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Assessment of Tongue Coating among University of Benin Undergraduate Students

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ABSTRACT

Objective: Tongue coating is a common aetiology of oral malodour which affects the social, psychological and social wellbeing of an individual. Despite the potential negative impact of tongue coating on the individual, its management is still far from the ideal. It is therefore necessary to critically assess the level of coating of the tongue. The objective of the study was to determine the prevalence of tongue coating and oral malodour among University of Benin undergraduate students and the age/ gender variation in their level of coating and oral malodour.

Methods: This observational cross-sectional study was carried out using 425 undergraduate students of the University of Benin. An interviewer-administered questionnaire was used to elicit information on the participants' demographic characteristics, perceived oral malodour, tongue cleaning aids and frequency of tongue cleaning. Tongue coating assessment was done using the Kojima index of tongue coating and organoleptic assessment was used to measure participants' level of oral malodour.

Results: The prevalence of tongue coating was 13.9%. Majority of participants with tongue coating (66.1%) had thin coating of more than one third but less than two thirds of the tongue or a thick coating of less than one third of the tongue dorsum. The age and gender distribution of tongue coating was not statistically significant. The prevalence of oral malodour among the study participant was also 17.9%. Only 34.2% of cases of malodour were not self-perceived. More of the study participants (55.6%) in the age group > 30 years had barely noticeable malodour, 36.4 % in the age group 24-30 years had moderate oral malodour while 38.9 % in the age group 15-23 years had slight but noticeable oral malodour ($P=0.005$). More persons among the males (41.0%) and females (37.8%) had barely noticeable malodour ($P=0.886$).

Conclusion: The prevalence of tongue coating and oral malodour among the studied undergraduate students is low. There was no statistically significant relationship between age/ gender and the level of tongue coating of the study participants but the variation in the level of malodour across the age groups in this study was statistically significant.

Keywords: Oral malodour, Tongue Coating

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INTRODUCTION

The tongue dorsum's papillary structure forms a unique ecological oral site that provides a large surface area favoring the accumulation of oral debris and microorganisms.¹ Although there is a continuous shedding of the tongue epithelium the dorsum of the tongue is hardly ever free of staphylococci and streptococci.² The appearance of the tongue dorsum is variable, it is usually pink in color but may have a whitish thin coating.

Investigations of source of salivary microorganisms revealed that an enormous volume of salivary micro-flora emanates from the tongue and the microorganisms of the tongue influence the flora of the entire oral cavity.³

The tongue dorsum, occupying a large area of oral mucosa, is also a major habitat of *Candida* species, which can cause severe infections in immune-compromised patients.⁴ A coated tongue has been defined as a tongue with white, yellow, or brown furred surface, representing a possible accumulation of mycelia, bacteria, food debris, or desquamated epithelia cells.⁵ This phenomenon of tongue coating is the most common cause of bad breath.⁶ In about 85% to 90% of all halitosis cases, the origin is found in the oral cavity.⁷ In professional halitosis consultation sessions, the coating on the tongue is diagnosed as one of the causes in 60% of the patients and as the only cause in 40% of patients.⁷

Various studies have been carried out to determine the prevalence of tongue coating among different

groups of people and to determine if demographic factors affect the level of the tongue coating.⁸⁻¹² However, there is paucity of such studies in our environment that can be used to compare what has been reported in other parts of the world. The objective of this study therefore was to determine the prevalence of tongue coating and oral malodour among the University of Benin undergraduate students and the age/ gender variation in their level of coating and oral malodour.

MATERIALS AND METHODS

This observational cross-sectional study was carried out among the undergraduate students of the University of Benin residing in the halls of residence within the university's main campus. A total of 425 students participated in the study. A multi-stage sampling technique was used to select the study participants from all the halls of residence to have a sample representative of the entire undergraduate students. Four halls of residence were randomly selected. Each hall had an average of 240 rooms, a sampling interval of 8 was used to select 30 rooms from each hall, giving a total of 120 rooms. All the occupants of the selected rooms were eligible but only the students who gave informed consent were included in the study. Students who are smokers and who had any systemic disorder, that may be a non-oral cause of malodour e.g. Chronic Sinusitis, Diabetes mellitus, Gastro-intestinal tract disorder, were excluded.

