Tobacco Use, Oral Cancer Screening, and Oral Disease Burden in Indian Women

Abstract

Introduction: India lacks data on national level adaptation of oral cancer screening measures and burden of oral diseases. We intend to address the issue through a secondary data analysis of existing data and reports. Materials and Methods: Data were acquired from the National Family Health Survey-4 (2015-2016). Of the 699,686 responses, representing 99% of India’s women population living in all of India, the following data from the age group of 15–49 years were mined – any tobacco use, desire to quit tobacco use, and oral cavity screening for cancers. Data from Central Health Intelligence Bureau 2016 was used to identify population served by dentists in each state. The state-level data of the District Level Household and Facility Survey-4 (2012–2013) were mined for household population having symptoms of chronic illness including mouth/dental illness persisting for more than 1 month and had sought treatment. Statistical Analysis Used: SPSS version 20; Descriptive statistics for values in proportions; Pearson’s correlation test assessed between the various factors. Results: Tobacco use in any form was highly prevalent among the North Eastern states, and there was also a lack of willingness to quit the habit. There was unequal distribution of dentists in different states. No significant statistical correlation was found between the proportions. Conclusion: There is disparity existing in treating seeking behavior of the general population as well as the need for dental treatment. The skewedness in dentists’ distribution among the nation as compared with oral burden of diseases needs to be correlated before oral health policies are planned.

Keywords: Dentists’ distribution, disease burden, health-seeking behavior, oral cancer

Introduction

Oral health is an integral part of general health. Poor oral health in addition to causing dental disease worsens conditions such as diabetes and cardiovascular disease. Tobacco has been associated with gingival and periodontal inflammatory disorders, potentially malignant disorders, and oral cancer. Oral cancer in the Indian subcontinent is the 3rd most common cancer among men and 6th most common cancer among females.

In India with an estimated 1.3 billion population, the health-care access varies among the states and Union territories.[1] According to the report by Vundavalli et al.,[2] the dentist to population ratio is 1:10,271. There is a large number (approximately 26,000) of dentists graduating every year. New emerging dentists find it difficult in private sectors, and there are <5% graduated dentists in government sector. Policies at the national level to address this problem is the need of the hour.[2]

People avail only symptomatic treatment for dental problems, particularly pain and do not report back for follow-up to the dentist. The major constraints for rural women to avail dental facilities are anxiety and fear of the treatment, lack of time, habit of self-medication, and lack of priority for oral health care.[3] The exact burden of oral disease in India is not clearly known.[1] We describe and discuss here the tobacco use pattern, reach of oral cancer screening measures, and burden of oral diseases in Indian women based on national data from epidemiological studies (1960s to 2001).

Materials and Methods

Data for this study were acquired from the National Family Health Survey (NFHS)-4 2015–2016 reports. This survey is carried out once in 10 years and consists of door to door interview of households. The survey was conducted by the India-based International Institute for Population Sciences in collaboration with various Field Organizations and technical assistance from Demographic

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The survey uses a multistage, stratified sample design; especially calculated weights for extrapolation to national estimates. The NFHS-4 survey was done from representative population obtained in such a fashion that all Indian citizens who satisfied the inclusion criteria had an equal probability of being sampled. Appropriate sample size estimation was carried out as previously described.[4] Urban and rural samples were drawn independently in each Indian state. The NFHS-4 survey involved a two-stage cluster sampling procedure which was followed in rural areas (villages, households) and a three-stage procedure in urban areas (wards, blocks, households). Both at rural and urban areas, random sampling was done till the last stage. The data set utilized was for women in the age group of 15–49 years and contained women’s responses obtained from 699,686 women in the age group of 15–49 years and representing 99% of India’s women (15–49 years) population living in all of India. This data for women were utilized rather than men due to the low health-seeking behavior of women attributed to mobility constraints in rural areas and the lack of female doctors in rural areas.[5] Furthermore, oral screening is easier when clubbed with screening for common cancers among women such as breast cancer and cancer of the uterine cervix. The individual data of surveyed participants from this study have still not been released while consolidated data have been released as fact sheets. The fact sheets from such survey were mined for the following – any tobacco use, desire and attempt to quit tobacco use and oral cavity screening for cancers. All the retrieved data were expressed as percentage of the women screened.

