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Oral health concerns in India

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ABSTRACT

Oral health is an integral part of general health. There are many oral health issues which are of concern to India, despite having the maximum number of dental schools in the world. Dental caries, oral cancers and periodontal diseases are areas of national oral health concern. India lacks baseline data to know the exact prevalence of oral diseases, which is the first requirement to frame any national policies or manpower allocation. India is a vast country, nations within a nation, with great diversity in eating and behavioural practices. With a population of 1.21 billion and 68.84% of population residing in villages, the strategies need to be customised based on the population subgroup. Low level of awareness, strained and skewed infrastructure and resources, lack of motivation and research and oral health policies are some major factors that need to be tackled. This paper would attempt to highlight the oral health concerns of India, lacunae in the current system and possible strategies to address these issues.

1. Introduction

Term health' is defined as the overall 'well-being' of an individual. According to World Health Organization "health is the state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity".[1]

A good oral health reflects an aesthetic and functional dentition which allows individuals to continue in their desired social and functional role. Poor oral health leads to altered oro-facial form and function i.e. difficulty in speaking or mastication etc. Hence the social wellbeing of an individual or the quality of life is hampered either directly or indirectly e.g. feeling ashamed of smiling in public due to crooked teeth.

Oral health has a profound effect on systemic health. There is an increased risk of infective endocarditis, digestive problems in senior citizens, cardiovascular disease, stroke and bacterial pneumonia, preterm delivery in patients with poor oral health. A direct relationship between cardiovascular diseases and oral infections like periodontitis has been reported. There are chances of development of infective endocarditis and various other systemic complications in patients of rheumatic fever and organ transplant due to oral bacteria. The possible mechanisms by which oral infections might contribute to Cardiovascular diseases include a direct effect of micro-organisms in atheroma formation in the endothelium, indirect host-mediated responses, or a genetic predisposition for the pathogenesis.[2] Apart from cardiovascular diseases, maternal oral health has significant implications for birth outcomes and infant oral health. Periodontal disease during pregnancy has been associated with preterm birth, development of preeclampsia, and delivery of a small for-gestational age infant. It has also been found that maternal oral flora is transmitted to the new-born infant and increased cariogenic flora in the mother predisposes the infant to the development of caries.[3]

It is said that mouth is window to general heath and many diseases like osteoporosis, diabetes, HIV and some endocrine problems can be diagnosed by some oral signs and symptoms. Poor oral health has amajor impact on our daily wellbeing and the quality of life. In children, dental problems are associated with a substantial reduction in school attendance and in parental working days.[4] It affects the functional, psychological and social dimensions of a child's well-being. Oral pain has devastating effects on children like sleep loss, poor growth, behavioural problems and poor learning. Developmentally crucial processes of communication, socialization and self-esteem are also affected. In the geriatric population there is an increased prevalence of caries, periodontal disease, and tooth loss. Edentulousness, xerostomia, soft tissue lesions, or poorly fitting dentures affect eating and food choices are major concerns thus impairing the overall health related quality of life of senior citizens.[5] Apart from this, conditions such as oral clefts, missing teeth, severe malocclusion, or severe caries are

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associated with feelings of embarrassment, withdrawal, and anxiety. Oral and facial pain from dentures, temporomandibular joint disorders, and oral infections affect social interaction and daily behaviours.

In economic terms, dental disease accounts for many lost work and school days. Lower wage earners and minorities are disproportionately affected. Thus, in this paper we attempt to highlight the major oral health issues of our country and suggest some possible solutions.

2. Oral health concerns in India

Till date there have been only 2 national health surveys in India. First national level epidemiological oral health survey in India was conducted by Dental Council of India in 2004. The next survey was published in 2007.[6] In the year 2016 the first attempt was made to assess the state wise global disease burden (GDB) of India.[7] Oral health which is an integral part of general health was totally overlooked and not recorded in this survey. This study was based on the prevalence patterns of oral disease in the various states and union territories of India from year of 2001–2004.[8]

The survey was conducted as per WHO guidelines. Each state was divided into a few homogeneous regions, comprising of a number of districts, on the basis of agro-climatic factors used by the Planning Commission and the physio-geographic factors used by the Office of the Census Commissioner and the Registrar General of India.

