



## Relationship between Periodontal Status and Dental Status in Malino Community, Tinggimoncong District, South Sulawesi Province, Indonesia

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### Abstract

**Objective:** To determine the periodontal status with caries status in the community in Malino, Indonesia.

**Methods:** This study uses an analytical observational approach with a cross-sectional study design, on April 12<sup>th</sup> to 13<sup>th</sup>, 2018. The subjects are people aged >18 years with the criteria obtained as many as 52 people.

**Results:** There was no significant relationship between bleeding, pocket, and attachment loss with caries status ( $p>0.05$ ).

**Conclusion:** Showed that there was no significant relationship between periodontal status and caries status in the adult community of Malino, Indonesia.

**Keywords:** Periodontal status; Dental status; Gingival bleeding; Attachment loss

### Introduction

Dental and oral health is an integral part of body health, meaning that a healthy body cannot be separated from having healthy teeth and mouth. However, currently, Indonesian people's awareness of the importance of having dental and oral health is low [1]. Oral disease is one of the most common chronic diseases and an important public health problem because, in terms of prevalence, it will have an impact on individuals and society and the cost of treatment [2]. Dental caries and periodontal disease are the two most common oral diseases in humans. They are related to each other in some circumstances because they both occur in the mouth, especially in the teeth or in the tissues surrounding the teeth [3].

Based on the 2013 Riskesdas data, the prevalence of caries in Indonesia is 76.2% and especially in the province of South Sulawesi, which has a high average DMF-T score. The value of dental and oral hygiene is important for each individual to know, it plays a role in preventing caries and periodontal disease [4]. According to recent global estimates, 621 million children have untreated dental caries in primary teeth and 2.4 billion people have untreated dental caries in permanent teeth based on a study by Kassebaum et al. Severe periodontitis also affects 743 million people worldwide. The term "disease burden" encompasses several concepts, including the number of individuals affected, the impact of disease on quality of life, and the burden of disease on society in terms of health care costs and broader economic and social impacts [5].

Dental caries is a multifactorial disease. The contributions of lifestyle, environmental factors, and heredity have a major influence on the development of this disease. These include habitual intake of fermentable carbohydrates, poor oral hygiene, high numbers of cariogenic microorganisms, inadequate use of fluoride, and impaired salivary function. Meanwhile, periodontal disease refers to the disruption of the surrounding tissue and the supporting tissues of the teeth, namely the periodontium. In principle, these disorders may be developmental, inflammatory, traumatic, neoplastic, genetic, or metabolic [3].

Findings of the simultaneous occurrence of periodontal disease and dental caries are contradictory. In 1964, Brandtzaeg and Jamison conducted a study and found a positive relationship, as was the study by Albandar et al. in 1995. Meanwhile, Sewon et al. who conducted a similar study in 1988 found a negative relationship between these two diseases. Then Skier and Mandel in 1980,

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cited.

Frentsen et al. in 1990, and Kinane et al. in 1991 conducted a study and the results showed no relationship between these two diseases [6].

According to Albandar et al. a positive relationship may be related to the microbiological causes of the two. However, the typical bacterial species that are each responsible for this disease are very different from each other. On the other hand, according to Rosan and Lamont that plaque and biofilm formation is associated with these two diseases. Furthermore, these two diseases share many common social and behavioral background factors, which have been associated with causation based on the findings of Tervonen et al. and Hobdell et al. [6].

Meanwhile, according to Sewon et al. the negative relationship apart from differences in the bacteriological spectrum was also related to the demineralization process seen in caries development as opposed to the mineralization process seen in calculus formation associated with the cause of periodontal disease. This is important for the evaluation of dental care needs and for planning comprehensive treatment and prevention strategies, to find out the prevalence of dental caries and periodontal disease, as well as what prolongs this common disease accumulates in the same individual [6]. Based on this, the authors are interested in conducting a survey. Regarding the relationship between periodontitis and caries in the community in Malino, Indonesia. This study aims to determine the periodontal status with caries status in the community in Malino, Indonesia.

