

The Prevalence and Correlates of Fissured Tongue Among Outpatients in A Regional Area of Afghanistan

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The prevalence and correlates of fissured tongue among outpatients in a regional area of Afghanistan

Running Title: Fissured tongue in Afghanistan

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Abstract

Background: Fissured tongue is a common manifestation of the tongue, marked by the presence of multiple prominent grooves or fissures on the dorsal surface of the tongue. However, there is a lack of studies focusing on the prevalence and factors associated with fissured tongue among patients attending an outpatient clinic living in regional areas of Afghanistan.

Aims: The purpose of the current study was to determine the prevalence and factors associated with fissured tongue among adult outpatients in Afghanistan in regional areas of Afghanistan.

Methods: The cross-sectional survey was conducted among outpatient populations in Andkhoy, Afghanistan, between September 2019 and December 2019. Socio-economic status, smoking, nass use (smokeless tobacco use) and medical data were also assessed. We used the logistic regression models to identify factors associated with fissured tongue.

Results: The studied population consisted of 1182 participants, of whom 573 (48.5%) were male and 609 (51.5%) female. The prevalence of fissured tongue was 27.2% (95% CI: 24.7-29.9%) with male having significantly higher prevalence than female (47.5%, 95% CI: 43.3-51.6% versus 8.2%, 95% CI: 6.2-10.7%, $p < 0.001$). Male participants (OR=7.1, 95% CI: 4.8-10.3), Diabetes mellitus (OR 1.6, 95% CI: 1.1-2.3) and smokeless tobacco use (OR, 12.0 95% CI: 8.1-17.6) were the only variables independently associated with fissured tongue.

Conclusions: This study suggested that there was a high rate of fissured tongue among an outpatient clinic in Andkhoy, Afghanistan. Male gender, diabetes mellitus, and nass consumption were associated with fissured tongue. Therefore, these factors might usefully be targeted in local health promotion, prevention and early intervention programs.

Keywords: Fissured tongue, prevalence, risk factors, Andkhoy, Afghanistan

Background

The tongue is the body's most complex structure and considered the most important muscular organ in the mouth (1). The tongue has many functions, including taste, phonation, chewing, swallowing, breathing, speaking and chewing (2). Systemic disease may first present with tongue pathology or alterations in tongue can lead to numerous systemic diseases (3). There are variations in the presentation and frequency of oral manifestation of systemic diseases. The number of people with oral manifestations of systemic diseases has been estimated to increase (4). Elderly are likely to have various manifestations associated with systemic diseases, that could affect the oral health care (5).

Fissured tongue, or scrotal tongue or lingua plicata, is a common manifestation of the tongue which is distinguished by a deep, prominent groove on the dorsum of the tongue (6). Fissures on the tongue vary in depth which can be shallow or deep. A cracked tongue trap food, it can lead to localized inflammation, burning sensation of the tongue and bad breath (7, 8).

Diagnosis can best be made through oral examination and personal history (9). The fissured tongue rates varied across the countries between 10% and 48.4% (10-14). Previous studies have shown that fissured tongue is correlated to inheritance, candidiasis, use of smokeless tobacco (in Afghanistan smokeless tobacco is known as nass) and systemic diseases including hypertension, psoriasis, orofacial granulomatosis and diabetes mellitus (DM) (15-18).

There is a paucity of data relating to the prevalence and factors associated with fissured tongue among Afghan adults living in the regional areas of Afghanistan. A point to consider is the access to health services which is particularly poor in regional areas of Afghanistan (19). This study was conducted to highlight the impact of limited access to health services in these areas. The aim of this study was to determine the prevalence and factors associated with fissured tongue among patients attending an outpatient clinic in regional areas of Afghanistan.