The individual sample consisted of 300–600 dental examinations of children aged 5, 12, 15, and adults aged 35–44 and 65–74 years from a homogeneous region. 315 households, both in rural and urban areas, were taken from each homogeneous region in a state. Out of 315 households, 210 households were to be from rural areas and 105 from urban areas. Male and female were kept in a same ratio i.e. 105 males and 105 females were examined in each of the five age groups from the rural areas, and 53 males and 53 females in each age group from the urban areas.

WHO Oral health assessment questionnaire and individual questionnaire developed by DCI, India was used to assess the oral health and to collect the information on etiologic factors related to oral health awareness, knowledge and practices of individuals respectively.

The clinical oral findings were presented under the following broad heads:

1. Dental Caries status & Treatment Need
2. Periodontal Disease status
3. Malocclusion Status
4. Oral Cancers and other oral mucosal conditions
5. Dental Fluorosis status
6. Other conditions: Extra Oral Lesions; TMJ Assessment; Enamel Opacities and Hypoplasia; Prosthetic Status & Need; and Community need for immediate Care and Referrals.

The summary of the findings is as follows (Table 1):

2.1. Dental caries and treatment needs

DMFT and SiC index was used to assess the dental caries prevalence in all the age groups. The decayed teeth component (dt/DT) was found to be the most prevalent in children of age group 5, 12, 15 years and younger adults (35–44 years), while the missing teeth component (MT) was most dominant in older adults (65–74 years). Moreover, the carious component seemed to increase as the age advanced and was found to as high as 84.7% in 65–74 year age group. Another multicentric survey conducted by Ministry of health and family welfare in collaboration with WHO, conducted in eight states, reported a prevalence of 67.8%.[6]

Filled component was not significant in the various age groups indicating a high proportion of untreated caries. There was no marked gender-based differentials but the prevalence was slightly higher in rural residents. Root caries was prevalent in the 3.9 and 5.4% subjects

Table 1
Summary of findings of important oral health conditions by age in India.[8]

Findings	Age in years				
	5	12	15	35–44	65–74
Oral disease conditions					
Mean number of teeth present in mouth	19.9	27.1	27.9	30.0	19.1
Dental Caries					
% Prevalence	50.0	52.5	61.4	79.2	84.7
Mean DMFT	1.9	1.7	2.3	5.2	14.6
SiC Index	5.3	4.5	5.4	10.6	29.5
Periodontal disease					
Bleeding, calculus or pockets					
% Prevalence	NA	NA	66.2	89.2	79.4
Mean no of Sextants affected	NA	NA	2.8	4.5	2.9
Loss of attachment					
% Prevalence	NA	NA	7.7	42.2	60.6
Mean no of Sextants affected	NA	NA	0.2	1.4	1.6
Malocclusion (%)	0.6	23.6	23.9	42.0	NA
Dental Fluorosis (%)	5.8	12.1	11.8	9.3	5.2
Oral mucosal conditions (%)	0.9	1.4	2.4	7.3	10.0
Oral Cancer (%)	0.2	0.2	0.3	0.3	0.4
Edentulousness (%)	NA	NA	NA	0.8	29.3

in the country in the age-groups of 35–44 and 65–74 years, respectively.

The treatment need was high across age-groups and was found to increase with age. The predominant treatment need, by type of need, was that of fillings (one or more surfaces), followed by extractions and pulp care.

2.2. Periodontal diseases

The periodontal status was assessed using the Community Periodontal Index (CPI) with its three indicators of gingival bleeding, calculus and periodontal pockets. The prevalence of periodontal disease was found to be higher in adult age groups in comparison to children reaching as high as 89.2%. Calculus was more prevalent than bleeding in all age groups. Periodontal pockets, both shallow (4–5 mm) and deep (6 mm) were markedly more prevalent in older adults (65–74 years). Rural residents were affected more than their urban counterparts with no gender difference. Loss of attachment was also assessed using WHO CPI Probe in subjects aged 15, 35–44 and 65–74 years. The least severe form of loss of attachment (4–5 mm depth) was prevalent in both age groups i.e. 42.2% in age group pf 35–44 years and 60.6% in age group of 65–74 years. The pattern of distribution of loss of attachment by depth was similar in both rural and urban residents.

