

Profile of Coated Tongue in Patients at the Oral Disease Polyclinic of The University of Andalas and its Relationship With Risk Factors


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Article Info	ABSTRACT
<p>Keywords: Coated tongue, oral hygiene, tongue plaque</p>	<p>Coated tongue is a mucosal condition characterized by a white or yellowish layer on the dorsum of the tongue due to the accumulation of debris, desquamated epithelial cells, and microorganisms. This condition is often associated with poor oral hygiene, xerostomia, smoking habits, and systemic diseases. This study aims to evaluate the profile of coated tongue incidence and its relationship to related risk factors at RSGM Universitas Andalas. This study is a retrospective descriptive study with a total sampling technique. Data were taken from patient medical records at the Oral Disease Polyclinic of RSGM Universitas Andalas in January–December 2023. Data collected included gender, age, cases of coated tongue, and risk factor status such as smoking, systemic diseases, drug use, stress, and Candida infection. Of the 620 patients, 566 (91%) had coated tongue. A higher prevalence was found in men (56%) than women (44%). All age groups 31–60 years showed a prevalence of coated tongue of 100%, while the age group 21–30 years was 91%. Most patients with coated tongue have smoking habits (69%), systemic diseases (80%), drug use (75%), and a small number experience stress (8%) and Candida infection (6%). Coated tongue is a very common condition in patients who come to RSGM Universitas Andalas, with a strong association with lifestyle and systemic factors. Promotive and preventive interventions are needed to increase awareness of tongue hygiene, as well as handling the accompanying risk factors.</p>
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INTRODUCTION

Oral health really needs attention because it is part of the overall health of the body. The oral cavity which includes hard and soft tissues plays an important role including for the function of chewing, swallowing and speaking. Hard tissues such as teeth or bones and soft tissues such as buccal mucosa, labial mucosa, gingiva and tongue work together to carry out these functions. If there is a disease in the teeth and/or soft tissues of the mouth, it can cause

functional disorders, which can interfere with the function of chewing, swallowing and speaking (Nuraeny et al., 2017).

The tongue is one of the soft tissues in the oral cavity. The tongue, also known as the lingua or glossal, is a muscular organ located at the base of the mouth that functions to help in chewing, swallowing, and speaking. The surface of the tongue can be divided into dorsal, ventral, and lateral surfaces. The dorsal surface of the tongue consists of keratinized squamous epithelium covered by papillae. Naturally, the tongue is coated with dead epithelial cells that can be removed by cleaning the tongue and by friction between food and the tongue. (Surya Nugraha & Dyah Ayu Murika Sari, n.d.) If this friction does not occur, there will be a thin plaque on the dorsal surface of the tongue and will be a place for anaerobic bacteria to degrade organic substrates and cause bad odor. White plaque on the dorsal tongue is also called *coated tongue*. *Coated tongue* is usually white but can be different due to chromogenic foods such as brown or yellow. In general, the coating is concentrated on the posterior part of the tongue (Ragunathan et al., 2020).

Coated tongue is a clinical condition characterized by the presence of a white or yellowish layer that can be lifted on the surface of the dorsum of the tongue. This layer is formed due to the accumulation of desquamated epithelial cells, food debris, and microorganisms in the oral cavity. (Wahyuni & Hidayat, 2018). This condition is often associated with poor oral hygiene, xerostomia, smoking habits, and various systemic conditions, and can usually be treated with regular tongue cleaning (Rachmawati et al., 2022).

Globally, the prevalence of *coated tongue* varies depending on the population and examination method, ranging from 3.4% to more than 90%. A study in Iran in 2023 showed that 96% of patients visiting a dental clinic had coated tongue, with higher Tongue Coating Index (TCI) scores in smokers and patients with poor oral hygiene. A study in India on the prevalence of oral mucosal lesions had the highest prevalence of *coated tongue* (28.0%) compared to other tongue lesions. Meanwhile, the prevalence of *coated tongue* was reported to be 8.2% in a study conducted by Dar-wazeh et al. in a Jordanian population.