Materials and Methods

The cross-sectional survey was conducted among outpatient populations in Andkhoy, a city in the northern part of Afghanistan. Andkhoy is a district in the Faryab Province of north-western Afghanistan with an approximate population of 37,100. The district is located in the northern part of the province (20). This clinic is an outpatient service for people who need to see a specialist, which provides patients with care, ongoing management and referrals to other services, if needed. The clinic is also a referral centre in Faryab province in northern part of Afghanistan. Data obtained from 1182 consecutive patients. A convenience technique was applied by including patient aged 18–80 years. Patients with limited mouth opening and patients who were unable to protrude tongue were excluded from the study.

Survey conducted by interviewers face-to-face using the WHO STEP-wise questionnaire (21). The clinical examinations were performed by the trained doctors. Translation involved translating the English questionnaires into Dari (target language) by independent bilingual translators. The questionnaire was also tested in thirty patients that examined its utility and effectiveness. Clarifications were made in questions where needed (the sample used in the pilot study was not included in the main study). Informed consent was received from all patients, and they were advised that their participation was voluntary and anonymous.

All methods were performed in accordance with the relevant guidelines and regulations by including a statement in the methods section to this effect. The study assessed socio-demographic variables include, age, gender, education, job, and tobacco use (cigarette smoking and nass use). Questions were asked about the patients' tongue symptoms associated with systemic diseases such as tongue burning. Patients were assessed with a comprehensive history and physical examination. The patients were assessed while in the sitting position on the chair by light and straight probe and a mouth mirror. The examination of the oral cavity was performed with the patient in the sitting position by using sterile gloves, sterile gauze and wooden tongue depressor. The patients were asked

to perform maximal mouth opening and protrude the tongue, and no biopsy was performed. Classification of fissured tongue was assigned according to the pattern of fissure. Patients with fissured tongue were classified into the following types in accordance with pattern of tongue fissures. a. Central longitudinal pattern, b. Central transverse pattern, c. Lateral longitudinal pattern, d. Branching pattern, and e. Diffuse pattern (18).

The participants were divided into four groups according to their smoking status: current smokers, past smokers, and non-smokers. Current smoker was defined as patients that have smoked at least 100 cigarettes in their entire life and that they have smoked during the past 30 days. Past smokers were defined as patients that have smoked at least 100 cigarettes in their entire life and that they have not smoked during the past 30 days. Non-smokers were defined as patients who have never smoked a cigarette or had smoked less than 100 cigarettes in their lifetime. Since the number of past smokers was very low, past smokers and never smokers were considered in the non-smokers group in this study(22). 'Nass' is a smokeless tobacco product widely used in Afghanistan, Iran, Pakistan and the Central Asian Republics. Nass consists of tobacco leaves, lime, cotton oil or sesame oil, and ash. Nass is consumed by placing it in the mouth cavity, usually between the oral mucosa and gingival cavity or sometimes under the tongue (23). Patients were classified into four categories according to their nass use: non-nass users, past nass users, and current nass users. Non-nass users were defined as patients that have not used nass in their lifetime. Past nass users were defined as patients that have quit nass use at least one month ago. Current nass users defined as patients that have not used using nass 20 or more times in their life and using nass every day or some days (24). Since the number of past smokers was very low, both past nass users and never nass users were constituted in the non-nass user's category.

Hypertension was defined as a blood pressure at or above 140/90 mm Hg on two separate measurements or are taking medications for hypertension (25). DM (diabetes mellitus): A fasting

blood glucose ≥ 126 mg/dL, or a random blood glucose level of ≥ 200 mg/dL, or on the treatment of antidiabetic drugs therapy (26).

Statistical analysis: Statistical analysis was performed using SPSS software ver. 22.0 (IBM, Armonk, NY, USA). A descriptive analysis was conducted on participant characteristics using frequencies, means, \pm standard deviation (SD) and 95% CI (confidence interval). Chi-square tests were done to investigate the associations between fissured tongue and socio-demographic variables, include, age, sex, education, occupation, tobacco use (cigarette smoking and nass use); systemic diseases, namely, hypertension and DM. Univariate associations between fissured tongue and each of the above-mentioned variable variables were first assessed using a series of univariate logistic regression analyses. All variables that might be a risk factor or might lead to fissured tongue were considered as the independent variables including sex, age groups, education level, marital status, occupation, smoking, nass use, hypertension and DM. - Any variable was significantly associated with fissured tongue in the univariate logistic regression analysis were selected as a candidate for the multivariate analysis. *P* value of < 0.05 was considered statistically significant.

