

ORAL HEALTH CONDITIONS OF GERIATRICS

Chika C. NGWU and Stephen A. FADARE

Orapuh Literature Reviews

(Orap. Lit. Rev.)

*Open access internationally
peer-reviewed online journal of
oral and public health review articles
specifically crafted for students,
researchers, and faculties.*

ORAPREV.ORAPUH.ORG

*Re-use permitted under CC BY-NC 4.0
No commercial re-use or duplication



TABLE OF CONTENTS

• Cover page	1
• Table of contents	2
• To cite	2
• About Orapuh Review	2
• About the Journal	2
• Editorial Team	2
• About the Publisher	2
• Article information	3
• Abstract	3
• Keywords	3
• Introduction	3
• Purpose of study	4
• Review parameters	4
• Concept of oral health at old age	4
• Relationship between oral and systemic health	5
• Common oral health problems associated with geriatrics	5
- Dental caries	5
- Periodontal disease	6
- Edentulism	6
- Dry mouth (Xerostomia)	6
- Oral cancer	6
- Halitosis	7
• Preventive measures to be adopted	7
- Mechanical plaque removal	7
- Rinses	8
- Electric devises	8
- Denture care	8
- Counselling and education	8
• Conclusion	9
• Acknowledgments	9
• Ethics Approval	9
• Conflicts of Interest	9
• Funding	9
• Plagiarism	9
• Originality	9
• Contributions of authors	9
• Copyright information	9
• Updates	9
• Responsibility	9
• Authors' ORCID iDs	9
• Open Access information	9
• References	9

To cite: Ngwu, C. C., & Fadare A. S. (2023). Oral health conditions of geriatrics. *Orapuh Literature Reviews*, 3(1), OR011.

JOURNAL INFORMATION

About Orapuh Review

An Orapuh Review is a standalone survey of current scholarly sources on a specific oral and/or public health topic to provide an (updated) overview of knowledge in that area.

About the Journal

Orapuh Reviews are published in 'Orapuh Literature Reviews' (Orap. Lit. Rev.) – ISSN: 2644-3651. This journal is open access internationally peer-reviewed online repository of scholarly oral and public health review articles specifically crafted for students, researchers, and academics.

Editorial Team

Editor-in-Chief

1. Dr. V. E. Adamu – Euclid University (<https://euclid.int>) (Dom.: The Gambia) - editor@orapuh.org, v.adamu@orapuh.org

Editorial Board Members

2. Dr. Ombeva Oliver Malande –University of Makerere/East Africa Centre for Vaccines and Immunization (ECAVI), Kampala, Uganda – o.malande@orapuh.org
3. Dr. Sulaiman Gbonnie Conteh - University of Sierra Leone, Freetown – s.conteh@orapuh.org
4. Dr. Stephen Ayoade Fadare - Mindanao State University, Marawi, The Philippines – s.fadare@orapuh.org
5. Dr. Ndenengo-Grace Lekey-Kawo - Independent Consultant Paediatrician, Tanzania – n.kawo@orapuh.org
6. Mr. Denis Robert - Euclid University (Pôle Universitaire Euclide) (Dom.: United States) – d.robert@orapuh.org
7. Dr. Paul Okot - United Nations International Children's Emergency Fund (UNICEF), Uganda – p.okot@orapuh.org
8. Dr. Heron Gezahegn Gebretsadik - Euclid University (Dom.: Switzerland) – h.gebretsadik@orapuh.org
9. Mrs. Susan Atieno Onyango - Department of Health, Homa Bay County, Kenya – s.onyango@orapuh.org
10. Mrs. N. I. F. Enejojo, MOCS - Orapuh School (Dom.: The Gambia) – fenejojo@orapuh.org
11. Mr. Balarabe Musa Hussain - Federal College of Dental Technology and Therapy, Enugu, Nigeria – b.hussain@orapuh.org
12. Ms. Nina Redl - Bryan Health, Lincoln, Nebraska, United States – n.redl@orapuh.org
13. Mr. Nkiese Julius Kenkoh - Mboppi Baptist Hospital, Douala, Cameroon – n.kenkoh@orapuh.org
14. Dr. Johnson John Omale - Federal College of Dental Technology and Therapy, Enugu, Nigeria – j.omale@orapuh.org

About the Publisher

Orapuh Literature Reviews (Orap. Lit. Rev.) is published by Orapuh, Inc. (www.orapuh.org).