## Method

This study uses an analytical observational approach with a cross-sectional study design. This survey was conducted in Malino, Tinggimoncong District, Gowa Regency, South Sulawesi Province, Indonesia on April 12<sup>th</sup> to 13<sup>th</sup>, 2018. The subjects in this survey were people aged >18 years with exclusion criteria, namely people who did not perform a complete intra-oral examination. The number of subjects obtained as many as 52 people.

### Gingival bleeding score (BOP)

The research instrument is the assessment of periodontal status with a Gingival Bleeding Score (BOP) which is 0 (healthy gums), 1 (no bleeding), 9 (excluded teeth) X=no teeth. While the Periodontal Pocket Score (PPD) is 0 (no pocket), 1 (pocket 4 mm to 5 mm), 2 (pocket 6 mm or more), 9 (exclusion tooth), X (no tooth).

In the results of this study, the criteria for assessing periodontal pockets were compressed, including the categories for periodontal pockets which were divided into 2, namely no and no pockets. In the category there are pockets, it is obtained from the presence of a pocket depth of 4 mm to 5 mm and a pocket of 6 mm or more.

### Attachment loss score (AOL)

Namely with values 0 (0 mm to 3 mm) (normal), 1 (4 mm to 5 mm CEJ has not crossed the black band), 2 (6 mm to 8 mm CEJ between the 2<sup>nd</sup> and 3<sup>rd</sup> black bands), 3 (9 mm to 11 mm CEJ between the black bands). Third and 4<sup>th</sup>, 4<sup>th</sup> (12 mm CEJ, over 4<sup>th</sup> band), X (Sectants not checked), 9 (teeth not recorded).

In the results of this study, compression was carried out on the assessment criteria for attachment loss, including the categories for attachment loss which were divided into 2, namely none and there was a loss. In the category of attachment loss, it was obtained from the presence of 4 mm to 5 mm attachment loss and 6 mm to 8 mm

or more.

### Caries assessment based on DMF-T. Index

Numerically, the DMF-T index describes the prevalence of caries in each individual and the results are obtained by counting the number of teeth with caries assessment criteria, namely very low (0.0 to 1.1), low (1.2 to 2.6), moderate (2.7 to 4.4), high (4.5 to 6.5), very high (>6.6). Performing dental status checks on subjects assessed by CPI Modified and DMF-T Index using WHO diagnostic tools and probes and recording them on the WHO examination sheet. Data processing using SPSS version 25.0 program. Data analysis with chi-square test [7,8].

## Results

This survey involved 52 people aged >18 years in Malino, Indonesia. Table 1 shows the distribution of survey subjects based on demographic characteristics with caries status. Based on gender, the number of female subjects (21 people) was more than that of male subjects (9 people) with very high caries status. Based on age, most subjects <29 years old (9 people) compared to other ages with very high caries status. Based on the type of work, the most subjects with no job (9 people) compared to other types of work with very high caries status.

Table 2 shows the distribution of subjects based on demographic characteristics with periodontal status. Based on age characteristics, the age of the survey subjects with the highest periodontal status was <29 years in the categories of bleeding (11 people), pocket (18 people), and attachment loss (13). Based on gender characteristics, female sex with periodontal status was more than male, namely in the category of bleeding (19 people), pocket (22 people), and attachment loss (23 people). Based on the characteristics of the occupation, the occupation of housewives with periodontal status was the most compared to other occupations with the categories of bleeding (14 people), pockets (21 people), and attachment loss (14 people).

Table 3 shows the relationship between periodontal status and caries (DMF-T). The results showed that there was no significant relationship between bleeding, pocket, and attachment loss with caries status ( $p>0.05$ ).

