Journal of Applied Dental and Medical Sciences
NLM ID: 101671413 ISSN:2454-2288
Volume 7 Issue 1 Jan-March 2022

https://www.ncbi.nlm.nih.gov/nlmcatalog/101671413
www.joadms.org

Original Research

Assessment of role of areca nut and smokeless tobacco-related habit in altering physical properties of saliva

[1]Dr Atoofa Zargar, [2]Dr Dheeraj Sharma

[1,2]Senior Resident, Department of Dentistry, Govt. Medical College, Doda, J&K, India

ARTICLE INFO

Keywords: salivary flow, areca nut, tobacco-related habits.

ABSTRACT

Background: Areca nut and tobacco products are reported to be substances that can cause mucosal changes. Areca nut contains many minerals, namely, copper, manganese, zinc, nickel, and lead. The present study was conducted to assess role of areca nut and smokeless tobacco-related habit in altering physical properties of saliva.

Materials & Methods: 60 subjects with habit of using smokeless tobacco and areca nut of both genders (Group I) and controls (group II) were enrolled Stimulated saliva was collected and stimulated salivary flow rate, pH, and buffering capacity of the selected subjects were determined using the GC saliva check –buffer kit.

Results: Group I had 40 males and 20 females and group II had 30 males and 30 females. The mean salivary flow rate in group I was 3.56 ml/min and in group II was 4.12 ml/min. The mean pH was 6.31 in group I and 7.82 in group II. The difference was significant ($P< 0.05$). The buffering capacity was very low in 14% in group I and 2% in group II, low in 30% in group I and 28% in group II and normal in 56% in group I and 70% in group II. The difference was significant ($P< 0.05$).

Conclusion: There was reduction in salivary flow and change in the pH as well as the buffering capacity of the salivary flow in subjects with areca nut and tobacco-related habits.

Introduction:

Oral fluid is mainly composed of saliva. Other components of saliva include gingival cervical fluids, mucosal transudate, dead cells, bacteria, and food remains. Saliva is secreted from salivary glands.[1] The source of saliva is interstitial fluid through blood capillaries, which enters the salivary glands and gets modified from isotonic to hypotonic fluid. Saliva is essential for protection, lubrication of oral mucosal tissue remineralization of teeth, digestion, taste sensation, stimulation, washed-out effect, pH balance, and phonation.[2] Salivary nucleus in the medulla oblongata is the salivary center which is regulated by the control center in the hypothalamus. As the salivary gland is innervated by autonomic nervous system, it responds to both parasympathetic and sympathetic stimulus but differently. Parasympathetic impulses are more common and mostly isolated, with varying degree of expulsion from the acinar cells causing salivary secretion.[3]

Areca nut and tobacco products are reported to be substances that can cause mucosal changes.Areca nut contains many minerals, namely, copper, manganese, zinc, nickel, and lead. Within moments of chewing, gutkha begins to dissolve and turns deep red in color. Copper content of betel nut products is strongly associated with oral submucous fibrosis (OSMF). AN also contains four very important alkaloids, namely, Arecoline, arecaidine, guvacoline, and guvacine.[4] Arecoline has parasympathomimetic activity, which increases salivary flow rate in AN chewers which further increases the pH of saliva. The common oral lesions associated with AN chewing include dental attrition, staining, dental caries, periodontal diseases, lichenoid lesions, betel chewers mucosa, oral leukoplakia, OSMF, and oral squamous cell carcinoma.[5] The present study was conducted to assess role of areca nut and smokeless

Corresponding author: Dr Dheeraj Sharma, Senior Resident, Department of Dentistry, Govt. Medical College, Doda, J&K, India **Email:** drdheerajmds@gmail.com

tobacco-related habit in altering physical properties of saliva.

Materials & methods:

The present study comprised of 60 subjects with habit of using smokeless tobacco and areca nut of both genders. Equal number of normal non- tobacco users were also enrolled. All gave their written consent for the participation in the study.

