Assessment of Oral Health Status and Access Barriers of Patients Reporting to a Dental College in Lucknow

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Abstract

**Background:** Dental caries and periodontal diseases have been considered the most important global oral health burdens. The dentist-to-population ratio is 1:10,000 in urban areas, whereas 1:50,000 in rural areas. There are several challenges being faced in delivery of oral health care to the Indian population, such as lack of workforce and poor accessibility which is compounded by poverty and illiteracy. In view of the above, the present study was carried out. **Aim:** The aim of the study is to assess dentition status, oral mucosal lesions, and periodontal status of patients and to determine the level of access barriers of the population in utilization of oral health services of dental college in Lucknow. **Materials and Methods:** A hospital-based survey was designed to assess the dentition status, oral mucosal lesions, periodontal status, and access barriers of patients reporting to dental college in Lucknow. The study was conducted among patients aged above 15 years coming to the Outpatient Department of Oral Medicine and Radiology in Dental College. The participants completed a self-administered questionnaire regarding accessibility and utilization of dental services across different socioeconomic groups. Caries status, Community Periodontal Index, and oral mucosal lesions were recorded as per the WHO 2013 pro forma. All descriptive as well as inferential statistical analysis using Chi-square was carried out using SPSS version 21.0 for Windows and the value of $P < 0.05$ was considered statistically significant. **Results:** Dental caries was found to be 55.8%, prevalence of oromucosal lesions was 11.1%, and only 1.6% had loss of attachment (6–8 mm) and prevalence of periodontal disease was 40.3%. Access to dental care in the present study was high 80.1%. Regarding the utilization of dental services, a large percentage of the respondents visited the dental college only when they have a toothache (48.1%) or hole in the tooth (14.8%). Only very few visit the dentist for regular checkups or cleaning (2.2%). **Conclusion:** The prevalence of dental caries was 55.8% and mean decayed-missing-filled teeth was 8.57%. The periodontal changes were 40.3% and severe periodontal disease was uncommon. The most important barrier in the utilization of the available services was cost of seeking oral care and individual variations in perceived need of care.

**Keywords:** Access barriers, dental caries, oral health, oral mucosal lesions, periodontal disease

**Introduction**

Oral health is as important as general health, and there are multiple factors which influence an individual’s oral health. These factors include various sociodemographic factors such as geographic location, socioeconomic status, and literacy. Oral health comprises of the oral and related tissues which enables an individual to eat, speak, and socialize without active disease, discomfort, or embarrassment which contributes to general well-being. Recent researches link oral diseases to heart and lung diseases, diabetes, premature deliveries, low-birth-weight babies, and a number of other systemic diseases, and thus oral health is a critical component of general health status.

Dental caries and periodontal diseases have been considered the most important global oral health burdens. The prevalence of dental caries in 5–7 years, 12–15 years, 35–44 years, and 65–74 years is 33.2%, 31.3%, 64.9%, and 50.1%, respectively. The prevalence of periodontal disease in 35–44 years and 65–74 years is 65.2% and 90.4%, respectively, in an Indian study. Nearly 19% of the population aged between 65 and 74 years is edentulous.

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Oral conditions, including oral cancer, oral manifestations of HIV/AIDS, dental caries, and periodontal disease, all have broad impacts on oral health and well-being. In one of the study, dental caries was observed to have higher prevalence, 46.9% in females and 43.8% in males and periodontitis and gingivitis had the prevalence of 52.3% in females and 47.7% in males. Oral health and general health share common risk factors related to diet, the use of tobacco, and the excessive consumption of alcohol and the solutions to control oral disease are to be found through shared approaches with integrated chronic disease prevention.

Although many oral diseases are not always life-threatening, they are important public health problems because of their high prevalence, and impact on individuals and society in terms of pain, discomfort, social, and functional limitations and also their effect on the quality of life. The distribution and severity of oral diseases vary in different parts of the world and within the same country or region. People residing in rural areas are generally not able to reap the benefits that urban residents can, let it be in field of education, health facilities, or any other fields due to various access barriers. India is the second highest populated country with more than 1.35 billion population, out of which approximately 72% live in rural areas and remaining 28% in urban areas. The dentist to population ratio is 1:10,000 in urban areas, whereas 1:50,000 in rural areas. There are several challenges being faced in delivery of oral health care to the Indian population, such lack of workforce and poor accessibility which is compounded by poverty and illiteracy. Moreover, there is a great paucity of data pertaining to oral health status of rural population of India which is essential for planning oral health services for the population. Considering the above facts, the present study was undertaken with the aim to assess the dentition status, oral mucosal lesions, periodontal status, and various access barriers of the population in utilization of oral health services in dental college.