## Discussion

Periodontal disease and dental caries are complex diseases with multiple and diverse exposures that have an impact on the risk of disease initiation (risk factors) or progression of existing diseases (prognostic factors). Includes inherited (e.g. genetic variants), acquired, such as social, educational, and economic factors, local environment (e.g. biofilms), other diseases (e.g. sub-optimally controlled diabetes), and lifestyle factors (e.g. smoking, sugar consumption, carbohydrate intake). These may arise in different combinations at different individual levels, and may also have different effects [9].

Both of these diseases if not treated will cause tooth loss, edentulous, loss of masticatory function, poor nutritional status, loss of self-confidence, social difficulties, and lack of quality of life. Carious lesion cavities, severe periodontitis, and the consequent loss of teeth constitute a disease burden estimated at 12,900,000 incurable life years in 2015, or about 2% of the total human disease burden [10].

The results of this study indicate that there is no significant relationship between periodontal status and caries in the Malino

**Table 1:** Distribution of subjects based on demographic characteristics with caries status.

Characteristics	Caries Status (DMF-T)											
	Very low		Low		Currently		High		Very High		total	
	n	%	n	%	n	%	n	%	n	%	n	%
<b>Gender</b>												
Male	1	9.1	1	9.1	0	0	0	0	9	81.8	11	100
Female	2	4.9	3	7.3	9	22	6	14.6	21	51.2	41	100
<b>Age</b>												
<29 years	3	15.8	3	15.8	4	21.1	0	0	9	47.4	19	100
30-39 years	0	0	1	10	2	20	2	20	5	50	10	100
40-49 years	1	7.1	0	0	1	7.1	3	21.4	9	64.3	14	100
50-59 years	0	0	0	0	1	16.7	0	0	5	83.3	6	100
≥ 60 years	1	20	0	0	1	20	1	20	2	40	5	100
<b>Profession</b>												
Laborer	0	0	0	0	0	0	0	0	1	100	1	100
Housewife	1	3.6	3	10.7	8	28.6	3	25	6	50	12	100
Student	0	0	0	0	0	0	0	0	1	100	1	100
Employee	0	0	0	0	0	0	0	0	1	100	1	100
Student	1	33.3	0	0	0	0	0	0	2	66.7	3	100
Farmer	0	0	0	0	0	0	0	0	2	100	2	100
Volunteer	0	0	0	0	0	0	0	0	1	100	1	100
Does not work	0	0	0	0	1	10	0	0	9	90	10	100
Entrepreneur	0	0	1	20	0	0	0	0	4	80	5	100

**Table 2:** Distribution of subjects based on demographic characteristics with periodontal status.

Characteristics	Periodontal Status (CPI)												Total	
	Bleeding				Pocket				Loss of attachment					
	Yes		No		Yes		No		Yes		No		n	%
n	%	n	%	n	%	n	%	n	%	n	%	n	%	
<b>Age</b>														
<29 years	11	57.9	8	42.1	18	94.7	1	5.3	13	68.4	6	31.6	19	100
30-39 years	5	50	5	50	7	70	3	30	4	40	6	60	10	100
40-49 years	5	38.5	8	61.5	9	69.2	4	30.8	7	53.8	6	46.2	13	100
50-59 years	2	33.3	4	66.7	4	66.7	2	33.3	3	50	3	50	6	100
≥ 60 years	1	25	3	75	1	25	3	75	1	25	3	75	4	100
<b>Gender</b>														
Male	5	45.5	6	54.5	9	81.8	2	18.2	5	45.5	6	54.5	11	100
Female	19	46.3	22	53.7	30	73.2	11	26.8	23	56.1	18	43.9	41	100
<b>Profession</b>														
Laborer	0	0	1	100	1	100	0	0	1	100	0	0	1	100
Housewife	14	50	14	50	21	75	7	25	14	50	14	50	28	100
Student	0	0	1	100	1	100	0	0	1	100	0	0	1	100
Employee	0	0	1	100	1	100	0	0	0	0	1	100	1	100
Student	1	33.3	2	66.7	3	100	0	0	2	100	0	0	3	100
Farmer	1	50	1	50	1	50	1	50	2	100	0	0	2	100
Volunteer	1	100	0	0	1	100	0	0	1	100	0	0	1	100
Does not work	3	30	7	70	6	60	4	40	4	40	6	60	10	100
Entrepreneur	4	80	1	20	4	80	1	20	3	60	2	40	5	100

