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# GERIATRIC ORAL HEALTH: A LITERATURE REVIEW

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## ABSTRACT:

**Introduction:**Globally, poor oral health was seen among elderly people with a high level of tooth loss, dental caries experience, high prevalence rates of periodontal disease, xerostomia and oral cancer. Thus this present review was undertaken to collect the information regarding oral health status of elderly population across India, which would provide an idea about existing oral problems and current oral health status of elderly population.

**Methods:**This study was a literature review of English-language articles indexed in PUBMED, PUBMED CENTRAL & GOOGLE SCHOLAR which was published from the year 2000-2014 with Medical subject heading (MeSH) terms linked with the Geriatric oral health like Aged, Geriatrics, Dental caries, Root caries, Periodontitis, Oral health, Institutionalized persons, India etc.

**Results:**Of 253 citations, 10 studies met study criteria and were reviewed.

**Conclusions:**The present review clearly states that the oral health status and prosthetic status of elderly subjects across India was very poor with more oral disease and conditions, so immediate preventive measures should be instituted to avoid deterioration of their oral health.

**Keywords:** Aged, Geriatrics, Oral health,India.

## INTRODUCTION:

**Gerodontology** is the delivery of dental care to older adults involving the diagnosis, prevention and treatment of problems associated with normal aging and age related diseases as part of an interdisciplinary team with other health care professionals [1].World Health Organization (WHO) defines older adults in developed countries as those people aged 65 years or over. In developing countries, like India, the elderly population is considered to be over the age of 60 years [1].

The world's population is ageing rapidly with advances in technology, increase in quality and availability of medical facilities and prolonged life expectancy, the proportion of older people will continue to increase longevity in a positive development [2]. As the population attains an increase in life span, chronic diseases play a significant role and dental diseases are the most prevalent chronic condition.

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The dentist, therefore, has an essential role in maintaining and improving dental health as part of total healthcare services available to the elders [1,2].

India is a vast country with a population of one billion people. Of this, people older than 60 years constitute 7.6%. There are several factors that affect the oral health of elderly. The Dentist: population ratio is 1:27,000 in urban areas and 1:300,000 in rural areas, whereas 80% of the elderly population reside in rural India [3]. Forty percent of the elderly live below the poverty line and 73% are illiterate. Ninety percent of the elderly have no social security and the dependency ratio is 12.26. Incidence of oral cancer, which is considered as an old-age disease, is highest in India. 13.5% of all body cancers are oral cancers. Preventive dental care is almost non-existent to the rural masses and is very limited in urban areas [3,4].

Health is defined as a state of complete physical, mental and social well – being & not merely the absence of disease or infirmity [5], while oral health is part of total health & essential to quality of life. Many of the elderly patients have a variety of systemic diseases that will have an impact on their oral health. In order to provide good oral health care, dental professionals must understand the complexities inherent to older people, their special needs and their capacity to undergo and respond to care [6]. Diagnosis and treatment planning for the elderly patient must include considerations of the biological, psychological, social and economic status of the patient in addition to the obvious dental problems [7].

Globally, poor oral health was seen among elderly people with a high level of tooth loss, dental caries experience, high prevalence rates of periodontal disease, xerostomia and oral cancer[8]. Edentulousness is also shown to be an independent risk factor for weight loss [9]. Poor oral health and poor general health are interrelated, primarily because of common risk factors; for example, severe periodontal disease is associated with diabetes mellitus, ischemic heart disease, and chronic respiratory disease. [10] So knowing the current oral health status of elderly is important for making appropriate treatment planning and oral health.

Thus this present review was undertaken to collect the information regarding oral health status of elderly population across India, which would provide an idea about existing oral problems and current oral health status of elderly population.

## METHODS:

A thorough literature review was made which engaged most of the articles published in peer reviewed journals relating to Geriatric oral health among Indian population. The review itself began with the search of relevant Medical subject heading (MeSH) terms linked with the Geriatric oral health like Aged, Geriatrics, Dental caries, Root caries, Periodontitis, Oral health, Institutionalized persons, India etc., in various search engines including PUBMED, PUBMED CERNTRAL & GOOGLE SCHOLAR. Articles published in English language only

were included in the review. The spotlight of the present review will be among elders of Indian population and articles published between the years 2000 to 2014 were only reviewed. The present review also highlights important measures that can be undertaken to improve their geriatric oral health. Finally of 253 citations, 10 studies met study criteria and were reviewed.