**Materials and Methods**

A questionnaire-based cross-sectional hospital survey was designed to assess of dentition status, oral mucosal lesions, periodontal status, and access barriers of patients reporting to the dental college in Lucknow. The study was conducted for a period of 3 months from March 1, 2018, to May 30, 2018. Patients included patients aged 15 and above to Outpatient Department (OPD) of Oral Medicine Diagnosis and Radiology (OMDR), in dental college. The study was conducted in morning hours between 11 am and 1 pm when the number of patients attending OPD is maximum. A pilot study was conducted on 85 patients before the start of the main study, to check the validity of the questionnaire based on the reference article and operational feasibility of the study.

The questionnaire consisted of two parts. The first part of the questionnaire consisted of three sections:

a. The first section included demographic details such as name, age, gender, and residential address

b. The second section included the socioeconomic status (Kuppuswamy socioeconomic status scale, 2017)

c. The third section included questionnaire regarding accessibility and utilization of dental services across different socioeconomic groups.

The second part included examination of dentition status tooth wise (WHO 2013), Community Periodontal Index (CPI) (WHO 2013), and oral mucosal lesions (WHO 2013) Department of Public Health Dentistry.

Cronbach’s alpha was applied for reliability of the questionnaire as the questionnaire items were analyzed for understanding, interpreting, and answering correctly without any difficulty. The same set of questionnaire was asked to the patients 2 weeks after the questionnaire was used for the first time. These two sets of responses were then used in calculating alpha coefficient which was found to be 0.84. No adjustments were found to be necessary. These patients were not the part of the final study sample. A sample size of 850 was decided on the basis that the data would be collected from 15 patients daily, for 3 months (anticipating 19 days in a month).

Ethical clearance was obtained from the Institutional Ethical Committee of the college vide letter No. 951216/PHD/EC dt 16/02/18. The study procedure was explained to the participants and informed consent was obtained from all the participants prior to the study.

All the patients were explained about the study procedure and those who accepted to participate in the study were included in the study as per the following inclusion and exclusion criteria.

### Inclusion criteria

1. Individuals above 15 years of age visiting the OPD of OMDR of dental college in Lucknow, Uttar Pradesh, India
2. Individuals living within 15 km radius from college.

### Exclusion criteria

1. Individuals with cognitive, hearing, or vision impairment
2. Medically compromised individuals
3. Pregnant women.

The study was carried out by a single investigator who was trained in recording dentition status, CPI an oral mucosal lesions as per the WHO 2013 pro forma, before the start of the study. The questions for the survey was pretested and predesigned and was written in English and Hindi language. Data were collected by personal one-to-one interview. A single investigator had interviewed and examined the subjects. In the hospital, patients present on the day of examination were made to sit on a dental chair with the recorder sitting in front of the patient close to the examiner. Each patient was examined (American Dental Association Type III examination) by the examiner using sterile instruments. All descriptive as well as inferential statistical analysis using Chi-square was carried out using IBM SPSS version 21.0, USA for Windows and the value of $P < 0.05$ was considered statistically significant.
RESULTS

Distribution of subjects according to various sociodemographic details

The age group of the patients was 15 years and above, divided into the blocks of 10 years each and a block of 65 years and above. Among them, 52.6% (447) were male and 47.4% (403) were female. As to geographical distribution, 52.6% were rural and 47.4% were urban. 41.1% were graduate or postgraduate and 39.2% included individuals with limited formal education up to tenth class. Professional, clerical, and technical occupations were represented by only 38% of patients and 5.9% were unemployed. Regarding the socioeconomic status, majority of them were upper-middle class, constituting 37.8% and upper-lower 27.3% [Table 1].