Orapuh is an international, independent Oral and Public Health Information, Education, and Research Organization incorporated in the Republic of The Gambia (C10443).

The Orapuh Team works to improve access to health information, catalyse health career skills, strengthen oral and public health education and research, and promote favourable health outcomes in resource-limited contexts.

Team members operate from Universities, Colleges, hospitals, and research institutions in Africa, Europe, North America, and Asia, and are associated with at least one of our affiliated entities.

Oral health conditions of geriatrics

Ngwu, C. C.¹, & Fadare A. S.²

Lead-Author: Ms Chika C. Ngwu (ngwuchikacharity@gmail.com)

¹Department of Dental Therapy, Pogil College of Health Technology, Ijebu Ode, Ogun State, Nigeria,

²College of SPEAR, Mindanao State University (Main), Marawi, The Philippines

RECEIVED:

31 March 2022

ACCEPTED:

21 February 2023

PUBLISHED:

13 March 2023

UPDATED:

13 March 2023

ABSTRACT

Oral health is a part of general health, but maintaining good oral health is a bit awkward and different in geriatrics. The dental care of geriatric patients is challenging and needs more attention than the dental care of younger people. Aging is a natural process associated with many oral diseases and problems. A healthy mouth that will last well into old age is crucial for a healthy body. This review aimed to keep clinicians informed on the oral health status of senior citizens, as well as the obstacles they face because of systemic disorders and changes in their oral tissues as they age. The authors reviewed previously published articles in journals and provided up-to-date knowledge on the common oral health concerns of the elderly. The authors conducted a narrative evaluation of geriatric oral health issues. The writing process took three months, (between November 2021 and January 20, 2022). We searched databases such as PubMed, Z-library, Publon, Medline, JSTOR, and Google Scholar, and obtained original articles published in various journals, textbooks, and review papers. Conclusively, good oral health helps one to stay healthy, maintain quality of life, and preserve independence. Good oral hygiene, adequate nutrition, and regular visits to the dentist will help protect one's teeth for a lifetime. This review demonstrated that many geriatrics encounter oral health problems and need serious attention to assuage their oral health conditions.

Keywords: *Elderly, geriatrics, oral health, oral health conditions, oral health status*

INTRODUCTION

Oral health is described by the World Health Organization (WHO) as a condition of complete physical, psychological, and social well-being, rather than only the absence of disease or disability (World Health Organization [WHO], 2006). Geriatric dentistry encompasses all the elements of dental health and treatment for the elderly. Oral health is a fundamental human right. It is also an important component of overall health. It improves a person's physical, mental, and social well-being and has a substantial influence on the quality of life (Glick et al., 2016).

Following WHO's broadening of the definition of health to include social wellbeing, oral health assessments have been expanded to include the idea of wellbeing. As a result, dental health affects overall well-being, not only the absence of disease. Eating, chatting, smiling, chewing,

swallowing, communicating, socializing, and making creative contributions to society are all factors that influence an individual's happiness (Anastassia, 2018).

According to the findings of Lyzbeth et al. (2019), the main reason older adults lose their teeth is not necessarily their age but most often due to inadequately controlled chronic diseases and poor oral hygiene. In addition, they seek oral health services less frequently than the rest of the population. Common oral health conditions of geriatrics include dental caries, periodontal disease, reduced salivary flow, oral cancer, tooth loss, halitosis, and denture-related conditions. These conditions may cause pain, local and systemic infection, chewing and swallowing difficulty, aesthetic problems, and occasionally, increased mortality. Furthermore, bad breath and

a poor dental appearance can increase social isolation (Florence et al., 2019).

Oral infections and periodontal disease have been closely associated with general health such as cardiovascular disease, diabetes mellitus, and lower respiratory tract infections, while tooth loss may hurt diet and nutrition (Florence et al., 2019). Conversely, oral disease can be prevented by daily oral hygiene, a healthy diet, smoking cessation, and regular professional oral health care and follow-up (Priyadarshini et al., 2020). It is imperative for everyone involved to understand and comprehend the oral health challenges this specific vulnerable population faces. The risk factors associated with their poor oral health must be identified and appropriately intercepted.

Purpose of Study

This review aimed to keep clinicians informed on the oral health status of senior citizens, as well as the obstacles they face because of systemic disorders and changes in their oral tissues as they age. This objective focuses on the concerns and difficulties related to seniors' oral health disorders and offers a better solution and assistance for them to be motivated and informed on how to avoid such dental problems.

