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ORIGINAL ARTICLE

Effect of Gudakhu (Smokeless Tobacco) on Periodontal Health: A Case-control Study

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ABSTRACT

Aim: The epidemic of tobacco use is one of the greatest threats to global health today. Smoking and tobacco use is a major public health issue in developing countries, such as Chhattisgarh state in India which is a place with different culture and traditional variations when compared with other parts of the world. To extract if same diversity exists in the usage of Gudakhu in Bilaspur district, Chhattisgarh, this study was conducted as no similar studies have been done till date.

Materials and methods: A total of 200 patients who visited the outpatient department of the Department of Periodontology of New Horizon Dental College and Research Center, Bilaspur, Chhattisgarh, India, were selected.

Results: The mean Oral Hygiene Index Score in gudakhu user was 3.86, which was approximately threefold greater than 1.14 observed in non-gudakhu users. The number of subjects with good oral hygiene (82%) was significantly higher among non-gudakhu user subjects when compared with gudakhu users where none of the subjects had good oral hygiene. The number of subjects with mild and moderate gingivitis was significantly higher among non-gudakhu users when compared with gudakhu users. Less than half (46%) had periodontal pocket of 4 to 5 mm and 66% had loss of attachment (LOA) of 4 to 5 mm in gudakhu users when compared with non-gudakhu users; 10% subjects had 4 to 5 mm periodontal pocket and 24% had LOA of 4 to 5 mm.

Conclusion: Gudakhu has been found to have a role in deterioration of oral hygiene, gingival status, and periodontal status and also development of oral lesions.

Keywords: Gingival status, Gudakhu chewers, Oral hygiene, Periodontal status.

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INTRODUCTION

Oral diseases, including dental caries, periodontal disease, and related oral mucosal lesion, are major public health concern worldwide in both developed and developing countries. According to the most recent estimate by the World Health Organization, worldwide 4.9 million people died in 2000 as a result of their addiction to nicotine. In addition to several other chronic diseases, tobacco use is a primary cause of many oral diseases and adverse oral conditions. Many preventive measurements have been taking to improve the oral health, but the problem still persist on a global scale and is on rise in developing countries.[1]

Approximately one-third of the adult population in the world use tobacco in some form and of whom half of them die prematurely. It is the largest global threat to public health and is anticipated to kill 1,000 million people prematurely this century.[1] It contains 200,000 chemicals and 4,000 carcinogens which causes malignancy and other premalignant conditions. This can be smoked, rubbed, chewed, or snuffed. Gudakhu habit is prevalent in both males and females, educated and illiterate, old and young individuals. Cigarette smoking is more common in urban area whereas smokeless tobacco in rural area is due to economical reasons.[2]

- Tobacco mainly in the form of smoking, chewing, and snuff is considered as a primary cause of many oral diseases. Use of tobacco in the form of gudakhu has been developed recently among large number of population in rural area of Chhattisgarh (Fig. 1).

Fig. 1: Gudakhu

- Gudakhu is a paste-like substance, a mixture of tobacco, molasses, jiggery, and red kharia (a form of soil), widely consumed in Chhattisgarh, Orissa, Jharkhand. Particularly, in Chhattisgarh, gudakhu is popular in all socioeconomic group since it is widely available and more affordable in price. Not many studies have been done to evaluate the effect of gudakhu use among oral health, hence the present study was conducted to evaluate the effect of gudakhu (smokeless tobacco) usage on periodontium. People mostly use gudakhu to get rid of their bad breath and personal issues to get relaxed and get a cool or supposedly relaxed environment.[3]

MATERIALS AND METHODS

A total of 200 patients of both the genders (100 gudakhu users and 100 non-gudakhu users) aged between 25 and 60 years were selected from the outpatient department attending the Department of Periodontics at our institute based on the predetermined inclusion and exclusion criteria. Ethical clearance was obtained from the Institutional Ethical Committee and informed consent was taken from the subjects prior to the study.

Inclusion Criteria

Subjects with at least 20 permanent teeth, including all the index teeth. In case of users, presence of using habit for a minimum of 3 months duration and consuming at least four times in a day.

Exclusion Criteria

Patients who have undertaken periodontal therapy and those who had taken antibiotics in past 3 months. Patients with systemic illness, pregnant women, and those using tobacco in any form other than gutkha chewing were also excluded. Subjects were examined under artificial light using mouth mirror, explorer, William's periodontal probe, and Community Periodontal Index (CPI) probe by a single examiner. Intraoral examination was carried out to evaluate oral hygiene, gingival, and periodontal status using Oral Hygiene Index Score (OHI-S), Loe and Sillness gingival index (GI), and CPI respectively. The OHI-S by Greene and Vermillion determines the amount of debris and calculus on six preselected tooth surfaces. The GI estimates the severity of gingivitis by evaluating gum color, consistency, and bleeding during probing by the use of a periodontal probe on mesial, vestibular, distal, and lingual marginal gingiva of six index teeth. In order to assess CPI, oral cavity was divided into six sextants and the highest code for each sextant was recorded. Both CPI and loss of attachment (LOA) were assessed in each sextant. The highest code for CPI and LOA, among all sextants, was recorded as the CPI and LOA score for the subject. The assessment was done using a CPI probe. Data collected were entered onto Microsoft Excel and statistically analyzed using Statistical Package for the Social Sciences, version 17.0 software. Student's unpaired t-test, Fisher's exact test, and Chi-square test were used wherever applicable. A p-value of < 0.05 was considered to be statistically significant.

RESULTS

A total of 200 subjects participated in the study. Mean age of subjects using gudakhu was 28.22 years, while it was 26.78 years among non-gudakhu user.