Ethics approval and consent to participate

The study was approved by the ethics review committee of Faryab Public Health Directorate, Afghanistan and written consent was obtained from patients to participate in this study. A standard script was used to explain the study to participants as well as assurance about confidentiality and freedom to refuse participation or withdraw from the study at any time.

Results

Table 1 shows the socio-demographic and related characteristics of the participants. The studied population consisted of 1182 patients, of whom 573 (48.5%) were males and 609 (51.5%) females. The overall prevalence of fissured tongue among participants was 27.2% (95% CI: 24.7-29.9%), with male having significantly higher prevalence than female (47.5%, 95% CI: 43.3-

51.6% versus 8.2%, 95% CI: 6.2-10.7%, $p < 0.001$). Participants with fissured tongue had significantly higher levels of nass use than those without fissured tongue (68.2% versus 12.8%, $p < 0.001$). The fissured tongue was significantly higher among participants who were smokers (44.8% versus 21.8%, $p < 0.001$). Participants with a fissured tongue has higher levels of hypertension (33.0%), and DM (42.1%%) than those who did not” fissured tongue was common among participants with other types of jobs (38.3%).

INSERT TABLE 1 ABOUT HERE

Most participants with fissured tongue were asymptomatic. In our study the most common type of fissured tongue was the central longitudinal pattern (42.9%), whereas the lateral longitudinal pattern was the least tongue fissured type in the study sample (8.4%). The distribution patterns of fissured tongue in our study is shown in Figure 1.

INSERT FIGUGRE 1 ABOUT HERE

Table 2 indicates the results from a multivariate logistic regression analysis of the associations between fissured tongue, sex, occupation, smoking, nass use, DM, and hypertension. The likelihood of having fissured tongue was 7.1 times higher among male participants than those of female participants (95% CI: 4.8-10.3). Nass users (OR, 12.0 95% CI: 8.1-17.6), and DM (OR 1.6, 95% CI: 1.1-2.3), were also found to have higher odds to have fissured tongue.

INSERT TABLE 2 ABOUT HERE

Discussion

It is worthy to note that this is the first study to investigate the prevalence and factors associated with fissured tongue among outpatients in Afghanistan. The findings suggest that fissured tongue is common in this population, with more than one quarter (27.2%) patients had fissured tongue. The findings of our study suggested that the prevalence of fissured tongue was high among outpatients in Afghanistan, with male having significantly higher prevalence than female, and were also associated with housewife, nass users, non-smokers, hypertensive and diabetic patients. In

multivariate analysis, male gender, DM, and nass use was the variable most strongly associated with fissured tongue.

Among patients attending the outpatient clinic in Andkhoy, Afghanistan, fissured tongue was found in 27.2% of the total sample. This finding is lower than a previous research conducted among patients visited in the department of Oral Medicine and Oral Diagnosis at faculty of dentistry, Benghazi Libya (48.4%) (14). However, the results of this study showed that the prevalence of fissured tongue was higher than that found in patients attending the Department of Oral Medicine and Radiology, Jodhpur Dental College General Hospital in India (14.9%) (13). Differences in the rates of fissured tongue could be attributable to variations in the characteristics of participants, race, and ethnicity in the studies sampled.