REVIEW PARAMETERS

The researchers conducted a narrative review of selected studies on the oral health conditions of seniors and the challenges associated with them. The review took over three months to complete, from November 2021 to January 2022. During this literature review, the writers sought relevant journals online and conducted different online literature searches in databases such as PubMed, Z-library, Medline, Publon, JSTOR, EBSCOhost, and Google scholar. We also obtained books and published articles from different print journals. The writers used keywords such as "elderly," "geriatrics," "oral health," and "health conditions." The authors extracted relevant information from the articles, Bibliographic reviews, systematic reviews, and case reports.

CONCEPT OF ORAL HEALTH IN OLD AGE

As one gets older, the chances of becoming more prone to developing certain oral health problems

increase. Old age is perceived as a natural, unavoidable biological process that begins in early adulthood. During early middle age, many bodily functions begin to gradually decline. Gerontology is the study of the physical and psychological changes that occur as people age, and clinical gerontology, or geriatrics, is the treatment of the elderly (Park, 2017). According to Kossioni et al., (2018), oral illness is widespread in older people leading to tooth loss caused by poor oral hygiene (increased amounts of soft and mineralized deposits found on teeth and denture surfaces). Furthermore, there is a high frequency of dental caries and periodontal disease, poor prosthetic equipment, or lack of prosthetic rehabilitation, hyposalivation, and different oral diseases, which are typically related to denture-wearing but also pre-cancerous or malignant states (Tonetti et al., 2017). The aged adult population is diverse and may be categorized into three: vigorous older adults, frail older adults, and dependent older people (Clegg et al., 2019).

To begin with, healthy elderly people age well and have minimal comorbidities. They have a high degree of functioning and can look after themselves, their health, their hygiene, and, most especially, their dental hygiene. In terms of oral hygiene, they are no different from younger adults (Clegg et al., 2019).

Frailty is commonly associated with aging and includes several characteristics. Frail older adults are weak, often have many complex medical problems, have lower ability for independent living, may have impaired mental abilities, and often require assistance for daily activities (dressing, eating, toileting, mobility). It is a clinical geriatric condition marked by a loss in energy reserve, strength, and performance, as well as a steady decline in numerous physiological systems, putting them at risk. This is characterized as a pre-disability condition distinct from disability, reversible, and responsive to intervention (Vergara et al., 2019). Finally, dependency is the inability to execute essential everyday activities without partial or complete assistance. Many studies have demonstrated that the dependent population's dental health is generally poor. In nursing homes,

oral health is repeatedly ignored. Behavioral issues, a lack of collaboration, and a loss of autonomy are all factors that make dental health care challenging (Boczko et al., 2019). According to research by Jordan and Micheelis (2016), dependent older people with cognitive impairment had poorer oral health than independent older adults and people without cognitive impairment (Jordan & Micheelis, 2016).

Polypharmacy, frailty, loss of autonomy, reliance on routines of daily living (RDL), reduced eyesight, and lower touch sensitivity are all common symptoms of physiological aging. Dental hygiene becomes difficult at the dependency stage, cleaning natural teeth is significantly more difficult and time-consuming than cleaning a mouth with a complete denture (Muller et al., 2017). Meanwhile, denture usage is made more difficult by poor motor control and weak oral tissues, and impaired neuroplasticity makes it more challenging to adjust to replacement prostheses. Muller et al. (2017) found that institutionalized older people, particularly those with cognitive impairment, have worse oral health and fewer teeth than their colleagues who live freely. Oral hygiene is often repeatedly disregarded when help is required to accomplish everyday chores. Dementia patients are particularly vulnerable. It causes a significant rise in cavities and infections, resulting in pain, tooth loss, and a worse quality of life. Oral biofilm accumulation on natural tooth surfaces, dental prostheses, or the tongue poses a specific concern (Muller et al., 2017).

Oral bacteria are generally transferred into the bronchoalveolar system in the event of dysphagia, which is a common ailment in the elderly (Muller et al., 2017). Age, caries, and periodontal disorders have a complicated connection (Chapple et al., 2017; Sanz et al., 2017). Both diseases may be affected directly by aging, such as immunological and cellular senescence and poor wound healing as well as indirectly by physical and cognitive impairment and limited access to treatment (Lopez et al., 2017; Preshaw et al., 2017).