Of the total 850 patients in the present study, who had visited to dental college, access to dental care was as high as 80.1%. It was observed that majority of the respondents only seek dental care when they have a dental problem (82.8%) such as toothache or when their normal masticatory functions are impaired. A large percentage of the respondents visit the dental college only when they have a toothache (48.1%) or hole in the tooth (14.8%). Only very few visit the dentist for regular checkups or cleaning (2.2%). One important fact was that majority of the patients had come to the dental college only after a month or more of their start of tooth problem (64.6%). In examining the factors that constituted barriers to accessing dental care, the study showed that the high treatment cost (68.4%) and to a lesser extent distance to the health facility (24.9%) and clinic environment (3.2%), all affected access.

Prevalence of dental caries in subjects

The prevalence of dental caries was 55.8% (474). 66.3% (267) females and 46.3% (207) males had dental caries, and it was found to be highest in 55–64 years age group. Missing teeth due to caries were found to be higher in lower socioeconomic class 40% as compared to upper socioeconomic class 27.4% [Table 2].

Oral mucosal lesion in subject

The prevalence of oromucosal lesions was 11.1% (94), which included leukoplakia 5.1% (43) followed by other lesions (oral submucous fibrosis [OSMF]) 6% (51). Oral lesions were significantly related to socioeconomic status with approximately 74.2% (36) of lesions occurring in lower class. When site of distribution of oromucosal lesions was studied, it was found that maximum lesions were present on buccal mucosa 7.6% (65) followed by lips constituting 2.6% (22) [Figure 1].

Prevalence of Community Periodontal Index (gingival bleeding and pocket) according to age

A total of 850 patients were examined for CPI. 18.1% of patients had gingival bleeding, while 22.2% had pockets. Gingival bleeding and pockets were found to be highest in patients aged 65 years and above [Figure 2].

| Sample | n (%) |
|--------|-------|
| Age (years) |       |
| 15-24 | 198 (23.3) |
| 25-34 | 226 (26.6) |
| 35-44 | 160 (18.8) |
| 45-54 | 158 (18.6) |
| 55-64 | 67 (7.9) |
| 65 and above | 41 (4.8) |
| Gender |       |
| Males | 447 (52.6) |
| Females | 403 (47.4) |
| Geographical location |     |
| Rural | 447 (52.6) |
| Urban | 403 (47.4) |
| Education |     |
| Professional or honors | 30 (3.5) |
| Graduate or postgraduate | 349 (41.1) |
| Intermediate or posthigh school diploma | 138 (16.2) |
| High school certificate | 143 (16.8) |
| Middle school certificate | 110 (12.9) |
| Primary school certificate | 54 (6.4) |
| Literate | 26 (3.1) |
| Occupation |     |
| Profession | 73 (8.6) |
| Semi-profession | 160 (18.8) |
| Clerical, shopowner | 90 (10.6) |
| Skilled worker | 118 (13.9) |
| Semi-skilled worker | 143 (16.8) |
| Unskilled worker | 216 (25.4) |
| Unemployed | 50 (5.9) |
| Income |       |
| >41,430 | 153 (18.0) |
| 20,715-41,429 | 165 (19.4) |
| 15,536-20,714 | 106 (12.6) |
| 10,357-15,535 | 132 (15.5) |
| 6214-10,356 | 85 (10.0) |
| 2092-6213 | 178 (20.9) |
| <2091 | 31 (3.6) |
| SES |     |
| Upper | 73 (8.6) |
| Upper-middle | 321 (37.8) |
| Lower-middle | 219 (25.7) |
| Upper-lower | 232 (27.3) |
| Lower | 5 (0.6) |

SES – Socioeconomic status

Distribution of maximum loss of attachment score according to age

82.1% patients had score 0, 15.4% had score of 1, while 1.6% were with a score of 3. LOA was found to be more in age group of 25–34 years [Table 3].

DISCUSSION

Dental diseases are a significant public health menace having a substantial impact on the quality of life, which in turn affects
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Table 2: Prevalence of dental caries in patients