Data such as name, age, gender etc. was recorded. Tobacco users were put in group I and controls in group II. A thorough oral examination was done. Stimulated saliva was collected and stimulated salivary flow rate, pH, and buffering capacity of the selected subjects were determined using the GC saliva check –buffer kit.Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results:

Groups	Group I	Group II
Status	Tobacco users	Control
M:F	40:20	30:30

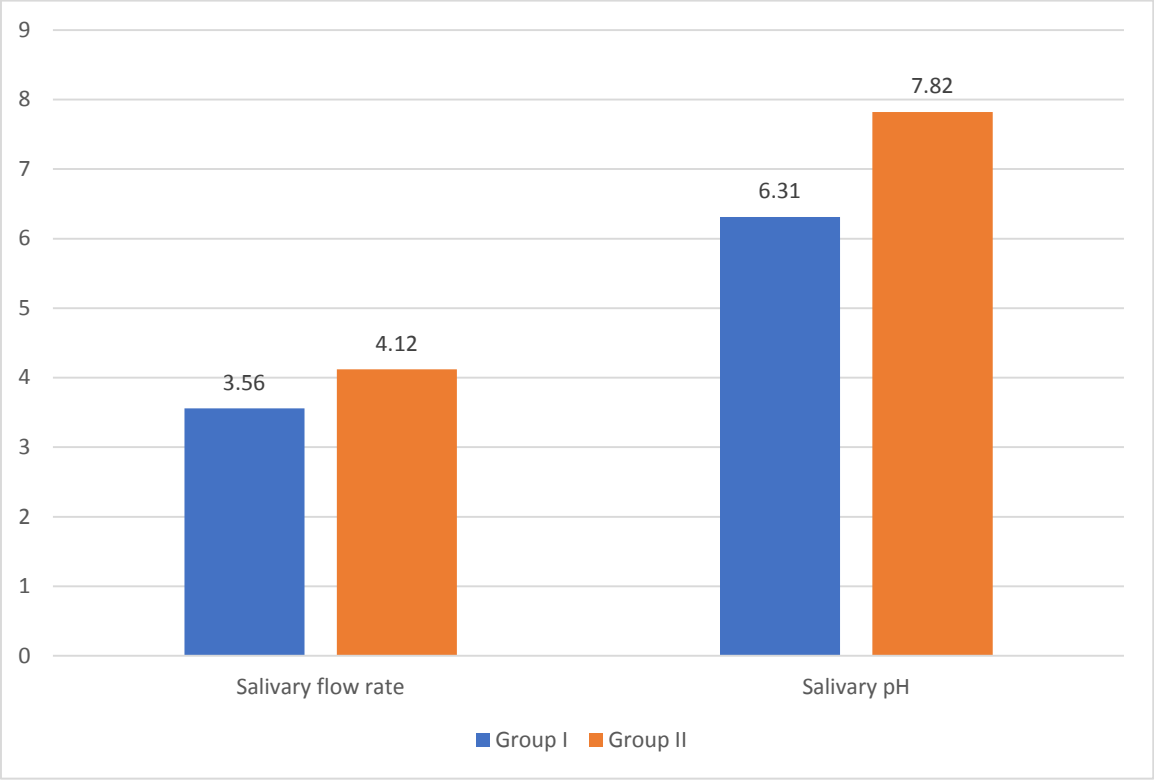
Table I Distribution of patients

Table I shows that group I had 40 males and 20 females and group II had 30 males and 30 females.

Parameters	Group I	Group II	P value
Salivary flow rate	3.56	4.12	0.05
Salivary pH	6.31	7.82	0.08

Table II Comparison of salivary parameters

Table II, graph I shows that mean salivary flow rate in group I was 3.56 ml/min and in group II was 4.12 ml/min. The mean pH was 6.31 in group I and 7.82 in group II. The difference was significant (P< 0.05).

