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Review Article

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Current Perspectives on Geriatric Oral Health in India: A Narrative Review

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Abstract

India, which comprises 2.4% of the world's land area, supports over 17.5% of the global population. As the second most populous nation with more than 1.41 billion people, the country's demographic landscape is shifting rapidly. According to the 2023 India Ageing Report by the United Nations Population Fund (UNFPA), the elderly population is expected to double, surpassing 20% of the total population by 2050. By 2046, the number of older adults is projected to exceed that of children aged 0 to 15 years.

This demographic transition presents significant challenges, particularly in healthcare, including oral health. Advancements in medical science have contributed to increased life expectancy, allowing healthcare professionals to better understand their unique oral health concern. Elderly individuals, either homebound or in nursing facilities, often experience complex medical conditions and are prescribed medications impacting their overall and oral health.

Given the intricate relationship between chronic diseases and oral health, an integrated multidisciplinary approach is essential to ensure proper dental care for older adults. This review explores the current oral health challenges faced by elderly individuals in India and proposes strategies to enhance dental care infrastructure and education policies in geriatric dentistry, aiming for improved health outcomes for the ageing population.

Keywords: ***Demographics, oral health, general health, multidisciplinary approach, geriatric dentistry.***

Introduction

Geriatric dentistry, also known as Gerodontics, focuses on providing specialized dental care for older adults. It involves the diagnosis, prevention, and treatment of oral health concerns linked to aging and age-related diseases [1,2]. Given the complex medical and dental needs of the elderly, this field requires a multidisciplinary approach, working alongside other healthcare professionals [1,2].

Advancements in healthcare throughout the 20th century have significantly increased human life expectancy. According to surveys, the average life expectancy at birth rose to 69.8 years for males and 72.3 years for females during 2021-2025 [6]. In India, individuals aged 60 and above are classified as elderly, whereas in developed nations, the threshold is 65 years. Globally, approximately 830 million people are aged 65 and above, with India accounting for 153 million individuals in the 60+ age group. This number is expected to reach 347 million by 2050 [3].

Categorization of the Elderly Population

The elderly demographic is divided into three main groups [4]

- Young elderly (65-74 years): Generally healthy and active individuals.
- Mid-old (75-84 years): A diverse category, ranging from those maintaining good health to those managing chronic conditions.

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- Oldest-old (85 years and above): Often physically frailer; this group represents the fastest-growing segment of older adults.

Over the last decade, the population aged 65 and above has surged globally, and India is no exception [5]. Extensive research conducted in the 1990s established a clear link between oral health and systemic health [5]. Recognizing the need for improved elderly care, the Government of India launched the National Policy on Older Persons in 1999, aiming to ensure the overall well-being of senior citizens and their rightful place in society [5].

Oral Health Challenges Among Older Adults

Oral health among the elderly is influenced by various factors, including behavioral habits, medical conditions, and previous treatments. Additionally, aspects such as mobility, independent living, social interactions, and sensory functions play a crucial role in maintaining oral hygiene [6].

Despite advancements in dental care, fluoridation, and oral hygiene awareness, older adults remain highly susceptible to oral diseases due to physiological aging, chronic illnesses, and polypharmacy [6] Systemic diseases and the side effects of medical treatments frequently contribute to:

- Reduced salivary flow, impairing taste and increasing susceptibility to infections.
- Orofacial pain, gingival enlargement, alveolar bone resorption, and tooth mobility.
- Decreased dexterity, leading to inadequate oral hygiene practices.
- Diet-related concerns, such as high sugar intake, tobacco and alcohol use, which negatively impact oral health.
- Cognitive impairment and physical disabilities, making access to dental care more challenging [7].

Despite the need for dental treatment, a large percentage of older adults do not seek regular dental check-ups [8,9]. Studies indicate that up to 78% of elderly individuals suffer from edentulism, significantly affecting their dietary habits. Older adults wearing dentures or facing dental issues tend to limit their intake of fruits and vegetables, instead consuming soft foods rich in saturated fats and cholesterol [10-13].