In this study, we found that the smoking prevalence of fissured tongue was higher among men compared women. A similar finding has been reported in another study among outpatients in India (13, 27). However, opposite pattern is seen for Indian and Brazilian outpatients (10, 28). Our findings support the hypothesis that males encountered a higher burden of fissured tongue compared to females. A possible explanation for the preponderance of fissured tongue among males in our study can be explained by the higher prevalence of nass use by males, whereas because of cultural constraints, females are less likely to use nass. Of the 1182 study population examined, 230 male participants had a habit of nass use, while 78 females were recorded as nass users, and participants with fissured tongue had significantly higher levels of nass use than those without fissured tongue.

In multivariate analysis nass use was the variable most strongly associated with fissured tongue comparable to previous studies in the Southwest of Sweden (16). It is believed that SLT (smokeless tobacco), may result in oral tissue changes due to local irritation effect among SLT users. This could be attributed to injury to the oral epithelium caused by SLT products and their ingredients (29). A previous study has found that a high risk of cancer linked to the toxic chemicals in nass (30). Nass causes local tissue trauma in the mouth, throat and tongue by erosion (31). Saeed

et al has shown that high degree of toxic heavy metals could be attributed to using ashes and lime in nass (30). This may play in fissured tongue development of fissured tongue. These findings suggest that nass use is correlated to fissured tongue this implies it may be a possible approach to decrease the harmful effects of nass use and helping them to quit using nass.

The study shows that diabetes is an independent risk factor for fissured tongue. These findings are comparable to the results of studies among outpatients in India and Pakistan (32, 33). An illustration of the relationship between diabetes and fissured tongue could be inadequate blood glucose control, immunological changes, microcirculatory alternation with decrease of blood flow, xerostomia and alteration in salivary flow and composition (34-36).

Limitations

Overall, the current study has some limitations: Firstly, a single centre study, which limits the possibility of generalizing to all the people in Afghanistan. Secondly, the sample was non-random which may affect its overall power. Furthermore, the sample was selected using convenience sampling which limited the generalizability of the results. Finally, cross-sectional studies cannot be used to determine causal relationships with risk factors and fissured tongue. One of the strengths of this study is that it can be valuable for the accumulation of further data on the prevalence of fissured tongue and studies of variables potentially correlated to with fissured tongue in Afghanistan. Additionally, study populations could be replicated in other study.

CONCLUSIONS

In conclusion, the study revealed a high prevalence of fissured tongue in an outpatient clinic in Andkhoy, Afghanistan with male having significantly higher prevalence than female. This study has found that male gender, DM and nass consumption were most determinates of fissured tongue among an outpatient clinic in Afghanistan. This study suggests a need for an early intervention program particularly these targeting factors, for oral health promotion and illness prevention are needed.

Declarations

Ethics approval and consent to participate

The study was approved by the ethics review committee of Faryab Public Health Directorate, Afghanistan and written consent was obtained from patients to participate in this study.

Consent for publication

Consent to publish is not applicable to this manuscript.

Availability of data and materials

The data are not publicly available due to restrictions their containing information that could compromise the privacy of research participants but are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

Mohammad Hassan Hamrah, TD and MSH conceived the original idea, wrote the paper and design of the study, Mohammad Hussain Hamrah, Maryam Khosrozadeh and Mojgan Kargar design of the study, acquisition of data, and critically reviewing the article, AB, SG, SM and AC supervised. All authors read and approved the final manuscript.

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Table 1. Socio-demographic and clinical variables of patients with and without fissured tongue

Variables	With FT (n=322)	Without FT (n=860)	<i>p</i> -value
Gender, no (%)			
Male	272 (84.5)	301 (35.0)	<0.001
Female	50 (15.5)	559 (65.0)	
Age (in years) number, no (%)			0.072
<39	28 (8.7)	68 (7.9)	
40-49	28 (8.7)	124 (14.4)	
50-59	94 (29.2)	244 (28.4)	
≥60	172 (53.4)	424 (49.3)	
Level of education, no (%)			0.062
Illiterate	117 (36.3)	278 (32.3)	
Primary/private education	50 (15.5)	122 (14.2)	
Secondary	91 (28.3)	223 (25.9)	
High school or more	64 (19.9)	237 (27.6)	
Marital status, no (%)			0.258
Single	16 (5.0)	64 (7.4)	
Married	276 (85.7)	728 (84.7)	
Others	30 (9.3)	68 (7.9)	
Occupation, no (%)			0.003
Employed	36 (11.2)	158 (18.4)	
Unemployed	114 (35.4)	260 (30.2)	
Farmer	11 (3.4)	19 (2.2)	
Housewife	130 (40.4)	373 (43.4)	
Other types of jobs	31 (9.6)	31 (9.6)	
Nass use, no (%)			<0.001
Yes	210 (65.2)	98 (11.4)	
No	112 (34.8)	762 (88.6)	
Smoking, no (%)			<0.001