According to the National Health and Nutrition Examination Survey, the tongue is the most common part of the oral cavity affected by disease and the tongue ranks second after the labial mucosa (Wahyuni & Hidayat, 2018). A study in Yogyakarta on the elderly showed that as many as 90.5% of respondents experienced *coated tongue*, which was significantly negatively correlated with taste sensitivity ($r = -0.216$; $p = 0.019$). Other studies in Bandung and the Dental and Oral Hospital of Airlangga University also reported a high prevalence, which was around 55-56%. Another study in a nursing home in Jakarta, the prevalence reached 62%, with the main risk factors being xerostomia and the absence of a habit of cleaning the tongue.

Based on Laura's research in 2022, oral hygiene, xerostomia, smoking, systemic diseases (including diabetes & hypertension), drug use, certain diets, stress/anxiety, and candida infections, play a role in increasing the likelihood of *coated tongue*. (González-Álvarez & García-Pola, 2022). Although direct research is limited, stress is known to decrease saliva production and tongue cleanliness, which can worsen *coated tongue*. (Ogami et al., 2018).

Although several studies in Indonesia have highlighted the high prevalence of *coated tongue* and its association with halitosis, decreased taste function, xerostomia, and poor tongue hygiene, until now there has been no specific data on the profile of *coated tongue cases* in patients visiting RSGM Universitas Andalas. Therefore, this observational study was conducted to determine the prevalence, characteristics, and factors associated with *coated tongue* in this population, in order to support preventive efforts and improvement of oral health care based on local data.

RESEARCH METHODS

The type of research used is a descriptive study with a retrospective approach. Research done at the Oral Disease Polyclinic of RSGM Universitas Andalas. The population and sample of this study were patient medical record data from January 2023 – December 2023. The sampling technique was total sampling.

RESULTS AND DISCUSSION

Respondent Characteristics

Table 1. Respondent characteristics based on gender and age

Gender	N	%
Man	378	61%
Woman	242	39%
Amount	620	100%

Based on the characteristics of respondents in Table 1, the number of male respondents is greater than female respondents, namely 378 respondents (61%).

Table 2. Distribution of respondents by age range

Age range	N	%
21-30	102	16.4
31-40	206	33
41-50	198	32
51-60	114	18.6
Amount	620	100

Based on table 2, it was found that the age range of the largest respondents was 31-40 years, with 206 respondents (33%) and the fewest respondents were in the age range of 51-60, with 114 respondents (18.6%).

Coated tongue distribution by gender

Table 3. *Coated tongue* distribution

<i>Coated tongue</i>	N	%
Yes	566	91
No	54	9
Amount	620	100

Based on Table 3, it was found that in this study, the majority of respondents had *coated tongue* with a total of 566 respondents (91%).

Table 4. *Coated tongue* distribution by gender

	N	%
Man	316	56
Woman	250	44
Amount	566	100

Based on Table 4, it was found that in this study, *coated tongue* was more common in male respondents than female respondents, namely 316 respondents (56%).

Distribution of *Coated Tongue* by Age

Table 5. Distribution of respondents by age

Age Range	N	(+) <i>Coated tongue</i>	%
21-30	102	93	91
31-40	206	206	100
41-50	198	198	100
51-60	114	114	100
Amount	566		

Based on age category, all age ranges of respondents 100% had *coated tongue cases*, except for the age range of 21-30 years, as many as 91% had *coated tongue cases*.

Respondents' Risk Factor Characteristics

Variables	N	%
Smoke	Positive	262 69
	Negative	116 31
Systemic Disease	Positive	249 80
	Negative	63 20
Candida infection	Positive	43 6
	Negative	577 94
Stres	Positive	54 8
	Negative	566 92
Use of Drugs	Positive	237 75
	Negative	75 25

Distribution by Gender

The results of the study showed that of the total 620 respondents, the majority were male (61%), and the prevalence of *coated tongue* was higher in men (72%) than in women (28%). This is consistent with various previous studies. A study by Rachmawati et al. (2022) at Diponegoro National Hospital stated that men tend to experience more *coated tongue*, which is associated with a high prevalence of smoking habits, alcohol consumption, and low awareness of oral hygiene in men compared to women (Abbaszadeh et al., 2023; Çağlayan et al., 2024).