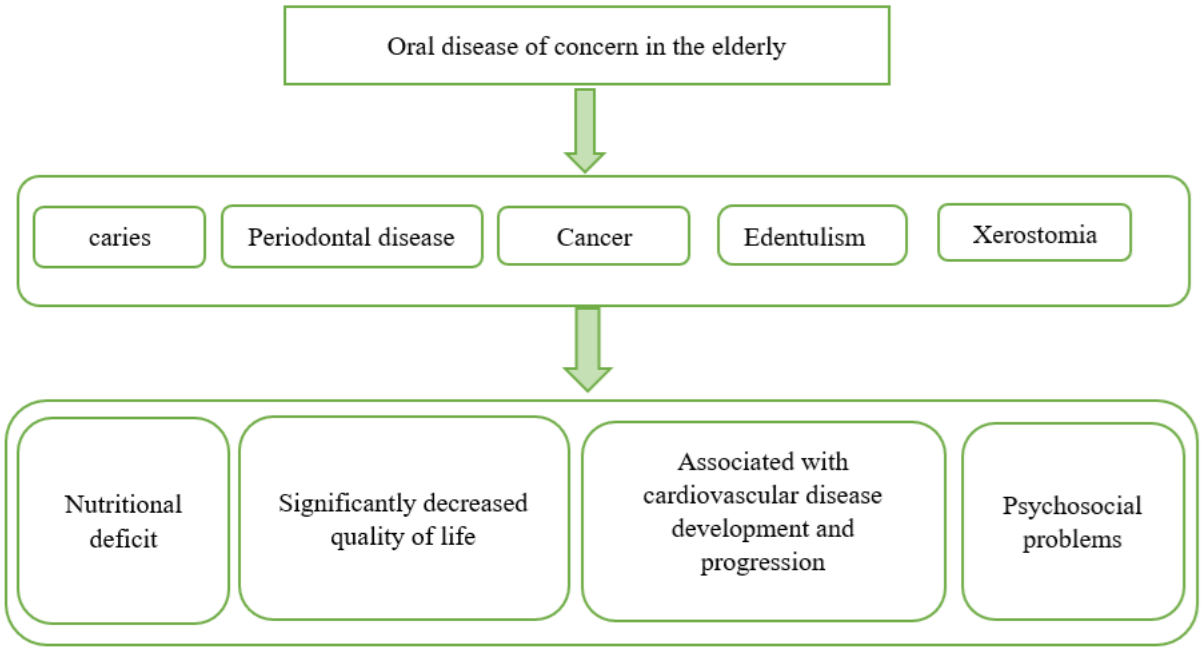

Chart 1: Depicting oral health concern in elderly.

Importance of Early Intervention

Detecting and addressing oral diseases at an early stage is essential to maintaining lifelong oral health. Many oral and systemic chronic diseases share common risk factors, including poor diet, smoking, and excessive alcohol consumption. These issues can be managed effectively through education and preventive measures beyond the dental clinic [11-14].

This introduction provides a comprehensive overview of geriatric dentistry in India, emphasizing both the demographic shift and the oral health challenges associated with aging. It sets the stage for discussing strategies to enhance dental care accessibility, infrastructure, and education policies, ultimately improving oral health outcomes for elderly individuals in India.

Materials and Methods

A thorough review of existing literature and scientific studies related to dental pathologies in elderly populations was conducted. Research databases such as PubMed, Cochrane Library, Web of Science, and Scopus were searched to gather relevant information. The search focused on demographics, oral health, general health, multidisciplinary approaches, and geriatric dentistry, using the keywords specified in the introduction.

Articles with matching titles and abstracts were evaluated, and those deemed relevant were included in this review. This study aims to examine the specific oral health challenges faced by elderly individuals, identify barriers to dental care accessibility, and suggest strategies to overcome these obstacles.

Oral Health Services in India

India, like many other Low- and Middle-Income Countries (LMICs), encounters significant difficulties in the health sector. Limited financial allocation for oral health in the national budget and low public healthcare investment hinder the development of a preventive oral health infrastructure [2].

According to the World Health Organization (WHO), oral healthcare access remains scarce in rural India, where 80% of the elderly population resides. India has 329 dental colleges, comprising

237 private institutions, 32 deemed universities, and 60 government-run colleges under the Dental Council of India (DCI). With around 300,000 registered dentists, India has the second-largest number of dental professionals globally.