RELATIONSHIP BETWEEN ORAL AND SYSTEMIC HEALTH

Aida and Campard (2017) identified diverse and complicated linkages between oral and general health and correlations between proper mastication and everyday activities, nutritional status, and quality of life. There is a link between the severity of periodontal disease, increased tooth loss, and plaque in the carotid artery. This might lead to an increase in cardiovascular disease all-cause mortality, including ischemic stroke. In their study, Allan-Deutsch et al. (2021) claim that chewing enhances regional brain activity and cerebral blood flow. The number of teeth lost in a person's mouth may predict cognitive impairment and dementia (Cerutti-Kopplin et al., 2016). Alzheimer's disease is caused by bacteria that cause periodontal disease (Dominy et al., 2019). There is a link between dental health and respiratory illness. Improved oral health has been shown in randomized controlled studies to lower the development or incidence of respiratory infections and pneumonia fatalities in high-risk older adults in residential care. Periodontitis is exacerbated by diabetes. Glycemic control is harmed by periodontal inflammation, which leads to systemic problems. Cardiorenal mortality is increased by severe periodontitis, and better dental hygiene can help with metabolic regulation (Alan-Deutsch et al., 2021).

COMMON ORAL HEALTH PROBLEMS ASSOCIATED WITH GERIATRICS

Tooth loss, dental caries, periodontal disease, hyposalivation, halitosis, edentulism, and oral cancer are all common oral diseases/problems linked with old age. Pain, local and systemic infection, chewing and swallowing difficulty, cosmetic issues, and increased mortality are all possible side effects of these disorders. Furthermore, foul breath and a lousy smile might contribute to social isolation (Delwel et al., 2018).

Dental caries

For a variety of reasons, dental caries continues to be a significant oral health concern among the elderly, which includes an increase in tooth treatment and maintenance rather than extraction, age-related salivary changes, poor

diet, exposure of the root surface due to gingival recession, and a higher risk of side effects (xerostomia) after drug treatment (Wyatt et al., 2018). Caries in dental crowns were shown to be prevalent among the dentate elderly in research done in England, with 20% of 75–84-year-olds displaying active root decay. In general, tooth loss due to caries is common, indicating that the most common therapy so far has been an evacuation of the afflicted tooth (Tonetti et al., 2017).

Periodontal disease

According to epidemiological data on periodontal disease (a chronic infectious illness that damages the teeth's supporting tissues, including gingiva and alveolar bone), the accumulation of bacterial plaque with subsequent gingivitis and mild or moderate alveolar bone loss is the most common finding among the elderly (Hirotsomi et al., 2020). According to a recent systemic review of studies from 37 countries by Kassebaum et al., (2020), the incidence of severe periodontitis (greater likelihood of tooth loss) was higher with an increase in age, and it was intense and relatively constant among the elderly.

Tooth loss (missing teeth) results from untreated or unsuccessfully treated periodontal disease and caries, which causes masticatory dysfunction and a worse quality of life. In the later stages of severity, it's essential to measure the combined burden of both illnesses. Tooth loss, on the other hand, can be caused by a variety of factors that might be difficult to identify (Jepsen et al., 2017).

Edentulism

Edentulism, the "ultimate measure of disease load for oral health," is a severe and permanent disorder. It is the state of being without natural teeth (Mohammed & Al-Rafee, 2020). Complete edentulism is an oral cavity without any teeth. Good dentition is quite essential for well-being and quality of life. Edentulism is one of the public health burdens for older people and affects primary care practice. When not treated, the final stage of caries and periodontal disease may lead to tooth loss, and edentulism is directly related to chewing and nutritional problems. Patients who are suffering from edentulism exhibit a wide

range of biological variations and health conditions. Teeth loss affects medication, and speech and may result in poor esthetics, affecting the quality of life (Mohammed & Al-Rafee 2020).