The tool of data collection for this study was an interviewer-administered questionnaire used to elicit information on demographic characteristics, perceived oral malodour, tongue cleaning aids and frequency. This questionnaire was pre-tested among 20 undergraduates of the same university residing-of-campus

Clinical examination to assess the level of tongue coating was done under adequate illumination, using wooden tongue depressors for soft tissue retraction. Tongue coating was assessed using the tongue coating index of Kojima¹³ with the following scores;

0. No tongue coating
1. A thin coating of less than one third of the back of the tongue.
2. A thin coating of more than one third but less than two thirds of the tongue or a thick coating of less than one third of the tongue dorsum
3. A thin coating of more than two thirds of the tongue or a thick coating of less than two thirds of the tongue dorsum
4. A thick coating of more than two thirds of the tongue dorsum

Oral malodour was assessed by two calibrated odour judges using the organoleptic assessment¹⁴ with a scoring system of 0-5. A score of 0 was awarded for no appreciable odour, 1 for barely noticeable odour, 2 for slight but noticeable odour, 3 for moderate odour, 4 for strong odour and 5 for extremely foul odour. The average of scores of the two odour judges was calculated to determine the organoleptic score of each study participant.

All data was retrieved, sorted, screened for completeness, coded, collated and analyzed using an electronic statistical package IBM SPSS version 21.0. Chi square statistics was used to determine the relationship between tongue coating, oral malodour and demographic variables. The level of statistical significance was set at $P < 0.05$. Ethical approval was obtained from Research and Ethics Committee of College of Medicine, University of Benin, Benin- City. The questionnaire was anonymous and participation was voluntary.

RESULTS

A total of 425 undergraduate students of the University of Benin were involved in the study. Majority of the participants were between the ages of 15 and 23 years (80.7%), males (58.8%, Christians (89.4%) and are in second year of study (58.8%) (Table 1). Tongue coating was present in 59 (13.9%) of the study participants (Figure 1). None of the participants with tongue coating had a score of 4 but 18.6%, 66.1% and 15.3% had tongue coating scores of 1, 2 and 3 respectively (Table 2). There was no statistically significant relationship between age/ gender and the level of tongue coating of the study participants. Majority in each age and gender groups had a tongue coating score of 2 (Table 2).

Table 1: Socio-demographic characteristics of the study participants

Demographics	Frequency(n)	Percent (%)
Age (years)		
15-23	343	80.7
24-30	60	14.1
>30	22	5.2
Sex		
Male	250	58.8
Female	175	41.2
Religion		
Christianity	380	89.4
Islam	39	9.2
African traditional	6	1.4
Level of study		
100	96	22.6
200	250	58.8
300	45	10.6
400	17	4.0
500	5	1.2
600	12	2.8
Total	425	100.0