While the WHO recommends a dentist-to-population ratio of 1:7500, India's ratio has improved from 1:300,000 in the 1960s to 1:10,000 today. However, rural areas still experience a severe disparity, where the dentist-to-population ratio is 1:250,000 [15]. The concentration of dental professionals in the private sector as opposed to public healthcare facilities poses financial challenges for underprivileged populations.

Significance of Oral Health

Oral health plays a crucial role in maintaining overall well-being. Extensive tooth loss in older adults leads to impaired chewing ability, prompting reduced consumption of fiber-rich foods and an increased preference for processed foods high in saturated fats [16]. Studies indicate that better oral hygiene reduces the risk of pneumonia, and conditions such as Alzheimer's disease and depression can negatively affect oral health [16].

The ability of elderly individuals to seek timely dental care is hindered by mobility issues, financial constraints, lack of awareness, and negative perceptions of oral hygiene. Addressing these concerns requires community-based intervention programs to promote accessibility.

To bridge this gap, initiatives such as the Toll-Free National Dental and Oral Health IVRS Helpline (1800-11-2032) available in Hindi and English have been established. Developed in collaboration with Lady Hardinge Medical College, this helpline aims to provide support. Additionally, the strengthening of 764 dental care units across 33 states and union territories (as of March 31, 2018) has been an important step in improving accessibility.

Challenges in Geriatric Dental Care in India

Several obstacles limit geriatric oral healthcare, including [17-19]

1. Lack of specialized geriatric training for dental students and faculty.
2. Insufficient oral healthcare services tailored for elderly patients.
3. Limited accessibility, particularly for those in rural and underserved areas.
4. Financial barriers, preventing economically disadvantaged elderly individuals from receiving treatment.

Common dental conditions among older adults include periodontal disease, edentulism, dental caries, oral mucosal lesions, oral infections, and temporomandibular disorders.

Additionally, India reports one of the highest incidences of oral cancer, particularly among elderly populations [20]. Long-term medication use for chronic conditions such as hypertension and dyslipidemia is often linked to hyposalivation, increasing susceptibility to dental caries and oral infections [21,22].

Age-related changes in vertical dimension, coupled with bruxism and other parafunctional habits, lead to mastication difficulties, reduced quality of life, and an increased risk of tooth loss. Furthermore, elderly individuals with comorbidities such as coronary artery disease, neurological disorders, and diabetes mellitus face additional oral health challenges [23,24,25].

Nutrition in Old Age

Maintaining proper nutrition is essential for promoting health and well-being among elderly individuals. Oral health problems often contribute to poor dietary habits, as issues like loose, painful teeth or ill-fitting dentures reduce chewing efficiency. Consequently, diet and nutrition must be incorporated into oral health assessments and management strategies for older adults [26].

As people age, their basal metabolic rate declines, leading to lower caloric requirements. Nutritional deficiencies, particularly in calcium, iron, and zinc, are more commonly observed in elderly women. Studies indicate that an 80-year-old individual requires approximately 8000 kJ (1900 kcal) per day. Additionally, an active older adult should consume 0.97 g of protein per kilogram of body weight daily to maintain strength and muscle function [27].

Older individuals who are homebound and have limited exposure to sunlight may suffer from vitamin D deficiency, increasing their risk of osteomalacia. Other commonly observed nutrient deficiencies include ascorbic acid, iron, and potassium [27].

While partial or complete dentures improve both chewing ability and overall nutritional intake, they are less effective than natural teeth. Changes in dentition often result in a dietary shift toward soft, easily chewable foods, which are frequently high in fermentable carbohydrates. This increases the likelihood of root caries formation [27].

Given these concerns, dentists play a crucial role in evaluating the nutritional status of elderly patients through screening and early intervention to improve both oral health and general well-being.

Changes in Salivary Glands and Xerostomia

Aging leads to reduced salivary gland function, primarily due to the loss of acinar cells. One of the most common oral health concerns in older adults is dry mouth, which contributes to root caries (senile caries) caused by decreased salivary flow.

