka; p.22-23.
2. Farah CS, Balasubramaniam R, McCullough MJ. 2019. Contemporary Oral Medicine: A Comprehensive Approach to Clinical Practice. Switzerland: Springer; p.952.
3. Oza N & Doshi JJ. 2017. Angular cheilitis: a clinical and microbial study. Indian J Dent Res. 28(6):661-665.
4. Rahmi, Argadianti AF, Radithia D & Soebadi B. 2019. Angular cheilitis in elderly patient with Diabetes Mellitus and decrease of vertical dimensions. Acta Medica Phillipina. 53(5):440-444.
5. Hatta I, Firdaus IWAK, Apriasari ML. 2018. The prevalence of oral mucosal disease of Gusti Hasan Aman Dental Hospital in Banjarmasin, South Kalimantan. Jurnal Kedokteran Gigi Dentino. 3(2):211-215.
6. Mayer FL, Wilson D, Hube B. 2013. Candida albicans pathogenicity mechanisms. Virulence. 4(2): 119-128.
7. Krishnan PA, Kannan R. 2013. Comparative study on the microbiological features of angular cheilitis in HIV seropositive and HIV seronegative patients from South India. J Oral Maxillofac Pathol. 17(3):346-350.
8. Ramos LS, Branquinho MH, Santos ALS. 2017. Different classes of hydrolytic enzymes produced by multidrug-resistant yeasts comprising the Candida haemulonii complex. Medical Mycology. 55(2): 228-232.
9. Hakim L, Ramadhian MR. 2015. Kandidiasis Oral. Majority. 4(9):53-57.
10. Kühbacher A, Burger-Kentischer A, Rupp S. 2017. Interaction of Candida Species with the skin. Microorganisms. 5(2):32.
11. Darwazeh AMG, Darwazeh TA. 2014. What makes oral candidiasis recurrent infection? A clinical view. Journal of Mycology. 2014:1-5.
12. Newman MG, Takei H, Klokkevold PR, Carranza FA. 2012. Carranza's Clinical Periodontology (Eleventh Edition). Missouri USA: Saunders; p.370.
13. Sriwahyuni H, Hernawati, Mashartini A. 2015. Insidensi dan distribusi penderita Angular Cheilitis pada bulan Oktober – Desember tahun 2015 di RSGM Universitas Jember. e-Jurnal Pustaka Kesehatan. 5(1): 120-122.
14. Simon AK, Hollander GA, McMichael A. 2015. Evolution of the immune system in humans from infancy to old age. Proc Biol Sci. 282 (1821): 20143085.
15. Fajriani. 2017. Manajemen of angular cheilitis in children. J Dentomaxillofac Sci. 2(1):1-3.
16. Giefing-Kroll C, Lepperdinger G, Grubeck-Loebenstein B. 2015. How sex and age affect immune responses, susceptibility to infections and response to vaccination. Aging Cell. 14(3): 309-321.
17. Laurretta R, Sansone M, Sansone. 2018. Gender in endocrine diseases: role of sex gonadal hormones. International Journal of Endocrinology. 2018:1-11.
18. Donald PM, George R, Sriram G. 2013. Hormonal changes in exfoliated normal buccal mucosal cells. J Cytol. 30(4): 252-256.
19. Utami S, Rahardjo TWB, Baziad A. 2018. Effect of blood estrogen and progesterone on severity of minor RAS. Journal of Physics Conf Series. 1025:1-5.
20. Schurz H, Salie M, Tromp G, Hoal EG, Kinner CJ, Moller M. 2019. The X chromosome and sex-specific effects in infectious disease susceptibility. Hum Genomics. 13(2):1-12.
21. Gombart AF, Pierre A, Maggini S.A. 2020. Review of micronutrients and the immune system-working in harmony to reduce the risk of infection. Nutrients. 12(1): 236.
22. Pflipsen M & Zenchenko Y. 2017. Nutrition for oral health and oral manifestations of poor nutrition and

- unhealthy habits. *General Dentistry*. 412: 36 – 44.
23. Rakhmayanthie N, Herawati E, Herawati DMD. 2016. Effect of nutritional intake towards angular cheilitis of orphanage children. *Padjadjaran Journal of Dentistry*. 28(3): 164-170.
  24. Fitzpatrick JE, Morelli JG. 2011. *Dermatology Secrets Plus E-Book*, 4th Edition. Philadelphia USA: Elsevier Mosby; p. 17.
  25. Ignatavicius DD, Workman ML. 2013. *Medical-Surgical Nursing - E-Book: Patient-Centered Collaborative Care*, 7th Edition. USA: Elsevier Saunders; p. 473.
  26. Lubis WH, Serelady. 2016. Data demografi dan profil penderita Angular Cheilitis di Rumah Sakit Gigi Mulut FKG USU tahun 2016. *Dentika Dental Journal*. 19(2): 138-141.
  27. Velnar T, Bailey T, Smrkolj V. 2009. The wound healing process: an overview of the cellular and molecular mechanisms. *The Journal of International Medical Research*. 37: 1528-1542.