**Nutrition and oral health**

Appropriate and adequate nutrition of elderly people is of great importance for their general and oral health. Diet plays an important role in preventing disease. It has been shown that general health and quality of diet are determined by social support, socio economic status, culture and oral health [11]. When the nutrient intake does not meet the nutritional needs, moderate micro nutrient deficiencies may occur, and gradually it may decline into the protein calorie malnutrition (PCM). This is more common in the institutionalized elderly population (30 - 50%) when compared to those elders living independently (2-4%), while the prevalence of moderate micro nutrient deficiencies is much more [12].

**Kshetrimayum N, Reddy CV, Siddhana S, Manjunath M, Rudraswamy S, Sulavai S in 2010** [13] conducted a cross sectional study to assess whether oral health–related quality of life (OHRQoL) is associated with nutritional status in the institutionalised elderly population of Mysore. Authors found that 15.6% were malnourished, 52.5% were at risk of malnutrition and 31.9% were adequately nourished. They also found that oral health–related quality of life was associated with nutritional deficit, and it requires a greater integration between dentistry and nutrition in the health promotion of older adults.

**Kumar D, Rastogi N, Madan in 2012** [14] Conduced a cross sectional survey in Lucknow to find the correlation between the nutritional status of individual to the number of teeth present. Authors reported that Body mass index (BMI) had no correlation with the dentition status of an individual, but nutrient intake was directly related to the number of posterior occluding pairs of natural teeth. Further it was also observed that edentulous participants consumed less dietary & crude fibres and consumed more saturated fat & cholesterol than participants with 21 or more teeth.

**Dental caries among elders**

Dental caries is a multifactorial disease process that occurs when a susceptible tooth covered with cariogenic bacteria is frequently exposed to fermentable carbohydrates over a sufficiently long period of time. Development of caries in older adults differs from that in younger individuals in that the elderly having numerous additional risk factors that increase their susceptibility to caries. Tooth loss in turn is the most significant negative variable in oral health related quality of life for the elderly [15]**.** Root caries is now been considered as a major dental public health problem for the elderly.

There are three main inter related arguments supporting this statement. Firstly, life expectancies at both birth and age 65 have been increasing markedly in

industrialised societies. Secondly there is ample evidence showing that periodontal disease increases with age due to its cumulative nature. Thus most old adults may have some gingival recession and alveolar bone loss which shall predispose for root caries. Finally improved oral health is causing the elderly to experience a higher retention of teeth, which implies an increased number of exposed root surface susceptible to caries.[16]

**Shah N and Sundaram KR in 2003** [17] conducted a community based cross-sectional study in New Delhi to evaluate the dental caries experience and restorative treatment needs of an elderly population. A total of 1240 elderly subjects above the age of 60 years were included in that study. Authors reported that caries prevalence was high in the study population were carious teeth was present in 676(64.2%) of the dentate elderly, filled teeth in 69(6.6%) & recurrent decay in 17(1.6%) together making it 70.4% of dentate elderly having carious experience. Recurrent caries was present in a small percentage of urban elderly (2.7%) & was totally absent in rural elderly as they had very few restorations.

**Periodontal status among elderly population**

Periodontal disease is a chronic bacterial infection that affects both the gingiva and the bone that supports the teeth and is caused by anaerobic Gram-negative microorganisms that are present in the bacterial plaque that adheres to the teeth [18].

An imbalance between a localized infection and an exaggerated host inflammatory response play a pivotal role in determining gingival tissue damage. The presence of anaerobic Gram-negative bacteria causes a local inflammatory response that becomes chronic and progressive; this inflammation of the gingiva causes alveolar bone destruction and loss of the tissue attachment to the teeth, caused by components of microbial plaque that have the capacity to induce an initial infiltrate of inflammatory cells, such as lymphocytes, macrophages, and polymorphonuclear leukocytes [19].