| Age group (years), n (%) | Decayed teeth | Filled with decay | Filled without decay | Missing due to caries | Missing due to any other reason | Crown or bridge abutment | Unexposed/unerupted teeth |
|-------------------------|---------------|-------------------|----------------------|-----------------------|-------------------------------|--------------------------|--------------------------|
| 15-24                   | 78 (39.4)     | 14 (7.1)          | 8 (4.0)              | 4 (2.0)               | 9 (4.5)                       | 2 (1.0)                  | 3 (1.5)                  |
| 25-34                   | 126 (55.8)    | 46 (20.4)         | 43 (19.0)            | 38 (16.8)             | 6 (2.7)                       | 10 (4.4)                 | 3 (1.3)                  |
| 35-44                   | 103 (64.4)    | 19 (11.9)         | 14 (8.8)             | 43 (26.9)             | 23 (14.4)                     | 17 (10.6)                | 0 (0.0)                  |
| 45-54                   | 100 (63.3)    | 9 (5.7)           | 18 (11.4)            | 80 (50.6)             | 4 (2.5)                       | 2 (1.3)                  | 0 (0.0)                  |
| 55-64                   | 51 (76.1)     | 8 (11.9)          | 1 (1.5)              | 34 (50.7)             | 6 (9.0)                       | 1 (1.5)                  | 0 (0.0)                  |
| 65 and above            | 16 (39.0)     | 18 (43.9)         | 0 (0.0)              | 35 (85.4)             | 11 (26.8)                     | 0 (0.0)                  | 0 (0.0)                  |
| Total, n (%)            | 474 (55.8)    | 114 (13.4)        | 84 (9.9)             | 234 (27.5)            | 59 (6.9)                      | 32 (3.8)                 | 6 (0.7)                  |
| P                       | <0.001*       | <0.001*           | <0.001*              | <0.001*               | <0.001*                       | <0.001*                  | 0.294                    |

Chi-square test, *Statistically significant

Table 3: Distribution of maximum loss of attachment score according to age

| Highest LOA score | 0-3 mm | 4-5 mm | 6-8 mm | Total |
|-------------------|--------|--------|--------|-------|
| Age (years), n (%)| 15-24  | 217 (87.4) | 21 (10.6) | 4 (2.0) | 198 (100.0) |
|                   | 25-34  | 214 (94.7) | 8 (3.5)  | 4 (1.8)  | 226 (100.0) |
|                   | 35-44  | 135 (84.4) | 24 (15.0) | 1 (0.6)  | 160 (100.0) |
|                   | 45-54  | 125 (79.1) | 33 (20.9) | 0 (0.0)  | 158 (100.0) |
|                   | 55-64  | 42 (62.7)  | 23 (34.3) | 2 (3.0)  | 67 (100.0)  |
|                   | 65 and above | 16 (39.0) | 22 (53.7) | 3 (7.3)  | 41 (100.0)  |
| Total, n (%)       | 705 (82.1) | 131 (15.4) | 14 (1.6) | 850 (100.0) |
| P                  | <0.001* |

LOA – Loss of attachment

Figure 1: Oral mucosal lesion in patients
done by Ikeda et al.[19] (0.4%) and Randhawa et al.[1] (0.48%). Males accounted for higher leukoplakia (8.5%) and other lesions, i.e. OSMF (10.7%). The most common site for the occurrence of oral mucosal lesions was the buccal mucosa (7.6%) similar to that reported by Randhawa et al.[1] This necessitates the need to raise awareness regarding the ill effects of tobacco, by continuing nationwide education and health promotion campaigns emphasizing oral cancer but integrated with wider health messages.

The overall prevalence of periodontal disease was 40.3% which was higher than reported by Macedo et al.[20] (24.4%) and lower than reported by Randhawa et al.[1] (47%); however, it was lower than most of the studies.[21,22] This may be due to the reason that in the present study, 15–34 years age group constituted 49.9% of patients, in which usually periodontal diseases will not be marked. Females accounted for higher periodontal disease (43.1%). Presence of loss of attachment (LOA) (0–3 mm) was among 82.1%, 15.4% had shallow pockets (4–5 mm), and 1.6% had deep pockets (6–8 mm), which was higher than reported by Randhawa et al.[1] who reported 3.2% patients having shallow pockets (4–5 mm) and 0.39% having deep pockets (6–8 mm).