**Table 3:** The relationship between periodontal status and caries in the Malino community.

Characteristics	Caries Status (DMF-T)												P-value
	Very low		Low		Medium		High		Very High		Total		
	n	%	n	%	n	%	n	%	n	%	n	%	
<b>Bleeding</b>													
No	1	4.2	4	16.7	6	25	1	4.2	12	50,0	24	100	0.06*
Yes	2	7.1	0	0	3	10.7	5	17.9	18	64,3	28	100	
<b>Pocket</b>													
No	3	7.7	4	10.3	6	15.4	3	7.7	23	59,0	39	100	0.31
Yes	0	0	0	0	3	23.1	3	23.1	7	53,8	13	100	
<b>Loss of attachment</b>													
No	3	10.7	3	10.7	4	14.3	3	10.7	15	53,6	28	100	0.43
Yes	0	0	1	4.2	5	20.8	3	12.5	15	62,5	24	100	

\*Uji chi-square ( $p \leq 0.05$ , significant)

community, Tinggimoncong District. This is in line with the study conducted by Kinane et al. studied 800 patients using their dental radiographs. The rate of bone resorption was measured to assess periodontal disease. The number of carious and filled teeth was recorded. The relationship between caries and periodontal disease was analyzed and the data were stratified for various categories of sex, age, and several teeth present. The results show there is no relationship between these two diseases [11].

Then in 1952, Massler et al. also conducted a study by calculating the average DMF score among three different groups of subjects without gingivitis, moderate to severe gingivitis. The study involved 4,043 white men between the ages of 17 and 20 from various parts of the United States. No association was found between caries and gingivitis [11].

Periodontal disease is considered a biofilm that initiates inflammatory conditions, particularly gingivitis and periodontitis. Globally, periodontitis affects between 45% to 50% of adults in the mildest form and the most severe disease affects 9% to 11% of the world's adult population according to studies conducted by Eke et al. [12] and Kassebaum et al. [12]. In periodontal health there is a symbiosis between health-related biofilms and a comparable host immune-inflammatory response. Periodontitis develops after the appearance of dysbiosis in susceptible individuals due to dysregulation of the immune-inflammatory response and leads to host-mediated destruction of connective tissue and alveolar bone loss according to studies by Meyle and Chapple, Mira et al. and Sanz and Beighton [13].

Dental plaque is a co-factor in the development of dental caries and periodontitis and it has been discussed that carries and periodontitis are incompatible. In cases of aggressive periodontitis where plaque is not the main causative factor the prevalence of carious lesions is low and can be compared with chronic periodontitis patients. However, in the study conducted by Kinane et al. they also could not find a pattern of association between caries and periodontitis [13].

Caries involves the interaction between tooth structure, the biofilm that forms on the tooth surface, sugar and salivary factors, and genetics based on Pitts and Zero's research. Caries is a common disease that occurs at all ages with a peak in untreated carious dentin cavity at 6, 26, and 70 years old based on research by Kassebaum et al. and Jepsen et al. in 2017 [9].

The bacteriological causes of these two diseases, as well as the

many possible common background factors, could explain these findings. Life habits, social factors, and dental health behavior have been described as background factors that allow the occurrence of these two diseases. Meanwhile, according to Sewon et al. the negative relationship apart from differences in the bacteriological spectrum was also related to the demineralization process seen in caries development as opposed to the mineralization process seen in calculus formation associated with the cause of periodontal disease [6].

## Conclusion

The results of this study indicate that there is no significant relationship between periodontal status and caries status in the adult community of Malino, Tinggimoncong District, Gowa Regency, South Sulawesi Province, Indonesia.

## Suggestion

Further research is needed on the relationship between these two diseases to improve understanding of the potentially modifiable risk factors in these two diseases.

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