The condition known as xerostomia refers to the subjective sensation of oral dryness, resulting from reduced salivary production or alterations in saliva composition [28]. True xerostomia is caused by chronic or acute salivary gland dysfunction, leading to insufficient saliva secretion. In contrast, pseudo-xerostomia, also known as false xerostomia, occurs when an individual perceives dryness despite normal gland function [29,30].

Several age-related factors contribute to xerostomia, including medication use, systemic diseases, and psychological conditions [31]. Research indicates that one in every two older adults seen in primary care settings experiences some degree of dry mouth, with women being more susceptible [31,32]. A significant number of medications prescribed for chronic conditions list xerostomia as a side effect, further increasing its prevalence among older individuals [33].

Diagnosis and Management of Xerostomia

The diagnosis of xerostomia relies primarily on patient history and physical examination. Common findings include:

- Absence of pooled saliva in the oral cavity
- Sticky mucous membranes
- Reddened oral mucosa
- Loss of tongue fissuring and papilla

A specialized assessment tool known as sialometry is used to measure salivary flow rates and evaluate salivary gland function [31].

Certain xerostomia-inducing drugs contribute to salivary gland suppression by inhibiting acetylcholine production or blocking muscarinic and adrenergic receptors [34,35].

Table 1 outlines the drug classes commonly associated with dry mouth symptoms, along with examples of specific medications responsible for xerostomia [36].

Class	Examples
Anticholinergic Agents	Atropine, Bronchodilators, e.g., Albuterol, Formoterol anti-migraine medications, e.g., zolmitriptan
Antidepressants, antipsychotics	SSRIs e.g., citalopram Haloperidol Phenelzine amitriptyline SNRIs, e.g., venlafaxine
Diuretics	Furosemide, Chlorothiazide Hydrochlorothiazide
Antihypertensive Agents	Captopril •Lisinopril • Enalapril • Beta-blockers, e.g., Metoprolol Alpha-blockers e.g., Prazosin calcium channel blockers
Sedative and Anxiolytic Agents	Alprazolam • Diazepam Lorazepam
Muscle Relaxants	Tizanidine Cyclobenzaprine
Analgesic Agents	Opioids, e.g., Morphine, Codeine NSAIDs
Antihistamines	Fexofenadine, Brompheniramine, cetirizine Diphenhydramine
Stimulants	Dextroamphetamine, Amphetamine, Methylphenidate

Age changes in Oral mucous membrane

As a sign of ageing the mucosa becomes thin, smooth and edematous with loss of surface stippling's. Loss of filiform papillae results in bald appearance of the tongue. Tongue also develops sublingual varices and candidal infections with age [1].

Age changes in teeth

The enamel of old population becomes less permeable and more brittle due to ion-exchange. Wear and attrition are the macroscopic changes affecting the tooth form [1].

Two age dependent changes in dentin [26]:

i. Continued growth, referred to as physiological secondary dentin formation.
ii. Gradual obturation of the dentinal tubules referred to as dentin sclerosis.

Dental pulp of elderly people contains fewer cells and more fibers. Degeneration of both myelinated and unmyelinated nerve fibers and pulp calcifications are found to increase in frequency, number and size with age. Further, root caries is other most common caries found in elderly patients [37].

Ageing and periodontal disease

Changes in dietary habits, variation in salivary gland secretions may affect the growth of microorganisms and affect the periodontal health in elderly. Periodontal inflammation, loss of attachment are common [38].

Habits and Oral implications

Elderly patient with habits such as smoking, tobacco pan and beetle nut chewing develops various precancerous or cancerous lesions. Elderly people in rural areas have a habit of tobacco and betel nut chewing as compared to urban population necessitating the need of integrating primary health care with oral care in rural population. Further, financial constraints and lack of family support or of transportation facilities affect access to dental services in later life.

Oral health status in Indian geriatric population

A short review of the Indian literature is presented compiling findings from various Indian studies assessing oral health status among the geriatric population, highlighting prevalent conditions, epidemiological trends, and accessibility challenges [39-47].