2.3. Malocclusion

Malocclusion was assessed using dental aesthetics index (DAI) by WHO. The percentage of subjects with malocclusion was 1.6, 23.6 and 23.9 in children aged 5, 12 and 15 years respectively. However, these figures only include the definite, severe and very severe types of malocclusion, i.e. the ones that need treatment. In adults aged 35–44 years, 42% subjects in the country had malocclusion. The majority (18.4%) had 'definite' malocclusion followed by 14.1%, who had 'very severe' malocclusion. The malocclusion was reported more in males than in females, contrary to popular perception, and more in rural than in urban residents in the 12- and 15-year age groups.

2.4. Flouorosis

Prevalence of fluorosis was found to be 12.1%, 11.8%, 9.3% 5.2% in the age groups of 12,15, 35–44 and 65–74 respectively. Moderate and severe forms of fluorosis, which may be associated with skeletal fluorosis, appeared to be infrequent and had a very low prevalence in the country. Three states, viz. Haryana, UP and Andhra Pradesh, in that order, had a prevalence of 'severe' fluorosis in children aged 12 years.

There were no marked gender related differentials, but fluorosis was marginally more in rural areas than in urban areas.

2.5. Oral cancers and other oral mucosal lesions

The prevalence for the oral mucosal lesions was found to be highest in older adults (65–74 years), with oral cancer in 0.4% and leukoplakia 3.1%. Lichen planus was observed in 0.4% (35–44 years) and 0.5% subjects (65–74 years). Ulceration, abscess, and candidiasis, in that order, were the other notable but much less prevalent conditions across age groups. According to this survey the prevalence of oral cancers was only 0.4% which strongly points that either the method of diagnosis or recording was inaccurate. It is now known that 80,000new cases of oral cancers are detected every year out of which 95% are squamous cell carcinoma. Head and neck is the predominant sub-site for cancers in India and constitutes 25–30% of all cancers as opposed to 3–4% in the Western World.[9]

2.6. Edentulessness

Complete edentulousness or absence of teeth in the mouth was a feature of the highest age group of 65–74 years. Nearly 30% subjects (29.3%) in the age group were completely edentulous. In contrast, only 0.8 or say one percent subjects were edentulous in the 35–44 years age group. This indicates that teeth are rapidly lost in middle and old age. The major reason for loss of teeth could be untreated dental caries as in the periodontal disease group shallow pockets (4–5 mm) and less severe forms of loss of attachment were the most dominant which could not be the cause of tooth loss. Also the prosthetic status i.e. extent to which subjects were wearing dental prostheses (including bridge, partial dentures and full dentures) was recorded for subjects aged 15 years and above. 6.7% subjects (65–74 years) were shown up with full mouth removable dentures, more in urban than in rural areas, in the country. There was a difference in the pattern of the type of prostheses present between age groups. Younger population group were found to have partial dentures while older age group had full dentures.

3. Factors affecting oral health

For any disease factors can be categorised into congenital or hereditary factors, behavioural factors and environmental factors. As far as the oral health is concerned, last two factors are the most important ones. Dental caries is a sugar-induced disease and modification of dietary practices amongst individuals and communities relating to refined sugars intake can prevent and control its prevalence. The practice of cleaning teeth and the regularity with which this was done by individuals was associated with the prevalence of periodontal disease.

The use of tobacco in its various forms (tobacco-smoking and tobacco chewing) affected oral health. In the present study, there was a strong association between the prevalence of oral mucosal conditions and tobacco-smoking. Latter was also found to be positively associated with the prevalence of oral health diseases, in particular periodontal disease. According to the largest survey in India, global disease burden (GDB) of India, the five leading individual causes of disability-adjusted life-years (DALYs) in India were ischaemic heart disease, chronic obstructive pulmonary disease, diarrhoeal diseases, lower respiratory infections, and cerebrovascular disease. These have common risk factors with oral diseases which are related to lifestyles. Thus lifestyle changes can be promote oral health also.

3.1. Suggested solutions for oral health problems in India

The strategies should be designed in 2 categories:

1. For the general population and its subgroups
2. For high risk individuals.

The programs can be as under:

3.2. School based/corporate based/government institution-based programmes

The distribution of caries depends on the exposure to the sugar and fluoride. Thus, altering the sugar exposure distribution in the country can achieve dramatic reduction of caries in country. Awareness programs at all these levels can lead to less sugar consumption and hence less dental caries. Involvement of teachers in schools in healthy food and brushing habits can give a major boost to the prevention of oral diseases in children.

