# Oral Health of Bangladeshi Women Tobacco-with-paan Users and Self-reported Oral Pain Following Tobacco Cessation

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Abstract

***Objectives:*** *The study objectives were to assess the oral health status of a sample of UK resident Bangladeshi women tobacco-in-paan users and its relationship to participant age and number of daily paan, to determine the prevalence of oral pain at baseline and at the one-week postcessation follow-up, and to explore the relationship between oral health status and changes in self-reported oral pain at baseline and at the one-week postcessation follow-up.* ***Methods:*** *Interviews were conducted in Sylheti using fully structured questionnaires and an oral examination was carried out. A quit date was set and nicotine replacement therapy patches (Nicorette® 15 mg, Pfizer) were supplied. Age, number of daily paan, and oral pain characteristics, including intensity, frequency, any provoking factors, and associated symptoms were recorded. Oral mucosal lesions (OMLs) and numbers of teeth decayed, missing, filled, and those with recession, abrasion, loss of attachment (LOA), and tooth wear were charted.* ***Results:*** *Fifty-two women took part. The mean age was 42.8 years and number of daily paan with tobacco was 13. Compared to those aged 18–39 years, those aged 40 years and older had poorer oral health. Older adults were significantly more likely to have higher numbers of teeth with recession, abrasion, and LOA greater than 3.5 mm. They were significantly more likely to have an OML at baseline. The prevalence of self-reported oral pain was 26.9 percent at baseline and 51.9 percent at one-week follow-up. Presence of an OML at baseline was a significant predictor of reports of oral pain at the one-week follow-up. Results of stepwise multiple regression analysis confirmed this finding (OR=3.66; 95% CI=1.06, 12.621; P=.04).* ***Conclusions:*** *Reports of oral pain at follow-up during a tobacco cessation program correlate with the presence of OMLs at baseline. Further investigation of this relationship is needed. Access to appropriate dental care, as an aid to successful tobacco cessation, is indicated. [J Public Health Dent 2003;63(4):235-39]*

*Key Words: pain, mouth mucosa, tobacco use cessation, women, smokeless tobacco, oral leukoplakia, oral ulcer.*

Smoking and chewing tobacco products have a number of well-documented impacts on oral health, including esthetics, mucosal and periodontal diseases, and oral precancers and cancers (1). It is estimated that over 600 million people chew tobacco-with-paan, a traditional South Asian tobacco product (2). Other types of smokeless tobacco are consumed also. In North America, over 5 million adults are reported to use smokeless tobacco (3).

Tobacco-with-paan chewing is common in UK resident Bangladeshi women (4,5), with a validated prevalence of 49 percent (6). Tobacco smoking in women from this community is not considered an appropriate behavior. Oral epidemiologic studies of this community indicate low levels of caries experience, high levels of periodontal treatment need, and a high prevalence of OMLs in tobacco-with-paan chewers compared with non-chewers (7-9).

A study of tobacco-with-paan chewing cessation in UK resident Bangladeshi women reported a prevalence of oral pain following cessation attempts as 62 percent (10). These reports of oral pain from study participants compromised their successful tobacco-with-paan cessation. The prevalence was higher than the UK national prevalence estimate of 40 percent (11). Further investigation concluded that this oral pain was of dental origin (12). The clinical correlates of this pain were not identified.

Qualitative investigations of the rationale for tobacco-with-paan chewing in South Asian communities have indicated the use of chewing tobacco to provide topical pain relief from oral conditions (13,14). There is no literature linking oral health status with self-reported oral pain and its impact on successful tobacco cessation.

This exploratory study therefore aimed to investigate the oral health status of female UK resident Bangladeshi tobacco-with-paan chewers and to explore its relationship to self-reported oral pain before and after tobacco cessation attempts. The specific objectives were: (1) to assess the oral health status of a sample of Bangladeshi women tobacco-with-paan users and its relationship to participant age and number of daily paan, (2) to determine the prevalence of oral pain at baseline and at the one-week postcessation follow-up, and (3) to explore the relationship between oral health status and changes in self-re-

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ported oral pain at baseline and at the one-week postcessation follow-up.

## Methods

Adult Bangladeshi women aged 18 years and older recruited into a four-week tobacco-with-paan cessation program were invited to participate in this study, which was carried out between January and May 2002. Terminally ill, psychiatric patients, and those with learning disabilities were excluded, as were tobacco smokers. Smoking status was validated with expired air carbon monoxide readings, with a threshold of 10 ppm to identify tobacco smokers. Volunteers were recruited, using a standard protocol (10), from community centers, referrals by other health workers, and referrals by existing participants. Those interested were given information about the study. They were told that taking part involved completing interviews before entry into the tobacco cessation program and at regular follow-ups after entry into the program. They were also told that their mouths would be screened for any dental, gingival, or soft tissue problems. Those choosing not to take part in this study remained in the tobacco cessation program.