Table 2

S. No	Type of study	Name of the author and year	Area of study	No of patients	Chief findings
1.	Cross- sectional study	Doifode VV, Ambadekar NN, Lanewar AG 2000	Urban Nagpur	5061 elderly	Dental Caries (43.2%) and periodontal diseases (32.8%)
2.	National oral health survey and fluoride mapping 2002-2003	National Oral Health Survey by Dental council of India	19 states	18233 of 65-74 years age group	Dental Caries (85%) Periodontal diseases (80%)
3.	Cross sectional study	Thukral G, Shah N, Prakash H 2013	Urban Delhi	Institutionalized elderly	Edentulous39.2%, Decayed teeth 44.9%, Deep periodontal pockets57.9%, 78.5% required Dentures,38.3% required either Extraction or Pulpal care
4.	Survey, followed by a community dental health programme operation;	Goel P, Singh K, Kaur A, Verma M, 2006	Rural Delhi	96 elderly	92.6% of edentulous without prosthesis in upper arch 92.5% in lower arch respectively.

5.	Multicentric study	Shah N, Pandey RM, Duggal R, Mathur VP, Parkash H, Sundaram KR	7 urban and rural areas	2,200 elderly subjects	Dental caries-67.8%
6.	Community based Cross sectional study	Patro BK, Ravi Kumar B, Goswami A, Mathur VP, Nongkynrih B, 2008	Urban Delhi	123 elderly	91.2% Dental caries
7.	Cross sectional study	Shrivastav A, Bhambal A, Reddy V, Jain M. 2011	Bhopal	117 elderly	86.3% and 88.0% of the subjects had no prosthesis in the upper and lower arch respectively only 4.2 % had complete dentures
8.	Pilot study	Shenoy RP, Hegde V. ,2011	Mangalore	133	88% Edentulous 12% had Complete Dentures
9.	Pilot study	Bijjargi S, Chowdhary R,2013	Gulbargha	1,360 elderly subjects	Complete edentulism in both the arches was highest in the middle socio-economic group, and was the lowest in the low socio-economic group. Less than 50% of edentulous elderly and only 10% of partially edentulous elderly were wearing dentures

The findings reflect significant oral health challenges among elderly populations in India, with high prevalence rates of dental caries, periodontal diseases, and edentulism across various regions. Despite the need for prosthetic rehabilitation, denture usage remains low, particularly among rural and lower socio-economic groups. Institutionalized elderly also face severe oral health issues, requiring urgent dental interventions. These trends indicate regional and socio-economic disparities in access to dental care, highlighting the need for comprehensive public health policies and improved oral healthcare services for India's aging population.

Proposed Strategies

As an increasing number of elderly individuals seek to preserve their natural teeth, the prevalence of complete edentulism has significantly declined. However, the rising demand for geriatric oral healthcare necessitates the implementation of clinical and community-based intervention programs. Several obstacles hinder the provision of effective geriatric dental care in India, including:

1. Limited geriatric training for students and faculty
2. Insufficient oral healthcare services
3. Accessibility challenges
4. Financial constraints [17-19]

To address these concerns, the following strategies are recommended:

1. Strengthening Geriatric Training in Oral Healthcare: A well-trained workforce is fundamental to ensuring quality dental care for elderly individuals.

a. Integrating Geriatrics and Gerodontology into Medical and Dental Education

Currently, geriatrics and gerodontology are not incorporated into the Indian medical and dental curricula [18]. These disciplines should be introduced to health education programs to provide students with specialized training. At present, only a handful of institutions offer 1-5 hours of geriatric instruction, which is inadequate [19,48]. The inclusion of oral assessments in standard medical history and physical examinations has been shown to improve the documentation of oral-systemic health data and encourage primary dental care referrals [19]. Interprofessional education can equip students with essential skills to evaluate, educate, and refer elderly patients for appropriate oral healthcare services.

b. Training Nurses in Basic Geriatric Dental Care

Nurses should receive specialized training in oral hygiene maintenance, denture care, root caries prevention, periodontal disease management, xerostomia treatment, oral mucosal lesion identification, and elderly nutrition. In-service training programs, successfully implemented in developed nations, have demonstrated both short-term and long-term effectiveness [48,49].

c. Encouraging Family Participation in Elderly Oral Healthcare

The past few decades have seen a rise in elderly abandonment, leading to an increased number of old-age homes. Families must be educated and motivated to ensure their elderly members receive regular oral health check-ups and adhere to daily oral hygiene routines.

d. Enhancing Institutional Capacity for Geriatric Dentistry

The government should support geriatric dentistry education and research to formulate policies and programs tailored to India's unique healthcare needs.

