Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/jobcr

Original Article

# Prevalence of oral submucous fibrosis among habitual gutkha and areca nut chewers in Moradabad district

*Nitin Kumar Nigam* [a,d,*], *K. Aravinda* [a], *Manu Dhillon* [b], *Siddharth Gupta* [a], *Satheesha Reddy* [c], *M. Srinivas Raju* [d]

[a] *Department of Oral Medicine & Radiology, Career Post Graduate Institute of Dental Sciences & Hospital, Sitapur Road, Lucknow 226020, Uttar Pradesh, India*
[b] *Department of Oral Medicine & Radiology, ITS Dental College, Ghaziabad, India*
[c] *Department of Oral Medicine & Radiology, AECS Maaruti College of Dental Sciences & Research Centre, Bangalore, Karnataka, India*
[d] *Department of Oral Medicine & Radiology, Saraswati Dental College, 233, Tiwari Ganj, Faizabad Road, Lucknow 226012, Uttar Pradesh, India*

ARTICLE INFO

*Article history:*
Received 16 July 2013
Accepted 29 October 2013
Available online 21 November 2013

*Keywords:*
Oral submucous fibrosis
Moradabad
Gutkha chewers
Areca nut

ABSTRACT

*Background:* To determine the prevalence and severity of oral submucous fibrosis (OSMF) among habitual gutkha, areca nut and pan chewers of Moradabad, India.
*Method:* A survey was conducted for a period of one year in east, west, north and south zones of Moradabad district, Uttar Pradesh. One thousand habitual chewers were selected as study participants, using a stratified random sampling technique, between the ages of 11–40 yrs, with a habit of chewing gutkha, areca nut, pan for over a year. A detailed history was recorded and meticulous clinical examination was conducted. Evaluation of taste sensation, hearing, interincisal distance, clinical staging was done in the OSMF patients found amongst habitual chewers. The obtained data was statistically analyzed using an SPSS 16.5 version soft ware.
*Results:* The prevalence of OSMF was 6.3% (63/1000) and gutkha chewing was the most common abusive habit (42/63) amongst OSMF patients. Stage 1, Stage 2, Stage 3 OSMF was seen in 28, 19 and 16 patients respectively. Restricted mouth opening, altered taste perception and defective hearing was observed in 37/63 (58.7%), 24/63 (38.09%) and 14/63 (22.22%) respectively.
*Conclusion:* Our study shows a prevalence of 6.3% OSMF among habitual chewers of Moradabad. Prevalence and severity were more in urban and rural patients respectively.


* *Corresponding author*. Saraswati Dental College, 233, Tiwariganj, Faizabad Road, Lucknow 227105, Uttar Pradesh, India. Tel.: +91 97 94321007; fax: +91 522 2851058.
E-mail address: nigam_nitin19@yahoo.co.in (N.K. Nigam).
2212-4268/$ – see front matter 
http://dx.doi.org/10.1016/j.jobcr.2013.10.005

## 1. Introduction

Oral submucous fibrosis (OSMF) is a chronic, progressive, scarring precancerous condition of the oral cavity seen predominantly in the Indian subcontinent and South East Asia.[1] In India, the prevalence increased over the past four decades from 0.03% to 6.42%.[2,3] Data published earlier reported an estimate of 5 million OSMF patients in India.[4] OSMF is seen commonly in males between 20 and 40 yrs age. The common sites involved are buccal mucosa, labial mucosa, retromolar pads, soft palate and floor of the mouth. Rarely fibrotic changes of the pharynx, esophagus and paratubal muscles of eustachian tubes have also been observed. Early features of OSMF include burning sensation, hypersalivation/xerostomia and mucosal blanching with marble like appearance.[5] Later on, the mucosa becomes leathery and inelastic with palpable fibrous bands resulting in restricted mouth opening. Eventually, OSMF leads to difficulty in swallowing, speech & hearing defects and defective gustatory sensation.[5–7]