The number of dentists and the estimated population in each state of India, as reported in Central Health Intelligence Bureau 2016 (which provides data till end of 2014), were used to identify the population served by dentists in each state. Furthermore, the available state-level data of the District Level Household and Facility Survey-4 (DLHF-4) (2012–13) were mined for obtaining percentage of household population having symptoms of chronic illness including mouth/dental illness persisting for more than 1 month and had sought treatment from different dental establishments (Government, Private Institutions). These data are not available for all the states. The District Level Household and Facility Survey-4 (2012–2013) is an earlier survey done on the lines of NFHS-4 but with emphasis on locoregional factors in the field of health, economic opportunities, and access to health services. These data form the basis for designing future policies.

All data were tabulated and analyzed using Statistical Package for Social Services, version 20 (SPSS®, IBM, IL, USA). Descriptive statistics are presented as the values are expressed in proportions; Pearson’s correlation test was assessed between any tobacco use, willingness to quit tobacco, oral cancer screening as well as unmet dental need in select states with available data.

## Results

The data mining from the relevant (NFHS-4, DLHF-4) reports, yielded the percentage of eligible women interviewed for any tobacco use, oral cancer screening, and the percent of tobacco using women willing to quit tobacco. Data of the estimated population as well as number of dentists were accumulated from sources[4,6] and the population served by one dentist was calculated by using the formula:

\[
\text{Number of population served by 1 dentist} = \frac{\text{Total estimated Population of state to (nearest 10,000)}}{\text{Number of dentists in the state}}
\]

The percentage of women who have been ever screened for oral cancer, use of any tobacco, and willingness to quit tobacco are given in Table 1.

### Oral cancer screening

The percentage of women (15–49 years) who had been screened for oral cancer at national level was 15.6% in urban and 10.7% in rural areas making a total of 12.4%.

Chandigarh and the Union territories of India have some data mentioned as observed in Table 1. In urban areas of India, the percentage of women screened ranged from 4.5% (West Bengal) to 54.7% (Lakshadweep) while in rural areas, it was 2.7% (West Bengal) to 52.3% (Goa).

The total women percentage ever screened ranged from 3.3% in West Bengal to 57.3% in Lakshadweep.

### Any tobacco use

Use of tobacco among urban women ranged from 0.1% (Kerala, Punjab) to 59.2% (Mizoram) while in rural areas, it was 0.1% (Punjab) to 59.3% (Mizoram). The overall range was 0.1% (Punjab) to 59.2% (Mizoram).

### Women willing to quit habit

Women in urban areas who were willing to quit their habit ranged from 14% (Andaman and Nicobar) to 54.7% (Tripura) while in rural areas, it was from 8.1% (Assam) to 52% (Uttarakhand). The total percentage of women showing their willingness to quit ranged from 9.2% (Assam) to 49.3% (Uttarakhand).

The number of population served by one dentist ranged from 1777 persons in Karnataka to 3,35,383 persons in Jharkhand.

As shown in Table 2, the percentage of women suffering from chronic illness (>1 month) in the preceding year ranged from 2.9% (Himachal Pradesh) to 19.1% (Haryana) in the urban areas while it was 1.8% (Nagaland) to 18.5% (Haryana). The overall percentage ranged from 2.2% (Nagaland) to 18.7% (Haryana). The percentage of population suffering from oral diseases of all the population suffering from any chronic disease varied between 0.2% (Goa) to 5.1% (Nagaland). In urban areas, it ranged
from 0% in Tripura to 4.8% in Arunachal Pradesh while in rural areas, it ranged from 0% in Goa to 7.1% in Nagaland.