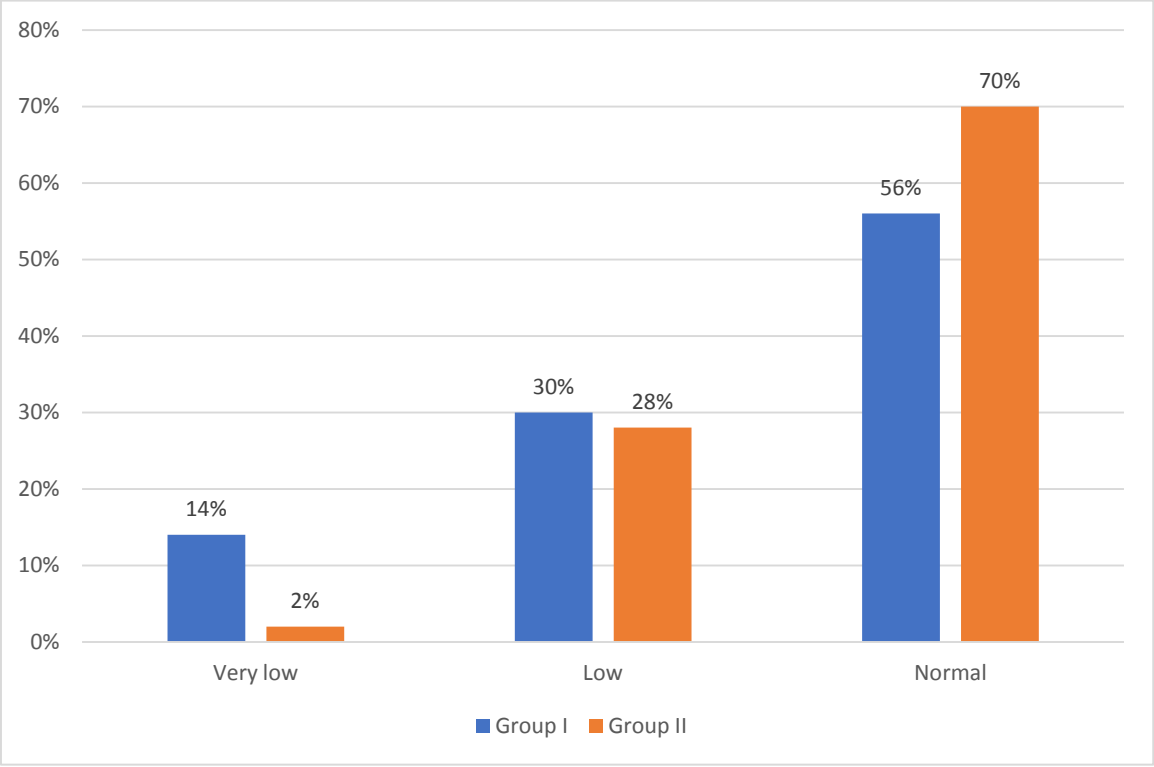


Graph I Comparison of salivary parameters

Buffering capacity	Group I	Group II	P value
Very low	14%	2%	0.02
Low	30%	28%	0.94
Normal	56%	70%	0.05

Table III Comparison of buffering capacity

Table III, graph II shows that buffering capacity was very low in 14% in group I and 2% in group II, low in 30% in group I and 28% in group II and normal in 56% in group I and 70% in group II. The difference was significant (P< 0.05).



Graph II Comparison of buffering capacity

Discussion:

It has been estimated that, worldwide, ~600,000,000 people are area nut chewers. It is the fourth most commonly abused social drug, ranking after nicotine, ethanol, and caffeine.[6] The areca fruits are sun dried for several weeks, after which the fibrous shells are removed and the hard, dry nuts, commonly called betel nut or "supari" in India, are ready for use. Such sun dried varieties of BN are very hard and are cut into small pieces to make it easier to masticate.[7] A flavored and sweetened dry mixture of betel nut, catechu, and slaked lime has become increasingly popular either with tobacco (gutkha or khaini) or without tobacco (pan masala). These products are packaged in small, attractive, and inexpensive sachets.[8] BN chewing leads to increased salivary secretion in chewers only by chemical stimulation but not on mechanical. The chewers showed lower levels of potassium, sodium, and salivary amylase.[9] The present study was conducted to assess role of areca nut and smokeless tobacco-related habit in altering physical properties of saliva.

We found that group I had 40 males and 20 females and group II had 30 males and 30 females. The mean salivary flow rate in group I was 3.56 ml/min and in group II was 4.12 ml/min. The mean pH was 6.31 in group I and 7.82 in group II. Patel et al[10]aimed to compare the alteration in the salivary properties like stimulated salivary flow rate, pH, and buffering capacity between subjects with areca nut and smokeless tobacco habit and without in subjects without habit. The sample size constituted of 50 subjects (group A) with a habit of areca nut and smokeless tobacco and 50 subjects (group B) without any habit. Salivary properties like salivary flow rate, buffering capacity, and pH were analyzed in both groups to test a hypothesis that the habit results in changes in the salivary properties and that there is a correlation between the changes and the frequency, duration, and exposure of the habit. The mean stimulated salivary flow rate among group A was 3.34 ± 1.32 and pH was 6.50 ± 0.54. The mean stimulated salivary flow rate among group B was