2. Expanding Oral Healthcare Services

a. Reorienting Public Health Services

With the United Nations declaring 2021-2030 as the 'Decade of Healthy Ageing,' the Indian Government has established 19 Regional Geriatric Centres in medical colleges and two National Centres for Ageing to provide specialized geriatric care. These centers aim to train healthcare professionals, including dentists, in geriatric oral health [50]. Additionally, periodic oral health awareness programs should be conducted at district hospitals and community health centers [51].

b. Educating the Elderly Population

Community health workers, such as Accredited Social Health Assistants (ASHA) and multipurpose health workers, should be trained to provide preventive oral care instructions and promote cost-effective dental hygiene solutions, such as herbal dentifrices for teeth and denture cleaning. Elderly individuals should be made aware of the impact of poor oral health on self-esteem, comfort, eating ability, pain, and appearance. Since prevention is key, emphasis should be placed on early oral hygiene habits to ensure better quality of life in later years.

c. Integrating Oral Healthcare into Non-Communicable Disease (NCD) Programs

Oral health must be integrated into national healthcare initiatives addressing diabetes, cancer, dementia, and metabolic disorders to improve overall health outcomes.

d. Training Auxiliary Dental Staff

Dental hygienists and dental nurses should undergo specialized geriatric training to assist in oral health education, caries prevention, and oral cancer screenings.

3. Improving Access to Dental Services

a. Deploying Mobile Dental Units

The Dental Council of India mandates that each dental college operates a mobile unit to deliver oral healthcare in remote regions. These mobile teams should conduct weekly visits to old-age homes and rural communities and should be accompanied by an interdisciplinary team at least once a month.

b. Engaging Local Dental Associations

Dental associations can help reduce accessibility challenges by arranging regular visits to old-age homes. These initiatives can raise awareness about the importance of oral health and its link to systemic diseases.

c. Enhancing Oral Healthcare in Urban Slums

Adopting strategies from developed nations, urban slums should feature community-based initiatives such as "Eat-In-Together" meal programs and elderly day centers to address both nutritional and oral healthcare needs [6].

4. Addressing Financial Constraints

a. Public-Private Partnerships (PPP) with NGOs

Collaboration with non-governmental organizations (NGOs) can facilitate the adoption of old-age homes, ensuring affordable oral healthcare services for elderly residents.

b. Village Adoption Programs

Service clubs and dental colleges should be encouraged to adopt villages to provide funded geriatric oral health services. Dental students and interns, under faculty supervision, can offer community-based care to elderly individuals.

c. Government-Funded Dental Care for the Elderly

State governments can collaborate with dental colleges to provide free or subsidized geriatric dental care. A notable example is the Danta Bhagya Yojna program in Karnataka, which supplies free dentures to senior citizens aged 60 and above. ASHA workers identify eligible individuals and link them to dental colleges, where the government funds the treatment [52].

Conclusion

The need for geriatric oral healthcare continues to grow in both developed and developing nations, including India. To meet this demand, the Indian government must formulate and implement an oral health policy specifically addressing the elderly. Research focused on enhancing oral healthcare for older adults should be prioritized, and Geriatrics and Gerodontology must be introduced as distinct subjects in undergraduate dental education. This will enable future dental professionals to design and deliver targeted oral healthcare solutions for elderly populations.

Given the demographic shift and the rising demand for geriatric dental care, policymakers and dental professionals must work together to ensure adequate training for practitioners, equipping them with the necessary knowledge and skills to address the oral health needs of India's aging population.

Abbreviations

UNFPA: United Nations Population Fund
LMICs: Low- and Middle-Income Countries
WHO: World Health Organization
DCI: Dental Council of India
IVRS: Interactive Voice Response System
ASHA: Accredited Social Health Assistants
NCD: Non-Communicable Disease
PPP: Public-Private Partnerships
NGO: Non-Governmental Organizations

Declarations

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