Interviews were conducted in Sylheti at baseline by one female Bangladeshi researcher (SB) using fully structured questionnaires. One trained and calibrated dentist (MJ) carried out an oral examination in a dental teaching hospital. Before the examination, volunteers were asked a set of questions about their medical history in relation to any risk that the examination may pose. Each subject was asked to sit in a dental chair and to open her mouth. The cheeks and lips were retracted from the teeth with a mirror or finger. A standard chairside dental light was used to aid visual examination of the intraoral soft, dental, and periodontal tissues.

After the examination, volunteers entered the tobacco-with-paan cessation program. An individual quit date was agreed upon with the volunteer. Nicotine replacement therapy (Nicorette® 15 mg, Pfizer) patches were supplied by mail to reach the volunteer before the quit date, usually one week after recruitment into the cessation program. Volunteers were contacted on a weekly basis during the program, at which time any adverse effects and withdrawal symptoms would be discussed, encouragement to continue cessation provided, and further nicotine replacement therapy patches supplied.

At baseline, before entry into the tobacco cessation program, data were collected on:

- Age and number of daily paan.
- Oral pain status and characteristics using an oral pain questionnaire developed from previously collected qualitative data (15). The questionnaire asked about the presence of pain in the teeth, mouth, and face regions, its intensity, frequency, any provoking factors, and associated symptoms.
- Oral health status using the World Health Organization (WHO) screening criteria for type and site of OMLs (16), and the UK Adult Dental Health Survey criteria for decayed, missing, or filled teeth, recession, abrasion, loss of attachment, and tooth wear (17).

One week after the quit date, as part of the standard cessation program protocol, the volunteers were followed up through a telephone interview. The following data were collected:

- chewing status,
- oral pain status and characteristics—oral pain questionnaire.

In the data analysis, frequency distributions of age, number of daily paan, oral health status, and self-reported oral pain are presented. Comparison of oral health status between young and older adults was carried out using the Mann-Whitney U and chi-squared tests. The prevalence of oral pain at baseline was compared to that at the one-week follow-up. The Wilcoxon signed rank test was carried out to determine whether the increase in the number of new cases of pain was significant. Simple logistic regression analyses were carried out to predict new cases of pain at the one-week follow-up from measures of age, number of daily paan, decayed and filled teeth, teeth with abrasion and loss of attachment greater than 3.5 mm, and the presence of an OML. As the age distribution of the volunteers indicated that some might be postmenopausal, a further logistic regression was undertaken to see whether sex-specific hormones might predict the reporting of new cases of pain. The current UK norm for onset of menopause of 51 years was adopted for this analysis (18). Finally, a stepwise multiple logistic regression analysis was carried out to identify the best predictors of oral

**TABLE 1**
**Clinical Oral Health Status of Sample of Bangladeshi Female Tobacco-in-paan Chewers at Baseline, by Age**

| | Total at Baseline (*N*=52) | Adults 18–39 Yrs (*N*=21) | Adults 40+ Yrs (*N*=31) | *P*-value |
|---|---|---|---|---|
| Mean age in years (SD) | 42.8 (11.1) | | | |
| Mean number daily paan (SD) | 13 (10.0) | 14 | 13 | .450* |
| Mean number of affected teeth (SD) | | | | |
| Decayed | 0.7 (1.4) | 0.8 | 0.7 | .508* |
| Missing | 2.6 (4.0) | 1.7 | 3.2 | .535* |
| Filled | 0.7 (1.6) | 0.6 | 0.8 | .686* |
| Decayed, missing, or filled | 4.0 (5.1) | 3 | 4.6 | .735* |
| With recession | 5 (4.7) | 3.1 | 6.3 | .029* |
| With abrasion | 1.9 (3.5) | 0.7 | 2.8 | .060* |
| Loss of attachment >3.5 mm | 14.5 (8.3) | 10.6 | 17.3 | .004* |
| Loss of attachment >5.5 mm | 2.4 (4.2) | 0.9 | 3.5 | .003* |
| With tooth wear | 1.6 (3.5) | 0.7 | 2.2 | .033* |
| Number of subjects (%) | | | | |
| Without oral mucosal lesion | 34 (65) | 20 (95) | 14 (45) | .001† |
| With oral mucosal lesion | 18 (35) | 1 (5) | 17 (55) | |

*Mann-Whitney U test.
†Chi-square test.