On correlating the proportions between oral cancer screening for women, any tobacco use, percentage of tobacco users willing to quit habit, population served by one dentist, and percentage of the population requiring dental treatment, there was no statistically significant correlation found between them [Table 3].

**Discussion**

Oral health is an integral part of general health. Oral health in a wide section of the Indian population is relatively poor, with high prevalence of dental caries, periodontitis, and oral cancer.[3] Oral cancer and precancer is a major problem in the Indian subcontinent apart from other oral diseases and is of public health importance. India is one emerging economic country in the world; however, there are still regions with inadequate access to a well-organized or a well-trained cancer care system. Furthermore, there is the economic burden in treating cancer, causing familial and social instability.

According to the Global Research policy, there is a disparity between gender among the rural population of India due to mobility constraints faced by women in accessing health services and also because Indian women frequently underreport illnesses or ailments.[5] We mined
the data of females (urban and rural), as it was found that the female healthcare-seeking behavior is a rate-limiting factor for the health-care delivery.

The female age group of 15–49 years in our study requires exploration since oral cancer was thought to be a disease of elderly women. Recent reports have highlighted the increased occurrence of oral cancer in younger females. Hence, studying the habits (tobacco/areca) among the younger females, creating awareness about the harmful usage of deleterious habits, and detecting cancer in its early form as oral potentially malignant disorder (OPMD) by proper oral screening is the need of the hour.

Tobacco use in any form was highly prevalent among the urban and rural females of Mizoram, Tripura, and other North Eastern states, and there was also a lack of willingness to quit the habit. The states of Chandigarh, Punjab, Himachal Pradesh, and Kerala have a lesser prevalence of tobacco use. This underlines the fact that the use of tobacco, gutkha, and areca is multifactorial and depends on the lifestyle and behavioral patterns, ethnicity of people in different geographic locations and varied in the awareness level of the causation of cancer.

Similarly, the population of females (urban and rural) who have undergone screening by general dental practitioners (GDP) in the North Eastern states is quite low compared to the states with higher literacy such as Punjab, Chandigarh, and Kerala which also had a higher number of dentists available to serve the population.

Jharkhand had the highest dentist: population ratio, followed by Odisha and Bihar. The number of dental colleges in the country (http://www.medindia.net/education/dental_colleges.asp; accessed on May 2017) is 328 (Private, Government, Dental OP in Government medical hospitals) dental organizations excluding private dental clinics. In spite of numerous dental colleges in the country, there still exists inequality in the state-wise distribution of dental colleges. There are more dental colleges in urban areas than

| State                  | Oral diseases prevalence as percentage of chronic illness | Percentages of chronic illness |
|------------------------|----------------------------------------------------------|--------------------------------|
|                        | Urban | Rural | Total | Urban | Rural | Total |
| Andhra Pradesh         | 0.6   | 0.6   | 0.6   | 12.5  | 12.6  | 12.6  |
| Arunachal Pradesh      | 4.8   | 2.7   | 3.2   | 7.8   | 7.6   | 7.6   |
| Goa                    | 0.3   | 0     | 0.2   | 12.6  | 9.2   | 11.3  |
| Haryana                | 0.8   | 1.2   | 1.1   | 19.1  | 18.5  | 18.7  |
| Himachal Pradesh       | 3     | 2.6   | 2.6   | 2.9   | 3.3   | 3.2   |
| Karnataka              | 1     | 1.6   | 1.4   | 7.1   | 5.4   | 6.1   |
| Kerala                 | 0.4   | 0.5   | 0.5   | 7.5   | 7.2   | 7.3   |
| Maharashtra            | 1.2   | 1.3   | 1.3   | 8.8   | 8.5   | 8.6   |
| Manipur                | 1     | 2.4   | 1.8   | 14.4  | 9.8   | 11.3  |
| Meghalaya              | 3.4   | 3.1   | 3.1   | 3.1   | 3.3   | 3.3   |
| Mizoram                | 1.1   | 2.4   | 1.5   | 4.2   | 2.7   | 3.5   |
| Nagaland               | 2.8   | 7.1   | 5.1   | 3     | 1.8   | 2.2   |
| Punjab                 | 0.5   | 0.7   | 0.6   | 12.2  | 11.9  | 12    |
| Sikkim                 | 1.5   | 0.8   | 1     | 9.2   | 7.8   | 8.1   |
| Tamil Nadu             | 0.8   | 1     | 0.9   | 4     | 3.8   | 3.9   |
| Tripura                | 0     | 1.2   | 0.8   | 5.2   | 3.8   | 4.1   |
| West Bengal            | 0.6   | 1.2   | 1     | 15.3  | 13.7  | 14.2  |