Access to dental services
The results show that majority of the respondents had knowledge about dental problems and also knew where they could receive treatment. Access to dental care in the present study is as high as 80.1%. This could, however, be explained by the fact that most of the respondents in this study were well educated who had an established knowledge about dental
diseases, and these factors according to previous studies can greatly affect access and utilization of dental services as found in the study by Uguru Nkolika. [2]

Access and utilization of dental services
From the results, it was observed that majority of the respondents (82.8%) seek dental care only when they have a dental problem such as toothache or when their normal masticatory functions are impaired. Most dental conditions are slow in onset and it is believed that with 6 monthly regular checkups, any condition will be spotted and treated before it progresses in severity. This can be attributed to the fact that the oral health promotion programs in the country are inadequate to sensitize the population for the need to have regular dental checkups, and the inability to integrate the oral health-care delivery into all relevant health programs, and flag off the oral health component of primary health-care delivery services in the country. [23] This health-seeking pattern is corroborated by previous studies which observed that visits to a dental care facility in most developing countries are undertaken for mostly symptomatic reasons, as stated by Varenne et al. [24]

Barriers to access and utilization of dental care
In examining the factors that constitute barriers to accessing dental care, the study shows that the high treatment cost (68.4%) and to a lesser extent distance to the health facility (24.9%) and clinic environment (3.2%), all affected access. In this light, the results have highlighted the fact that so many different factors come into play in accessing oral health services, and one factor alone might not be enough to constitute a barrier.

Access to health-care services is a general concept, summarizing a set of more specific dimensions, such as availability which refers to location of health services, affordability, which is the ability of consumers to pay for health-care services, and acceptability which is related to individuals perceptions of the nature of health services, and the way and level to which organization of health-care meets clients expectation. [25]

According to N. K Ahuja, dentistry faces serious problems regarding the accessibility of its services to all in India. The major missing link is the absence of a primary health-care approach. The significant geographical imbalance, the distribution of dental colleges, a great variation in the dentist to population ratio in rural and the urban areas contribute to underutilization of dental facilities. Reports suggest that there are about 1 million unqualified dental health-care providers or “quacks” in India. They have long been blamed for misdiagnosis and mistreating. [15]

Limitation of the study
Although the rural population was more than the urban population, these rural people were from close proximity to the urban areas and hence they had urban influence. Since the study was carried out in an urban setting, this might account for the seemingly high access and utilization rate, bearing in mind that most good dental services are found mainly in urban areas. Thus, the results can only be extrapolated to urban settings. Further studies will need to be done to compare rural with urban findings.

Conclusion
This study provides valuable data for a comparison of oral health status of various age and gender groups in the population of southern Lucknow. The prevalence of dental caries was 55.8% and mean DMFT was 8.57%. The periodontal changes were 40.3% and severe periodontal disease was uncommon in the population of Southern Lucknow. Only 1.6% had LOA (6–8 mm) and 11.1% had oral mucosal lesions in the study population.

The most important barrier in utilization of the available services was cost of seeking oral care and individual variations in perceived need of care. College/hospital timings for emergency services should be changed or extended according to the masses needs for effective delivery of oral health care. It has been found that maximum population who visited dental college have come with one or more dental problems, which means, population has considered college/hospital as a curative center.

There was no difference in access and utilization of dental services among different socioeconomic groups, and this could be attributed to the ignorance for regular dental checkups among all socioeconomic groups. Likewise, there was a high emphasis on curative rather than preventive approach to health care, and majority of respondents, regardless of their socioeconomic class, seek care only when symptoms of disease are present.

Recommendations
As seen in the study that majority of the population accessed the dental facility of the college only for treatment and not as preventive checkups, it is recommended that mass health education programs should be undertaken to educate the population regarding oral health care and people should be motivated to utilize the services rendered at college/hospital. The study also showed that the high cost of the treatment and distance to the health facility are the major access barriers, so existing health-care system of government can be utilized for effective referral of patient to dental college.
As the study shows that the cost, distance, and the clinic environment affects the access to the dental care, it is recommended that the institution should be population-friendly and population accessible and cater to the needs of the population at an affordable cost. Oral health barriers should be regularly assessed and removed for better utilization of services. College should establish continuous screening, health education, and motivational programs for the students as they cover 40% of population, and this will help in community education by the students.

As the study shows that there was a high emphasis on curative rather than preventive approach, it is expedient that the oral health policy should be implemented to fast track the integration of preventive dental care into the primary health program and improve the awareness while emphasizing the need for preventive dentistry.

As the cost of the treatment was the major access barrier in the study, it is recommended that a comprehensive health insurance package which covers oral diseases should be put in place so as to reduce the cost of dental treatment and hence improve the utilization of the oral health services of the institution by the population.

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Conflicts of interest
There are no conflicts of interest.

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