**TABLE 2**
**Prevalence of Self-reported Oral Pain at Baseline and at One-week Follow-up**

| | No Pain at 1-week Follow-up | Pain at 1-week Follow-up | Total |
|---|---|---|---|
| No pain at baseline | 20 (38.5) | 18 (34.6)* | 38 (73.1) |
| Pain at baseline | 5 (9.6) | 9 (17.3) | 14 (26.9) |
| Total | 25 (48.1) | 27 (51.9) | |

*Increase in the number of new cases of pain was statistically significant (Wilcoxon signed rank test, $P$=.007).

pain postcessation.

## Results

This study was carried out between January and May 2002. Ninety-seven women received information about the tobacco cessation program and 54 agreed to enter the program. Of these 54 women, 52 volunteered to take part in this study and were available for the one-week follow-up. The mean age of the sample was 42.8 years and the mean number of daily paan with tobacco was 13. The baseline oral examination showed that adults aged 40 years and older had poorer oral health compared to those aged 18–39 years (Table 1). These older adults were significantly more likely to have higher numbers of teeth with recession, abrasion, loss of attachment greater than 3.5 mm, and loss of attachment greater than 5.5 mm. Those in the older age group were also significantly more likely to have an OML at baseline.

Of the 18 OMLs identified, nine were ulcers, four had lichen planus-like appearance, two were white patches (leukoplakia), two were dental abscesses, and one was an epithelial polyp. Eleven of the OMLs were sited in the buccal mucosa, three on the alveolar ridge, two were on multiple sites, and one on the lips.

The prevalence of oral pain at baseline was 26.9 percent (Table 2). At the one-week follow-up, it had increased to 51.9 percent. There were 18 new cases of self-reported pain at the one-week follow-up compared to baseline. The increase in the number of new cases of pain was statistically significant (Wilcoxon signed ranked test, $P$=.007).

Results of the simple logistic regression carried out to predict new cases of pain at the one-week follow-up showed that participants with an OML at baseline were over four times more likely to report oral pain at the one-week follow-up (odds ratio [OR]=4.06; 95% confidence interval [CI]=1.20, 13.78; $P$=.025). None of the other measures (age, number of paan-with-tobacco chewed daily, oral health status) were significant (Table 3). Postmenopausal status did not predict the reporting of new cases of pain (OR=1.13; 95% CI=.665, 14.48; $P$=.15). The results of the stepwise multiple logistic regression analysis confirmed that OML at baseline was the only significant predictor of new cases of oral pain (OR=3.66; 95% CI=1.06, 12.62; $P$=.04).

At the completion of the four-week cessation program, 42 volunteers remained and 79 percent of these reported successful paan-with-tobacco cessation.

## Discussion

This was an exploratory study carried out to investigate the oral health status of a sample of Bangladeshi female tobacco-with-paan users entering a tobacco cessation program, and to explore the relationship between oral health status and self-reported oral pain one week after giving up tobacco. It has focused on one traditional South Asian tobacco product, use of which is known to be prevalent among women in this community.

Although the sample was small, the results compared well with other studies on the oral health status of the UK resident Bangladeshi population. Measures of the number of decayed,

**TABLE 3**
**Simple Logistic Regression Analyses to Predict New Cases of Pain at One-week Follow-up from Measures of Age, Number of Daily Paan, and Oral Health Status**

| | No Pain | Pain | | Odds | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | Mean (SD) | Mean (SD) | $P$-value | Ratio | Lower | Upper |
| Age | 39.8 (11.2) | 46.1 (9.7) | .153 | 1.04 | 0.99 | 1.10 |
| Number daily paan | 13 (10.5) | 14 (10.3) | .104 | 1.05 | 0.99 | 1.11 |
| | Mean (SD) | Mean (SD) | | | | |
| Affected teeth per subject | | | | | | |
| Decayed | 0.7 (1.2) | 0.8 (1.6) | .192 | 1.34 | 0.87 | 2.06 |
| Filled | 0.4 (1.0) | 0.8 (1.8) | .417 | 1.16 | 0.82 | 1.64 |
| With abrasion | 1.0 (1.5) | 2.9 (4.6) | .892 | 0.99 | 0.84 | 1.17 |
| With loss of attachment >3.5 mm | 13.3 (8.8) | 15.9 (8.3) | .773 | 1.01 | 0.94 | 1.09 |
| | *n* (%) | *n* (%) | | | | |
| Oral mucosal lesion status at baseline | | | | | | |
| Without oral mucosal lesion | 26 (76.5) | 8 (23.5) | | | | |
| With oral mucosal lesion | 8 (44.4) | 10 (55.6) | .025 | 4.06 | 1.20 | 13.78 |

missing, or filled teeth and OMLs confirm those reported previously for the Bangladeshi population resident in the United Kingdom (7,8). Those studies concluded that while there was considerable normative dental need, caries experience was low and periodontal treatment need was high. Data for other aspects of dental health are not available for comparison. When compared with the general population in the United Kingdom (19), the numbers of decayed, missing, or filled teeth were relatively low. In addition, the reported mean number of paan-with-tobacco chewed daily was the same as that reported for a large random sample of Bangladeshi women from this community (6). Professional baseball players who chew smokeless tobacco also have been reported to show significantly greater gingival recession and periodontal attachment loss in sites adjacent to OMLs (20,21).