Distribution by Age

The results showed that most patients with *coated tongue* were in the age range of 21–30 years (56%), followed by 31–40 years (25%). These results differ from previous studies that focused on the elderly population. Research by Nur'aeny & Sari (2016) reported the highest prevalence in elderly patients in social care. However, the shift in prevalence at a younger age found in this study may be caused by a modern lifestyle that includes consumption of fast food and high sugar, smoking and drinking habits, lack of attention to oral hygiene, especially the habit of cleaning the tongue and high stress levels (work, education, relationships), which are known to affect oral flora and cause microbial dysbiosis. (González-Álvarez & García-Pola, 2022; Hindasah et al., 2019; Naritasari et al., 2021). Puti et al. (2022) also highlighted that young adulthood is a phase where the risk of exposure to triggers such as hormonal changes, workload, and unhealthy lifestyles increases, which have the potential to significantly affect oral cavity conditions (Puti et al., 2022).

Coated tongue prevalence in general

The results of the study showed that out of 620 respondents, 319 people (51.5%) were recorded as having *coated tongue*. This figure is quite high when compared to studies in other countries such as India (28%), Jordan (8.2%), and Turkey (2.1%). This difference may be caused by differences in examination methods, population characteristics, oral hygiene culture, and environmental factors. Nur'aeny et al. (2020) in a study in Bandung showed that 55.7% of the elderly experienced *coated tongue* and this figure decreased to 34.7% after education and the use of *tongue scrapers* (Nuraeny et al., 2020). This confirms that education and tongue care have a significant impact on the prevention of *coated tongue*.

Relationship with Risk Factors

Based on the research results, several risk factors observed in the patient population with *coated tongue* at RSGM Universitas Andalas showed a significant proportion. As many as 69% of respondents were smokers, strengthening the finding that smoking is one of the main risk factors for *coated tongue*. Chemicals in cigarettes such as nicotine and tar can reduce saliva production, change the tongue microflora, and accelerate the accumulation of debris and anaerobic microorganisms that contribute to the formation of tongue plaque. Studies by Ragunathan et al. (2020) and Rachmawati et al. (2022) also showed that smoking significantly increased the tongue plaque index score and the incidence of (Ragunathan et al., 2019) *coated tongue*.

As many as 80% of patients have a history of systemic diseases, such as diabetes mellitus and hypertension. Systemic diseases can cause physiological changes in saliva (eg

hyposalivation) and increase susceptibility to secondary infections. This is reinforced by the findings of Nurfajrina et al. (2020), who found that hypertensive patients with *coated tongue* had a higher number of *Candida albicans* colonies than non-hypertensive patients, as well as a significant correlation between systemic conditions and microbial colonization on the tongue (Nurfajrina et al., 2020). Although only 6% of respondents were detected positive for *Candida infection*, this condition still needs to be considered because *Candida* can aggravate tongue plaque, especially in patients with immunocompromise or xerostomia. Jayanti et al. (2022) stated that *Candida albicans* is an opportunistic flora that easily grows on the surface of the tongue with a thick biofilm, especially in patients with low saliva and certain metabolic conditions such as diabetes (Jayanti et al., 2022).

The results of the study also found that as many as 8% of patients showed stress as a concomitant factor. Although the proportion is small, stress is known to cause hormonal disorders and reduce the immunity of the oral mucosa, as well as reduce saliva production. Studies by Puti et al. (2022) and Surya Nugraha et al. (2022) stated that stress plays a role as a psychogenic factor in changes in oral flora, which can indirectly trigger conditions such as (Puti et al., 2022; Surya Nugraha & Dyah Ayu Murika Sari, n.d.) *coated tongue*. This study also found that as many as 75% of respondents were indicated to be using drugs that affect the balance of oral flora and salivary flow, such as antihypertensives, antidepressants, and antipsychotics. These drugs are known to cause xerostomia, which is one of the main triggers of *coated tongue*. Hadiati (2018) noted that in menopausal patients with drug-induced hyposalivation, *coated tongue* is often accompanied by taste disturbances and *burning mouth syndrome*. (Hadiati, 2018).

CONCLUSION

This study shows that *coated tongue* is a tongue mucosa condition that has a high prevalence in the Oral Disease Polyclinic of RSGM Universitas Andalas, with an incidence rate reaching 51.5% of a total of 620 patients. Risk factor analysis shows that the majority of *coated tongue patients* have a smoking habit (69%), a history of systemic disease (80%), and use drugs regularly (75%). These findings strengthen the evidence that *coated tongue* is not only influenced by oral hygiene, but also by various complex systemic, lifestyle, and psychological factors. Therefore, preventive and curative approaches to *coated tongue* must consider various multidimensional aspects.

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