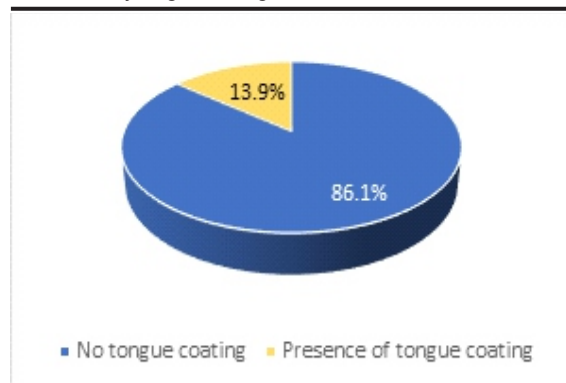


Figure 1: Prevalence of tongue coating among study participants

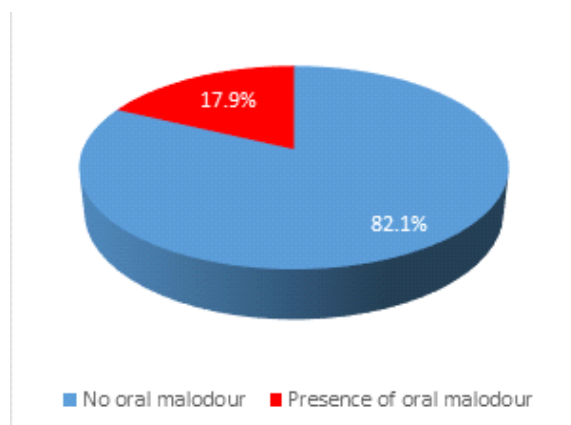


Figure 2: Prevalence of oral malodour among study participants

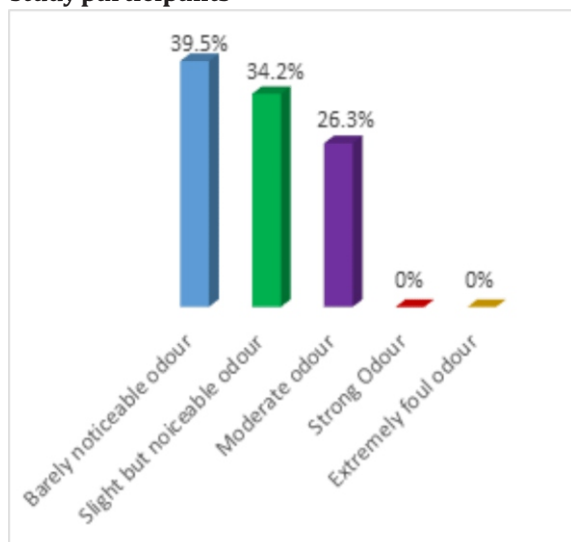


Figure 3: Level of oral malodour among the study participants

A total of 76 (17.9 %) study participants presented with oral malodour of varying degree (Figure 2) and 26 (34.2%) in this group were not aware of the presence of any oral malodour. Majority (39.5%) with oral malodour had barely noticeable odour (Figure 3). More of the study participants (55.6%)

in the age group > 30 years had barely noticeable malodour;

36.4 % in the age group 24-30 years had moderate oral malodour while 38.9 % in the age group 15-23 years had slight but noticeable oral malodour ($P=0.005$) (Table 3).

More persons among the males (41.0%) and females (37.8%) had barely noticeable malodour ($P=0.886$) (Table 3).

Table 2: Relationship between age and gender of the study participants and their level of

Demographic Variables	Tongue coating			Total n(%)	P value
	Score 1 n(%)	Score 2 n(%)	Score 3 n(%)		
Age (years)					
15-23	5 (21.7)	15 (65.2)	3(13.1)	23 (100.0)	0.884
24-30	3 (16.7)	13 (72.2)	2(11.1)	18 (100.0)	
>30	3 (16.7)	11 (61.1)	4(22.2)	18 (100.0)	
Gender					
Male	6 (18.8)	21 (65.6)	5(15.6)	32 (100.0)	0.995
Female	5 (18.5)	18 (66.7)	4(14.8)	27 (100.0)	
Total	11(18.6)	39 (66.1)	9 (15.3)	59 (100.0)	

DISCUSSION

The tongue is a major organ occupying a major part of the oral cavity. Adequate attention is usually not given to tongue cleaning, unless it becomes unsightly or result to oral malodour.⁸ The presence of desquamated epithelial cells, food debris and microorganisms on the dorsum of the tongue has a great impact on an individual's socialization and communication.¹⁵ The individual may however not take the necessary steps to ensure that the tongue is clean because of the painless nature of the tongue coating.¹⁶ Tongue coating is said to be prevalent globally. A prevalence of 21.8% was reported in Jordan⁸, 23.2% in Turkey,¹⁷ 45% in Malaysia¹⁸ and 51.4% in Italy.¹⁹ The prevalence in this study was however lower (13.9%). This may because this study was carried out among undergraduate students who may have higher level of oral health knowledge when compared with a mixed population usually seen in surveys or hospital based studies.

There was no significant age variation in the pattern of tongue coating in this study. The age range in this study is relatively narrow (15-34 years) and this may be why a significant age variation was not recorded. Previous studies have reported statistically significant gender difference in the oral hygiene practices, including tongue cleaning practice, among students with the oral hygiene practices being better among the female students.^{20,21} The report of this study did not reflect this because the pattern of tongue coating was similar among the males and the female students studied.