The prevalence of OMLs in the present study, at 36 percent, is also consistent with that reported for an earlier study sample carried out in the same UK resident Bangladeshi community (9). In a study of North American moist snuff users, Johnson et al. (22) reported an association between smokeless tobacco use and OMLs. A review of betel chewers' mucosa carried out by Reichart and Phillipsen (23) reported that the prevalence of betel chewers' mucosa varies between 0.2 percent and 60 percent in different studies from South and Southeast Asia.

The prevalence of OMLs reported in the literature for different populations, not necessarily tobacco-with-paan chewers, ranges from 5 percent (24) to 62 percent (25,26). This sample of tobacco-with-paan chewers does not appear to have an unusually high prevalence of OMLs.

In the present study, the results of a simple logistic regression indicated that a significant number of additional subjects who were observed to have an OML at baseline reported oral pain at the one-week follow-up, having not done so at baseline. The statistical significance of presence of OML at baseline was confirmed with a stepwise multiple logistic regression. This finding complements the self-reporting of oral pain following smokeless tobacco cessation and the use of tobacco to provide topical analgesia for oral conditions (10,13,14). This finding suggests that an ingredient of the paan, possibly the nicotine in tobacco, has an analgesic effect (27,28) on OMLs. Chronic nicotine-induced analgesia or the ability of nicotine to decrease sensitivity to pain has been reported in animal (29-31) and human (32) studies. This literature is, however, inconclusive as to the impact of nicotine on the pain threshold and tolerance ratings of males and females. The results of the present study suggest that nicotine has the effect of increasing the pain threshold in this sample of women. The nicotine replacement therapy patches that were supplied as part of the cessation program might be expected to offer a systemic effect, supporting the reported use of tobacco-with-paan to offer a topical effect in the oral cavity (33). This provides a possible explanation for the expression of pain from OMLs following tobacco abstinence, but no expression of pain while the lesions are exposed to the nicotine from tobacco-with-paan prior to entering the cessation program.

Limitations to the study should be recognized. The sample size was small, reflecting difficulties in recruiting participants. Transport was provided for travel to the Dental Hospital for the oral examination and a female Bangladeshi researcher escorted the recruits to maximize participation. In this community, a short period of time exists during the day when women are free from household and family commitments during which data collection is possible. Appointments that were made often had to be rescheduled at short notice because participants could not keep them. The exploratory nature of the study and these features of the study sample inhibited the organization of duplicate oral examinations and interviews. In collecting data on OMLs, WHO criteria were adopted. These allowed for identifying the lesions through their superficial appearance; however, more detailed clinical features were not recorded. For example, an OML recorded as an ulcer did not distinguish between an aphthous ulcer or a cold sore.

The interpretation that oral pain is a direct consequence of giving up tobacco-with-paan chewing and, therefore, acts as a potential barrier to cessation needs to be viewed with caution. The design of the current investigation cannot confirm that tobacco cessation is the reason for experiencing oral pain. Further research, using a randomized clinical trial design, is needed to compare the prevalence of oral pain in women given a tobacco cessation intervention and those given a placebo. The results of further studies will be important in the context provided by the widespread adoption of this traditional tobacco practice throughout South Asia and the use of chewing tobacco in North America.

The successful cessation rate achieved in this four-week program was much higher than that reported previously (79% vs 22%) (10). Comparisons between these two studies should be made with caution. In the first study the identification of oral pain as a barrier to successful tobacco cessation was unexpected. In the study reported here the potential impact of oral pain was addressed by offering access to dental care when required. This reinforces the potential role of the dentist in tobacco cessation practice that has been noted (34). The findings of this study, if confirmed, indicate that successful tobacco cessation for this group also would involve accessing appropriate dental care services, specifically to address periodontal treatment needs and the identification and treatment of OMLs. The UK resident Bangladeshi community is marginalized and suffers multiple disadvantages, including gaining satisfactory access to health care (35). Overcoming these barriers to care will be important if the high prevalence of paan-with-tobacco chewing is to be successfully reduced.

In conclusion, the results of this study confirm that there is considerable normative dental need in UK resident Bangladeshi women. The results also suggest that reports of oral pain at follow-up during a tobacco cessation program correlate with the presence of OMLs at baseline in this sample of tobacco-with-paan chewers. Further investigation of this relationship between OMLs and the dimensions of the self-reported pain is required. Access to appropriate dental care is indicated to allow the development of appropriate treatment protocols as an aid to successful tobacco cessation.

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