Yes	126 (39.1)	155 (18.0)	
No	196 (60.9)	705 (82.0)	
Hypertension, n (%)			<0.001
Yes	144 (44.7)	292 (34.0)	
No	178 (55.3)	568 (66.0)	
Diabetes mellitus, n (%)			0.001
Yes	120 (37.3)	165 (19.2)	
No	202 (62.7)	695 (80.8)	

FT, fissured tongue

Table 2. Multivariate logistic regression analysis of variables correlated to with fissured tongue among study sample

Variables	Fissured tongue N=322	OR	(95% CI)	P value
Gender, n (%)				<0.001
Female	272 (84.5)	1		
Male	50 (15.5)	7.1	4.8-10.3	
Occupation, no (%)				
Employed		1.0		
Unemployed	114 (35.4)	0.92	0.53-1.6	0.754
Farmer	11 (3.4)	0.66	0.22-1.9	0.477
Housewife	130 (40.4)	1.0	0.6-1.8	0.887
Other	31 (9.6)	1.7	0.80-3.8	0.164
Nass use, n (%)		0.91	0.4-2.2	0.843
No	210 (65.2)	1		<0.001
Yes	112 (34.8)	12.0	8.1-17.6	
Hypertension, n (%)				0.159
No	144 (44.7)	1		
Yes	178 (55.3)	1.3	0.90-1.87	
Diabetes mellitus, n (%)				0.02
No	120 (37.3)	1		
Yes	202 (62.7)	1.6	1.1-2.3	
Smoking, n (%)				0.641
Yes	126 (39.1)	1		
No	196 (60.9)	0.91	0.61-1.35	

OR, odds ratio; CI, confidence interval

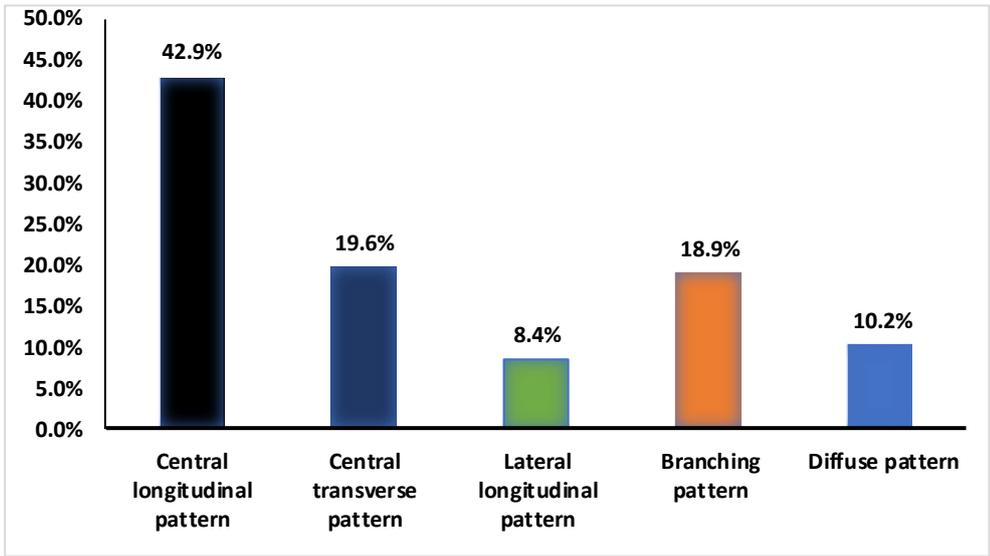


Figure 1. The distribution patterns of fissured tongue among study participants.