**Shah N and Sundaram KR in 2003** [17] evaluated the periodontal health status of elderly aged 60 years and above in the community. Authors found that prevalence of periodontal diseases was high. Step wise multivariate logistic regression analysis showed that periodontal disease was directly correlated with age, oral hygiene practices and presence of cardiac disease.

**T Singh and S Kothiwale in 2009** [20] conducted a study to understand the epidemiological profile of periodontal disease in rural population of Belgaum district, India. The total study population consisted of 1680 subjects with randomly selected from 12 villages of Belgaum district. The results showed that as the age increased, the CPITN score also increased. It was also observed that Community periodontal Index of treatment needs (CPITN) score 4 (pathological pocket of 6mm) was the highest in age groups of 64 yrs & above. Treatment Needs (TN-3) increased with increasing age & was highest

in the age group of 61 yrs & above. Finally authors concluded that increased prevalence of periodontal disease and aggressive treatment needs were observed as the age progress in the rural populations.

**Prosthetic status among elderly population**

Edentulism is defined as the loss of all permanent teeth and is the terminal outcome of a multifactorial process involving biologic processes like caries, periodontal disease, pulpal pathology, trauma and oral cancer[21]. According to the world health organization adults should have a minimum of 21 functional teeth to provide the ability to experience a good dietary intake without the need for denture[22]. A wide range of prevalence of edentulousness (partial and complete) in Indian population was reported by different studies, varying from 5.6 % in 6 year old children to 91.2 % in elderly over age of 65 years. The prevalence of tooth loss among the general population over age of 15 years was 38.2% to 62%, with prevalence of complete edentulousness with rage of 1 to 2.5%. However the prevalence of edentulousness in elderly was found to be in range of 70.3% to 91.2%. The full edentulousness among this elderly group was 14.2 to 35.4%[23]. Another issue that influences the demand for prosthodontic treatment in elderly is the time between tooth losses and seek for treatment. It was hypothesized that self perceived need and expressed desire for replacement are greater at the time of tooth loss [24]. It was also suggested that self-perceived treatment need might be overestimated because many patients do not seek immediate intervention, especially when anterior teeth are not involved, and patients need time to understand the potential impacts of tooth loss. Need-demand relation will be dependent on perceived extension of impacts, feasibility and availability of health care services [25].

**Shrivastav A, Bhambal A, Reddy V and Jain M in 2010** [26] conducted a cross sectional descriptive study to assess the dental prosthetic needs among the residents of geriatric homes of Bhopal city. The results showed that majority of the subjects 101(86.3%) for upper arch and 103(88.0%) for lower arch had no prosthesis. Bridge was found in 3(2.5%) subjects. Subjects with partial denture in upper and lower arch were 7(5.9%) and 4(3.4%) respectively. Full removable denture in upper and lower arch was seen in 5(4.2%) subjects only. Out of 117 residents, 78(66.6%) required prosthesis for the upper arch and 89(76.0%) for the lower arch. One unit prosthesis for upper and lower arch was required most 41(35%) subjects, followed by need for full prosthesis, multi-unit prosthesis and combination of one-and /or multi – unit prosthesis. Full removable dentures was required by 19(16.2%) subjects for upper arch and 24(20.5%) for lower arch.

**Vrinda SR, Darshana SN, Chartanya PH in 2010** [27] conducted a study to assess the prosthetic status and evaluated the prosthetic needs of the patients attending various institutes of Ahmadabad and Gandhinagar district. 510 subjects at various dental institutions were examined. Out of 510, any type of edentulousness was 322 (63 %). Among them, 254 (49.8 %) were

partially edentulous while 68 (13.3 %) were completely edentulous. Only 69 (13 %) had prosthesis in upper arch while only 80 (16 %) had prosthesis in lower arch. Need for any type of prosthesis in upper and lower arch was 55% and 60 % in males and females, respectively. In lower social class group need of prosthesis in upper and lower arch was 62% and 63 %, respectively. Authors reported that prosthetic status and prosthetic treatment needs increased with increase in age.