Table 3: Relationship between age and gender of the study participants and their level oral malodour

	Oral malodour			Total n (%)	P value
	Barely noticeable n (%)	Slight but noticeable n (%)	Moderate n (%)		
Demographic Variables					
Age (years)					
15-23	12 (33.3)	14 (38.9)	10 (27.8)	36 (100.0)	0.005
24-30	8 (36.4)	6 (27.2)	8 (36.4)	22 (100.0)	
>30	10 (55.6)	6 (33.3)	2 (11.1)	18 (100.0)	
Gender					
Male	16 (41.0)	12 (30.8)	11 (28.2)	39 (100.0)	0.886
Female	14 (37.8)	14 (37.8)	9 (24.3)	37 (100.0)	
Total	30 (39.5)	26 (34.2)	20 (26.3)	76 (100.0)	

The oral malodour prevalence of 17.9% in this study was based on organoleptic assessment. The result from the organoleptic assessment is objective and is fairly accurate. Organoleptic assessment has been reported to confirm oral malodour in 93.9% of subjects whose actual complaint was oral malodour.²² The percentage of persons with oral malodour who self-perceived it in this study is high (65.8%) and it is similar to the 61.1% previously reported in another study.²³ However, the prevalence of self-perceived oral malodour in the study is higher than the 14.5% and 17.1% previously reported among periodontal patients in the South-West region of Nigeria²⁴ and in our study area²⁵ respectively. We may have concluded that the reason for this difference is that the present study was carried out among young undergraduates who are more conscious about appearance, aesthetics and general hygiene but a previous study carried among young adult in our environment²⁶ also reported a prevalence of self-perceived oral malodour of 20%. It is however not surprising that some individuals with oral malodour were not aware of it. This phenomenon is referred to as the "malodour paradox" which is a situation where people who have oral malodour are completely unaware of it while others remain adamant that they have malodour even when there is no objective evidence.²⁷ Malodour paradox creates a typical problem in the management of persons with oral malodour and necessitates a multidisciplinary management approach.²⁷ Oral malodour is said to commonly affect people of all ages and most people have some transient unpleasant oral odour at one point or the other in their life time.²⁸ The variation in the level of malodour across the age groups in this study was statistically significant with the majority in the older age group (>30 years) having the least offensive level of oral malodour.

CONCLUSION

It can be concluded from this study that the prevalence of tongue coating and oral malodour among the studied undergraduate students is low. There was no statistically significant relationship between age/ gender and the level of tongue coating of the study participants but the variation in the level of malodour across the age groups in this study was statistically significant.

REFERENCES

- 1 Danser MM, Gómez SM, Van der Weijden GA. Tongue coating and tongue brushing: a literature review. *Int J Dent Hyg* 2003; 1(3): 151-158.
- 2 Amir E, Shimonov R, Rosenberg M. Halitosis in children. *J Pediatr* 1999;134(3):338-343.
- 3 Gomez SM, Danser MM, Sipos PM, Rowshani B, Van der Velden U, Van der Weijden GA. Tongue coating and salivary bacterial counts in healthy/gingivitis subjects and periodontitis patients. *J Clin Periodontol* 2001; 28: 970-978
- 4 Farrar J, Hotez PJ, Junghanass T, Kang G, Lalloo G, White N. Manson's tropical disease. 23rd edition. Saunders Ltd.
- 5 Harris P, Nagy S, Vardaxis N. Mosby's dictionary of medicine, nursing and health professions- Australian & New Zealand Edition 3rd Edition. Mosby Australia. 2014
- 6 Greenman J, Duffield J, Spencer P et al. Study on the organoleptic intensity scale for measuring oral malodor. *J Dent Res* 2004; 83: 81-85.
- 7 Roth B, Oppliger N, Filippi A. Knowledge of different medical professional groups in Switzerland about halitosis. *Swiss Dent J* 2014;124(12):1302-1312.
- 8 Omor RA, Arabeyat MA, Hiasat AN, Ajarmeh MS, Abu Fanas HH. Prevalence and Factors Related to Tongue Coating among a Sample of Jordanian Royal Medical Services Dental Outpatients. *J Royal Soc Med* 2015; 22(1): 35-