The pathogenesis of OSMF is multifactorial and enigmatic. The etiological factors implicated are excessive chilly consumption, areca nut chewing, vitamin B complex & iron deficiency, autoimmunity, genetic and environmental factors.[5,8,9] However, the most consistent factor identified through epidemiological studies is areca nut consumption in form of quid.[5,8,9] Quid is defined as " a substance, or mixture of substances, placed in the mouth or chewed and remaining in contact with the mucosa, usually containing one or both of the two basic ingredients, tobacco and/or areca nut, in raw or any manufactured or processed form".[10] Areca nut or betel nut is the endosperm of the fruit of Areca catechu. Areca nut contains alkaloids like arecoline, arecaidine, guvacine and guvacoline, flavanoids and copper. The alkaloids stimulate fibroblasts to produce collagen and flavanoids inhibit collagenase, thus decreasing collagen degradation.[4] Reasons for using areca nut primarily are attaining euphoria, satiation, thus making the habit, addictive. Areca nut is consumed either alone or in combination with other constituents. Paan or betel quid contains areca nut and slaked lime wrapped in a betel leaf (Piper betel).[10] Gutkha is a mixture of powdered areca nut and tobacco, marketed in pre packaged pouches of 5–10 g.[4] There is a sudden upsurge in the use of gutkha recently, due to easy availability, attractive colorful packs, longer shelf life and low cost. Babu et al reported that habitual chewing of gutkha/pan masala resulted in the early occurrence of OSMF than areca nut chewing.[9,11] The earlier presentation may be due to the synergistic action of nicotine on the cytotoxicity induced by arecoline.[12]

Though, paan and gutkha chewing are the most common abusive habits of northern India, very few studies were conducted among this population.[13,14] The present study was hence conducted to determine and compare the prevalence and severity of OSMF among areca nut, gutkha and pan chewers of the urban and rural population of Moradabad district, in Uttar Pradesh located in North India. The clinical profile and staging of OSMF patients among the study population was also recorded. Association between the severity of OSMF and the various chewing habits was also assessed.

## 2. Materials and methods

### 2.1. Study design

#### 2.1.1. Study area

After obtaining consent from the Institutional Review Board, a cross sectional study was conducted in Moradabad district, Uttar Pradesh. It has both rural and urban areas in close proximity. Census of India[15] defines an urban area as (a) All statutory places with a municipality, corporation, cantonment board or notified town area committee, etc. (b) A place satisfying the following three criteria simultaneously: i) a minimum population of 5000; ii) at least 75 per cent of male working population engaged in non-agricultural pursuits; and iii) a density of population of at least 400 per sq. km (1000 per sq. mile). Moradabad district has a population of 3,810,983. It has 1793 villages and is bordered by Bijnor district on the north, Badaun district on the south, Rampur district on the east and JP Nagar district on the west.

#### 2.1.2. Sample size & technique

One thousand subjects were selected using a stratified random sampling technique from the rural and urban populations using 3 stage design (Fig. 1). Line listing of the villages and urban areas of Moradabad district was done initially. In the first stage, 4 villages and Moradabad city proper were randomly selected representing rural and urban population respectively. Next stage comprised of selecting 3 colonies from each village and dividing Moradabad city into east, west, north and south zones. Third stage consists of selecting a sampling unit, a colony comprising of 40–50 houses from each village/zone. Dental health care camps were conducted in the rural areas of Moradabad district to attend to the basic dental needs of these patients like restorations of carious teeth, extraction of grossly carious teeth and oral prophylaxis. 125 subjects belonging to each village (rural) and each zone (urban) were selected from sampling unit and dental health care camps.

### 2.2. Study population

1000 habitual chewers were selected with the following inclusion and exclusion criteria:

Inclusion criteria:

- habit of chewing areca nut/pan/gutkha for ≥1 year
- frequency of ≥3 units per day
- age group of 11–40 yrs

Exclusion criteria:

- with limitation of mouth opening due to other causes like odontogenic infections and joint disorders
- History of tobacco smoking

The habits, clinical characteristics and severity of OSMF were compared among the rural (Group 1) and urban (Group 2) groups. The study population was not grouped as per the chewing product (areca nut/pan/gutkha) for analysis.