**Chhabra A, Chhabra N, Kabi D, Jain A in 2013** [28] conducted a cross sectional study in New Delhi to assess the dental status and treatment needs of a geriatric population in Northern India. 412 subjects aged 60 years and above participated in the study. The results showed that the prevalence of edentulism was 75%, with gender difference (69% of the men and 81% of the women). Eighty percent wore removable dentures, 10% had natural teeth only, and 10% had neither prostheses nor natural teeth. Most of the subjects needed to redo the prostheses (50%), 60% extractions and 25% conservative treatments. Finally the authors concluded a high unmet need for perceived oral care and dental treatment existed among the sample elderly population studied.

**Kumar GA, Maheswar G, Malathi S, Sridevi K, Ratnakar P, Someshwar B in 2013** [29] conducted a cross sectional survey to assess prosthetic status and prosthetic need elderly inmates of geriatric homes in Hyderabad. A total of 174 subjects aged 60 years and above was examined. The results showed majority of the subjects, 73 (70.8%) males and 53 (74.6%) females had no prosthesis. Only 4.6% had complete dentures and 21.1% had removable partial dentures and 10.9% had single/multiple bridges. Need for any prosthesis was (83.5%) male and 63 (88.7%) female subjects and nearly 82. 8% subjects required one-unit prosthesis.

**Eachempati P, Shenoy V, Jain N, Singh S** [30] in 2013 conducted a study in Mangalore to assess the prevalence of Kennedy's classification, status of existing prosthodontic appliances if any, awareness of the subjects regarding various treatment options, and treatment needs in institutionalized elders. Results showed that Kennedy's class I was most prevalent and class IV the least. Among the subjects examined, only 12.4% were wearing prosthesis. Based on the Nevalainen's index and Karslon's index, most of the prosthodontic appliances were found to be in poor condition. 86% of the subjects were in need of prosthodontic treatment. 75% of the subjects interviewed were unaware of the treatment options available.

**Oral health status of institutionalized elders**

One of the major impacts of globalization is breaking up of traditional family system. In India, migrants from the villages and towns to cities predominate, resulting in breaking up of families into nuclear families. The aged who are left behind have to fend for them. This is leading to an increased danger of marginalization of the geriatric population due to migration, urbanization, and globalization [31].

The homebound and the nursing home bound residents are the group of elders who are unable to maintain independence. The residents in old age homes have a dramatic contrast to those living their life independently. Loss of independence, cognitive problems, forgetfulness, lack of motivation, physical disability layered with chronic medical problems in them contribute to diminish the self care ability thereby enhancing their susceptibility to oral diseases. Elders in residential homes are also been frequently prevented from achieving good dental and denture hygiene due to lack of information, failing eyesight and impaired dexterity [32].

**Bansal V, Sogi GM and Veeresha KL in 2010** [33] determined the oral health status and treatment needs of subjects aged 60 years and above in elders homes of Haryana. 152 subjects were clinically examined. Results showed that around half (47.4%) of the subjects had no teeth. Among the rest of the subjects, 26.9% subjects did not use any oral hygiene measures. 19.1% subjects reported wearing a denture and 36.8% subjects had not visited a dentist ever in their life. 28.7% of subjects had suffering from pain.