- 40
- 9 Darwazeh AM, Almelaiah AA. Tongue lesions in a Jordanian population. Prevalence, symptoms, subject's knowledge and treatment provided. *Med Oral Patol Oral Cir Bucal* 2011; 16(6): e745-749.
- 10 Ongole R, Shenoy N. Halitosis: Much beyond oral malodor. *Kathmandu Univ Med J* 2010; 8(30): 269-275.
- 11 Bollen CM, Beiker T. Halitosis: The multidisciplinary approach. *Int J Oral Sci* 2012; 4(2): 55-63.
- 12 Hinode D, Fukui M, Yokoyama N, Yokoyama M, Yoshioka M, Nakamura R. Relationship between tongue coating and secretory immunoglobulin A levels in saliva obtained from patients complaining of oral malodor. *J Clin Periodontol* 2003; 30(12): 1017-1023.
- 13 Yaegaki K, Coil JM. Origin of oral malodour in periodontal disease. *J Dent Res* 1998; 77: 1998-2004
- 14 Rosenberg M, Kulkarni GV, Bosy A, McCulloch AG. Reproducibility and sensitivity of oral malodour measurements with a portable sulphide monitor. *J Dent Res* 1991; 70: 1436-1440.
- 15 Matsui M, Chosa N, Shimoyama Y, Minami K, Kimura S, Kishi M. Effects of tongue cleaning on bacterial flora in tongue coating and dental plaque: a crossover study. *BMC Oral Health*. 2014; 14:4. <http://doi.org/10.1186/1472-6831-14-4>
- 16 Kishi M, Namioka T, Onodera N, Aizawa F, Sekine M, Yonemitsu M. Prevalence of Tongue Cleaning Habit and Related Factors in Healthy Individuals in Iwate Prefecture, Japan. *J Dent Hlth* 2012; 62: 14-22.
- 17 Avcu N, Kanli A. The prevalence of tongue lesions in 5150 Turkish dental outpatients. *Oral Dis* 2003; 9: 188-195.
- 18 Ma MS. The prevalence of tongue lesions in the outpatients of Kementah dental centre. *Int Poster J Dent Oral Med* 2012; 14(3): poster 602.
- 19 Campisi G, Margiotta V. Oral mucosal lesions and risk habits among men in an Italian study population. *J Oral Pathol Med* 2002; 31(8): 504. 15.
- 20 Setia S, Pannu P, Gambhir RS, Galhotra V, Ahluwalia P, Sofat A. Correlation of oral hygiene practices, smoking and oral health conditions with self perceived halitosis amongst undergraduate dental students. *J Nat Sci Biol Med*. 2014; 5(1): 67-72.
- 21 Hasan GA. Oral hygiene practices and self perceived halitosis among dental students. *J Bagh Coll Dentistry* 2014; 26(3): 58-62
- 22 Romano F, Pigella E, Guzzi N, Aimetti M. Patients' self-assessment of oral malodour and its relationship with organoleptic scores and oral conditions. *Int J Dent Hyg* 2010; 8(1): 41-46.
- 23 Youngnak-Piboonratanakit P, Vachirarojpisan T. Prevalence of Self-Perceived Oral Malodor in a Group of Thai Dental Patients. *J Dent (Tehran)* 2010; 7(4): 196-204.
- 24 Arowojulo MO, Dosumu EB. Halitosis (Fetor oris) in patients seen at the periodontology clinic of the University College Hospital, Ibadan - a subjective evaluation. *Niger Postgrad Med J* 2004; 11: 221-224.
- 25 Azodo CC, Umoh AO. Self-perceived oral malodour among periodontal patients: prevalence and associated factors *Int J Med Biomed Res* 2013; 2(2): 125-132.
- 25 Ehizele AO. Ojehanon PI. Relationship between self perception of malodour and actual estimation of malodour in a group of dental patients. *Niger Postgrad Med J* 2013; 20(4): 311-314.
- 26 Steenberghe DV, Rosenberg M. *Bad Breath: A Multidisciplinary Approach*. Leuven University Press, 1996.
- 27 Porter SR, Scully C. Oral malodour (halitosis). *BMJ* 2006; 333 (7569): 632-635.