Table 1 depicts that the mean OHI-S in subjects using gudakhu was 3.86, which was approximately three-fold greater than 1.14 observed in non-gudakhu users ($p < 0.001$).

The mean GI score of 1.82 in gudakhu user was significantly greater ($p < 0.001$) than 0.64 in non-gudakhu user (Table 2). Higher prevalence (16%) of bleeding on probing was seen in users compared with 8% in non-users. Less than half (46%) had periodontal pocket of 4 to 5 mm and 66% had LOA of 4 to 5 mm in gudakhu user, when compared with the comparative group where 10% subjects had 4 to 5 mm periodontal pocket and 24% had LOA of 4 to 5 mm (Tables 3 and 4).

Table 1: OHI-S scores among the study groups

	Mean value	*Standard deviation*	*p-value*
Gudakhu user	3.86	1.02	0.0001
Non-gudakhu user	1.14	0.42	

Table 2: Gingival bleeding assessed using Loe and Sillness GI among the study population

	Gudakhu user	*Non-gudakhu user*	*p-value*
Mild	1.82	0.64	
Moderate	2.32	0.25	0.001
Severe	0.84	0	

Table 3: Comparison of CPI scores between the gudakhu users and nonusers

	Gudakhu user	*Non-gudakhu user*	*p-value*
Healthy	0.00	0.12	
Bleeding	0.76	0.32	
Calculus	1.98	1.67	0.001
Shallow pocket	1.23	0.74	
Deep pocket	0.54	0	

Table 4: Loss of attachment scores in gudakhu user and nonusers

LOA (mm)	*Gudakhu user*	*Non-gudakhu user*	*p-value*
0–3	1.24	0.24	
4–5	0.89	0.23	
6–8	0.76	0.01	0.0001
9–11	0.56	0.00	
12 and above	0.21	0.00	

DISCUSSION

Tobacco smoking and chewing habits are rapidly gaining popularity in our country. India is the world's third largest tobacco growing country, which produce an average of 580,000 tons every year.[4]

The extensive marketing of gudakhu has led to widespread addiction among young generation, especially in low economic status people. The present study revealed highly significant difference between gudakhu users and nonusers with respect to intraoral lesion and burning sensation of mouth.[5,6]

The present study showed that the nonchewers have better oral hygiene compared with chewers. Similar results were seen in the study by Parmar et al.[7]

Pindborg et al[8] found in a survey that among the 10,000 dental outpatients in Lucknow, Uttar Pradesh and 57,000 industrial workers in Ahmedabad, Gujarat, India, 2.1 and 2.6% chewed tobacco alone respectively. Mehta et al[9] surveyed 100,000 individuals in a rural area and found that 22% were Mishri users; the prevalence was 39% among women and 0.8% among men.

Bhonsle et al[10] surveyed exclusive areca nut chewing among 100,000 villagers in Maharashtra and observed 2% villagers using areca nut. Sinha et al[11] (2000–2004) conducted global youth tobacco survey supported by the World Health Organization and Centers for Disease Control and Prevention, which was the first survey that provided data on youth and it was found that prevalence of gudakhu use in these states ranged from 4 to 16%. Wickholm et al[12] conducted a study to describe the patterns of snuff dipping, smoking, and alcohol drinking in a sample (n = 6,287) of 9th grade male students participating in a census survey in the Stockholm region. Among the current nonusers of tobacco (66% of the sample), 14% reported frequent binge drinking, in contrast to 49% among current exclusive cigarette smokers, 60% among exclusive snuff users, and 69% among users of both cigarettes and snuff. They concluded that both tobacco use and alcohol drinking have been independently associated with a variety of pathological oral conditions. Mukherjee and Hadaye[13] conducted a cross-sectional study among 400 male secondary school students in Mumbai. The students were interviewed in personal and confidential manner. Prevalence of gutkha consumption was 10%. Average duration of consumption of gutkha by the students was 9 months. 70% of students quoted peer pressure and stress as the reason for initiation of gutkha chewing. The oral effects of tobacco chewing are typically seen on the mucosal surfaces where the product is placed as well as on the adjacent periodontium. Clinically, the lesion is usually clearly demarcated from the normal tissues. The best clinical diagnosis that can be assigned to these lesions is tobacco associated leukoplakia.[14] Teughels et al[15] investigated whether nicotine and nicotinine can make the epithelial cells more prone to colonization by periodontal pathogens. They concluded that the susceptibility of epithelial cells to become colonized by either *Aggregatibacter actinomycetemcomitans* or *Porphyromonas gingivalis* could be altered by nicotine, cotinine, or cigarette smoke extracts in a time-dependent, species-specific manner. Nociti et al[16] investigated the effect of nicotine administration on periodontal breakdown resulting from ligature induced periodontitis in rats. Daily administration of nicotine, in a dose-dependent manner, enhanced the effects of local factors in producing periodontal breakdown. Furthermore, they reported that the nicotine seemed to have a direct deleterious effect on the periodontal tissues. Further long-term studies need to be conducted with larger sample size, young individuals, and wider geographic distribution, and on the effects of particular form of smokeless tobacco on periodontium and the influence of socioeconomic status to further validate the present findings.

CONCLUSION

The present study concluded that using gudakhu has a role in deterioration of oral hygiene, gingival, and periodontal status. It is therefore, important to monitor this problem, understand the possible consequences on public health, and take moral responsibility to fight against this dreadful habit. Further long-term studies need to be conducted with larger sample size, young individuals, and wider geographic distribution, and on the effects of particular form of smokeless tobacco on periodontium and the influence of socioeconomic status to further validate the present findings.

The health authorities and health professionals take as a social and moral responsibility to fight against this dreadful habit of gudakhu chewing. Though studies on this specific topic are limited and there is insufficient data available, our study suggests that gudakhu plays a deleterious effect on periodontal health.

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