3.3. Fluorides as major prevention strategy

Fluoride has been used as anti caries agent world widely. A major preventive strategy is to spread the awareness of use of fluoride containing toothpastes and mouth rinses among the population. According to the findings of survey, a large proportion of subjects (upto 67.9% of 15 year olds) uses tooth brushes and few percentage of this uses toothpaste for cleaning their teeth at least once a day. Tooth brushing, once or twice a day, with a fluoride containing toothpaste should be promoted for effective plaque control.

3.4. Use of media to promote oral health

The use of media in form of newspapers or television commercial advertisement is one means which should be promoted. Even villagers have access to newspapers, radios and televisions and they should be a major means of promoting oral health.

3.5. Community based programmes

There should be community-based discussions, involving community leaders with the help of public health dentists to start health promotion programmes. The overall goal for service provision for oral health care must be on preventive measures. Correct methods of brushing tooth and introduction of regular professional prophylaxis programmes should be encouraged.

3.6. Fight against oral cancers

For any disease it is important to know its incidence to mortality ratio. For oral cancers the mortality rate has been reported to be 20·7 per 100,000 in subjects without any habits of smoking or alcohol intake to as high as 45.4% in Tobacco and Alcohol Users.[10] In India oral cancers are the commonest cancer in Indian men and third most common cancer in women.

Also the patients present at an advanced stage, resulting in oral cavity being a leading cause of mortality within the country (third after lung and stomach).

3.7. Curbing the use of tobacco

Tobacco is one of the causative factors in causation of oral cancer, periodontal disease, cardio-vascular diseases, diminished taste and smell acuity, halitosis, tooth discolouration and failure of treatment like implants. Therefore, it is important that the health education and health promotion programmes, integrated with general health programmes should be organised to make the general population aware of potential harmful effects of the tobacco. Strict rules and heavy taxes on the selling of such products and consumption of tobacco in any form need to be implemented.

3.8. Public private partnership

An efficient network of referrals and treatment care should be established to make the best use of inadequate government facilities. With the recent expansion of dental colleges in the country, people should be educated to avail of the facilities provided in these facilities at a reasonable and affordable cost.

3.9. Well -structured oral health surveys

An oral health surveillance system must be established to evaluate and monitor future trends of the dental caries and other oro-dental diseases and monitor progress of planned programmes. A national research centre to plan appropriate programmes and provide the following services should be set up and include the following tasks:

(A) Development and standardisation of new parameters and indicators in clinical and social dental research;

(B) Provide standard recording protocols, criteria, methods for use by various potential investigators so that the data collected is nationally and internationally comparable.

(C) Organise training and calibration for trainers and various investigators for ongoing oral health surveillance and maintain the country's oral health data bank.

3.10. Diet and nutrition

Apart from oral health practices one needs to understand that diet and nutrition have a major role to play in initiation and promotion of oral diseases. Its importance should be emphasised at all levels in schools and offices.

3.11. Barriers in seeking oral health

We need to identify the possible barriers as to why people are not seeking oral health at all age groups. Then only strategies can be formulated to overcome these barriers.

3.12. Audits

India lacks majorly in clinical audits. The focus should be on quality of services, rather than just the numerical increase in facilities. Strict policies and governance is needed to implement this.

3.13. Integration of oral health with medical health

This is the most potential means by which we can control oral diseases. As all the children go for their immunisation and vaccination protocols, we can collaborate with the paediatricians and dental fluoride application on the newly erupted teeth can be a part of that immunisation schedule. Similarly, for geriatric patients if we can collaborate and integrate our services with medical doctors providing geriatric care, maybe we can reduce the burden in the senior citizens who are many a times dependant on family to visit hospitals.

4. Conclusion

Oral health is an important component of general health. Adverse oral health has a significant impact on the overall systemic health, quality of life and economic productivity of the nation. Oral cancers, dental caries and periodontal diseases contribute to the major burden of oral diseases in India. Individual efforts are highly desired to meet the unmet needs of the country as everything cannot be left for the government to work upon.

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