4.42 ± 1.48 and the pH was 7.04 ± 0.47. The difference in these values was found to be statistically significant

We observed that the buffering capacity was very low in 14% in group I and 2% in group II, low in 30% in group I and 28% in group II and normal in 56% in group I and 70% in group II. Sahu et al[11]measured the effect of habitual chewing of areca nut and various tobacco products on salivary pH.The present study included 360 individuals (chewers and nonchewers) of age group between 20 and 30 years. It was observed that, in all the groups of chewers, pH decreased after chewing except in the gutkha and lime chewing group, where pH increased (pH before chewing was 7.43 ± 0.41 and after chewing was 7.51 ± 0.399), the difference was strongly significant ($P < 0.001$). pH was found to be less in lime and tobacco chewers (6.83 ± 0.33) and more in tobacco, betel nut, and lime chewers (7.50 ± 0.41) in comparison to other groups before chewing; the difference was strongly significant. In the mean ± standard deviation, increase in pH was found among chewers (7.32 ± 0.49) as compared to nonchewers (6.99 ± 0.14), which is the control group, and the data were statically significant.

Kanwar et al[12] in a study divided sixty participants equally into three groups – tobacco smokers A, chewers B, and controls C. The mean pH for Group A – 6.8, B – 6.7, and C – 7.04 when compared and a nonsignificant relation was obtained though, Group A and B showed lower salivary pH. The results show that normal salivary pH was changed to alkaline in chewers because the process of chewing itself brings copious amounts of saliva to the mouth and in the presence of added slaked lime may increase the pH in the oral environment.

The limitation the study is small sample size.

Conclusion:

Authors found that there was reduction in salivary flow and change in the pH as well as the buffering capacity of the salivary flow in subjects with areca nut and tobacco-related habits.

References:

1. Gupta PC, Warnakulasuriya S. Global epidemiology of areca nut usage. Addict Biol 2002;7:77-83.
2. Khandelwal A, Khandelwal V, Saha MK, Khandelwal S, Prasad S, Saha SG. Prevalence of areca nut chewing in the middle school-going children of Indore, India. Contemp Clin Dent 2012;3:155-7.
3. Chandak RM, Chandak MG, Rawlani SM. Current concepts about areca nut chewing. J Contemp Dent 2013;3:78-81.
4. Humphrey SP, Williamson RT. Areview of saliva: Normal composition, flow, and function. J Prosthet Dent 2001;85:162–9.
5. Dawes C. Physiological factors affecting salivary flow rate, oral sugar clearance and the sensation of dry mouth in man. J Dent Res 1987:66 (2 Suppl):648-53.
6. Shah G, Chaturvedi P, Vaishampayan S. Arecanut as an emerging etiology of oral cancers in India. Indian J Med Paediatr Oncol 2012;33:71-9.
7. Siddabasappa S, Ashok L, Sujatha GP. Estimation of unstimulated salivary flow rate, pH, copper and Iron in ghutka chewers with and without oral submucous fibrosis: A preliminary study. Res J Pharm Biol Chem Sci 2014;5:300-6.
8. Abdul Khader NF, Dyasanoor S. Assessment of salivary Flow rate and pH among areca nut chewers and oral submucous fibrosis subjects: A comparative study. J Cancer Prev 2015;20:208-15.
9. Nyachhyon R, Boaz K, Sumanth KN. Minor salivary gland changes in oral submucous fibrosis (OSMF): Retrospective pilot study. J Nepal Dent Assoc 2011;12:26–8.
10. Patel RA, Shah JS, Dudhia BB, Patel PS. Role of areca nut and smokeless tobacco-related habit in altering physical properties of saliva – A comparative study. J Indian Acad Oral Med Radiol 2021;33:421-7.
11. Sahu RK, Patro S, Nayak B, Bardhan D, Panda S, Rajguru JP. Habit-associated salivary pH changes in oral submucous fibrosis: A cross-sectional study. National Journal of Maxillofacial Surgery. 2021 Jan;12(1):78.
12. Kanwar A, Sah K, Grover N, Chandra S, Singh RR. Long-term effect of tobacco on resting whole mouth salivary flow rate and pH: An institutional based comparative study. Europ J General Dent. 2013;2:296–99.