Figures

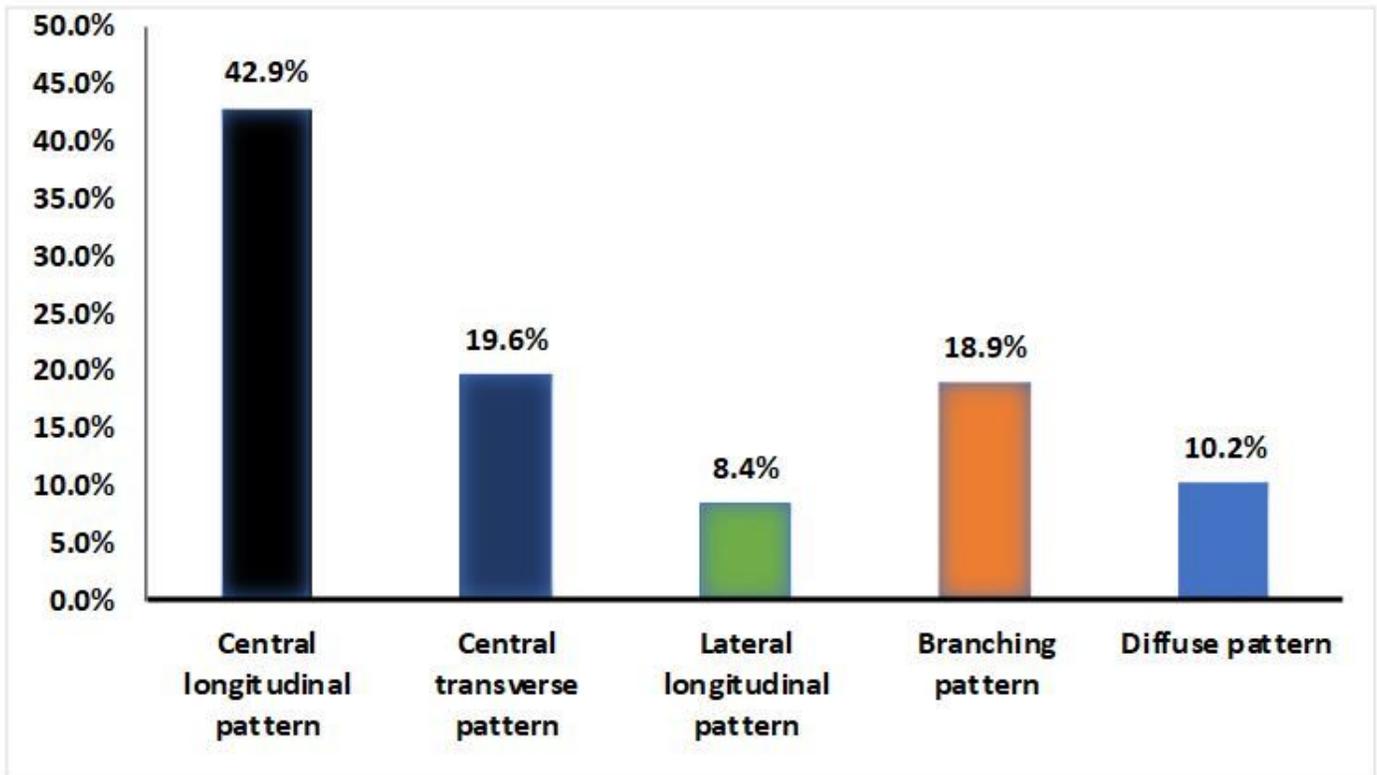


Figure 1

The distribution patterns of fissured tongue among study participants.