**Table 1: Summary of articles published from 2000 - 2012**

| Oral conditions | Authors | Year | Study Place | Sample size | Significant Findings |
|---|---|---|---|---|---|
| Nutrition | Kshetrimayum N<br>Reddy CV<br>Siddana S<br>Manjunath M<br>Rudraswamy S<br>Sulavai S | 2010 | Mysore | 141 | • 15.6% - malnourished<br>• 52.5% - risk of malnutrition<br>• Strong association between GOHAI & MNA |
| Nutrition | Kumar D<br>Rastogi N<br>Madan | 2012 | Lucknow | 75 | BMI had no correlation with dental status |
| Dental caries | Shah N<br>Sundaram | 2003 | New Delhi | 1240 | 64.2% - Decayed tooth<br>6.6% - Filled tooth<br>1.6% - Recurrent caries<br>70.4%-Carious experience |
| Periodontal status | Singh T<br>Kothivvale S | 2009 | Belgaum Karnataka | 1686 | CPITN Score 4 was highest in the study group. |
| Prosthodontic status | Shrivastav A<br>Bhambal<br>Reddy V<br>Jain M | 2010 | Bhopal | 117 | 86.3% - No upper prosthetics.<br>88% - No lower prosthetics |
| Prosthetic status | Vrinda SR<br>Darshana SN<br>Chartanya PH | 2010 | Ahmadabad | 510 | 49.8% - Partially edentulous<br>13.3% - completely edentulous |
| Prosthetic status | Chhabra A<br>Chhabra N<br>Kabi D<br>Jain A | 2013 | New Delhi | 412 | 75% - Edentulous |
| Prosthetic status | Kumar GA<br>Maheswar G | 2013 | Hyderabad | 174 | 83.5% - Males<br>88.7% - Females |

| | | | | | |
|---|---|---|---|---|---|
| | Malathi S<br>Srideevi K<br>Ratnakar P<br>Someshwar B | | | | Required prosthesis.<br>82.8% - Needed one unit prosthesis |
| Prosthetic status | Eachempati P Shenoy V<br>Jain N<br>Singh S | 2013 | Mangalore | 171 | Kennedy's class I – More prevalent<br>Kennedy's class IV – less prevalent.<br>75% - Unware of treatment options. |
| Oral health status | Bansal V<br>Sogi GM<br>Veeresha KL | 2014 | Haryana | 152 | 47.4% - No teeth<br>26.9% - No oral hygiene measure<br>36.8% - had not visited dentist |

## DISCUSSION:

Aging is a biological, psychological and social process. A variety of age related changes occurs throughout the body which can affect the healthcare and treatment plans. Some of these changes, previously thought to be normal aging, may be modifiable with lifestyles choices or may represent sub clinical pathological processes [34]. So provision of quality oral health care for older adults, depends upon health care professionals who requires training in the care of medically complex and cognitively impaired elders. Practitioners must be also able to manage age and disease related conditions of the aging population and also health care providers must be prepared to comprehensively treat geriatric patients by paying attention to a variety of parameters.

Dentistry has the manpower and the technology to improve the oral health of elderly, but society must be made aware of the importance of dental health in the total health of elderly persons to achieve the goal [35]. Since there is an increase in the amount of care required for older individual who would ultimately need more manpower; government should make appropriate policies that would make health care professionals to work for elderly population.

Dental management of the elderly population is different from that of the general population because special considerations for age-related physiological changes, complications of chronic condition/therapy, increased incidence of physical/mental disabilities, and social concerns are required. Therefore, special knowledge, attitudes, and skills are necessary to provide oral health care to the elderly [6,7,9].

It is been found that only limited studies were available in literature regarding geriatric oral health among Indian population when compared to other countries across the world, this reflects the interest of epidemiologist and health professional towards the elders. Thus health professionals who were considered as gate-keepers in primary health care system should be counselled and trained about their role towards health promotion and health education for elderly population

or else overall health management would be jeopardized.

Finally oral health of the elderly becomes potentially more complicated as they become frail, homebound or institutionalized and their access to oral health care is also limited. This situation will continue to be a salient public health issue as the population of older and impaired adult's increases in size, and the demand for oral health services grows. To reduce this crisis in the future we should ensure that adults of all ages are informed about the need for oral health care throughout their lifetime.

**Recommendations:**

- Health care professionals should be trained in geriatric oral care in maintaining adequate oral health for elderly.
- Free dental care or treatment should be given to elders in all the health centres.
- Attention should be given to institutionalised elders for their oral care
- "Home dentistry or domiciliary dental care," however it is yet an infrequent practice in India but can be a suitable option.
- Geriatric education should be included in undergraduate and postgraduate curricula and diploma courses.
- Finally the effective policies should be made by government regarding elderly oral care.

## CONCLUSION:

The present review clearly states that the oral health status and prosthetic status of elderly subjects across India was very poor with more oral disease and conditions, so immediate preventive measures should be instituted to avoid deterioration of their oral health.

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