Table 2: Percentage of women population in Indian states requiring dental treatment among all those with chronic illness for 1 month in the last 1 year

Table 3: Correlation of any tobacco use, oral cancer screening, attempting to quit tobacco, population served by one dentist, and oral disease burden
in rural parts. The lack of employment of dental graduates in government setup peripheral centers and hospitals in low socioeconomic and poor resource areas are the reasons for the inequality in dentists serving the population.\textsuperscript{[7]} This is clearly delineated in the population-dentist ratio in states such as Karnataka and Chandigarh where there are more number of dental colleges.

The prevalence of chronic illnesses or diseases among females throughout the states of India (urban/rural) can be due to varied dietary patterns, cultural festivities which occur many times in a year leading to much intake of sugary and fat delicacies, sleep and stress patterns (Call centers, Information technology sector). Those in urban areas who have good accessibility to health centers are able to avail health checkups periodically and keep their health progress in check whereas the rural population do not avail either due to negligence or lack of health-care facilities. Among the percentage of chronic illnesses, the prevalence of oral diseases (including cancer) was found to be almost equal to or more than other noncommunicable illnesses present in the females in states such as Arunachal Pradesh, Himachal Pradesh, North Eastern states of Mizoram and Nagaland. On one hand, this may be due to complete negligence toward health, misconception, and conservatism among people in such states of India.\textsuperscript{[3]} On the other hand, less number of medical and dental staff, hospital setups with lack of proper facility is a matter of serious concern.

A major confounding factor in the prevalence of oral cancer is the ability of dentists to identify oral cancer and OPMD.\textsuperscript{[8]} A study by Devi \textit{et al.} to assess the awareness concerning the early detection and screening of potentially malignant oral disorders and oral cancer among GDP of Tamil Nadu (\textit{n} = 194) reveals that 3\% of GDPs fail to counsel or advice the patients to quit the habit. This also creates a gap in clinical practice and the risk of OPMDs and cancer. Moreover, the GDPs lacked the knowledge of the clinical variants of OPMDs. The lack of knowledge of dentists toward the need for biopsy and the site needed to be biopsied was also found to be an impending factor. Nearly 78\% of dentists felt the need for assistance or consultation of an oral pathologist for biopsy.\textsuperscript{[8,9]} There is a need for oral health awareness programs in mass community setups.

Tobacco use predisposes to oral lesions/conditions and interferes with healing of oral wounds.\textsuperscript{[10]} The “unmet” burden of oral diseases as well as the large volume of tobacco users underlines the role of Indian dentists in averting tobacco-related morbidity.

**Conclusion**

With the out-of-pocket medical expenditure pushing a 3.5\% of Indian population, roughly translating to 150 million Indians, being pushed into poverty, it is necessary that preventive programs such as oral cancer screening and for dental diseases be employed.\textsuperscript{[10]} The present study highlights existence of huge “treatment gap” for dental treatment among general population, especially among tobacco users, as well as the need for dental treatment. Furthermore, the skewed distribution of dentists is a cause of concern. Urgent remedial steps including introduction of dental insurance, at least for preventive aspects would help to mitigate the problem of dental maladies among the general population.

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**Conflicts of interest**

There are no conflicts of interest.

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