Dry mouth (Xerostomia)

It is a condition in which the mouth's salivary glands do not produce enough saliva to moisten the mouth. A dry mouth is frequently caused by the adverse effects of certain drugs, age, or cancer radiation therapy. A disorder directly affecting the salivary glands can sometimes produce a dry mouth (WHO, 2021). Vulnerable elderly adults have a significant frequency of xerostomia and salivary gland dysfunction. Polymerization (especially with antihypertensives, antidepressants, and antipsychotics), poor general health, gender (primarily females), and declining health were among the etiologic variables that are among the most reported disorders, with low treatment success rates among older people. Various studies were conducted on the impact of dry mouth syndrome on oral health and the general quality of life of the elderly. (José Antonio et al., 2015). Multiple approaches have been studied, including products specifically for dry mouth, such as artificial saliva and saliva-stimulating drugs (pilocarpine), but the outcomes have not been encouraging. Palliative measures include:

- Addressing the underlying cause of xerostomia (drugs, diabetes, etc).
- Avoid dry, hot environments, dry foods, drugs, alcohol, and smoking, among other situations/activities that may exacerbate dryness.
- Regularly moistening the mouth with sips of water, lip balm, or olive oil.

Individuals with dry mouth require preventive measures against the consequences of the absence of saliva, including caries, periodontal disease, and candidiasis (José Antonio 2015; Gil-Montoya et al., 2015).

Oral cancer

Oral cancer represents a major threat to the health of the elderly in both high- and low-income countries. It includes lip, oral cavity, and pharyngeal cancer, and it is the eighth most common cancer worldwide (Rapp et al., 2017).

Incidence and mortality rates are higher in men than in women. The prevalence increases with age consequently, oral cancers is of particular concern among over-65-year-olds. Variations among countries are attributable to differences in risk profiles and the availability of and accessibility to health services, among others (Rapp et al., 2017). Recent medical and technological advances have led to a reduction in the mortality rate and an increased number of survivors. Oral cancer is frequently treated with surgery, radiotherapy, and/or chemotherapy. Oral cancer and its treatment can both be responsible for major anatomical changes in the oral cavity and the alteration of basic functions, including speaking, chewing, and/or swallowing, substantially impairing the quality of life of survivors (Antonio., 2015). A multidisciplinary approach is therefore essential for reducing the impact on patients, with dentists playing an important role. Dental care before, during, and after treatment can help to maintain or improve the quality of life of oral cancer patients (WHO, 2021).

Halitosis

Halitosis is described as a change in the quality of the odor of air exhaled via mouth or nose breathing due to physiological and adaptive processes and pathological alterations. Although it can be caused by extraoral causes such as otorhinolaryngological, gastrointestinal, pulmonary, and systemic issues, most cases (about 90% to 95%) originate in the mouth. They are linked to the accumulation of tongue biofilm and periodontal illnesses (Lu et al., 2017). It can reveal several systemic severe disorders, such as diabetes, renal, and hepatic insufficiency, which can cause or contribute to the condition (Maria et al., 2017). Oral halitosis, which is sometimes mistakenly thought to be innocuous, can cause morbidity and death among institutionalized geriatrics since a more pathogenic microbiota typically colonizes their mouths than non-institutionalized geriatrics, the independent aged, and young adults (Maria et al., 2017). Individuals with poor saliva and oral hygiene are more likely to develop tongue biofilm, serving as a reservoir for respiratory germs. When inhaled, they reach the lower airways and cause

pneumonia, a much more severe problem in institutionalized older adults due to the increased hospitalization and mortality rates.

PREVENTIVE MEASURES TO BE ADOPTED

Mechanical plaque removal

The term dental plaque is defined as preventive measures aimed at removing dental plaque and preventing it from recurrence. It can be achieved mechanically, chemically, or by the combination of the two. Colonization of tooth surface by bacteria is recognized as the key etiologic factor in gingivitis, dental caries, and periodontal disease. (Mandal et al. 2017). Several reports worldwide have shown that the use of professional dental health services is low among older people, particularly among the socio-economically disadvantaged (Abdul et al., 2014). Mechanical plaque control aids chewing sticks, toothbrushes, interdental brushes, and dental floss. The preferred method of brushing for most elders in underdeveloped countries such as Nigeria is chewing sticks while in developed countries are toothbrushes.

Persons with gingival recession should be instructed to observe certain precautions to avoid further recession or cemental abrasion. These may include the use of an extra soft toothbrush, the use of light pressure, and modification of the brushing method. The plaque retention in the elderly is exacerbated by the presence of restorations, missing teeth, and gingival recession. The wearing of removable dentures may also negatively influence plaque accumulation (Abdul et al., 2014).

Geriatrics often have trouble in the mechanical removal of plaque because of reduced manual dexterity or impaired vision or due to physical limitations associated with conditions such as stroke, Parkinson's disease, or severe arthritis. The elderly person should be helped to develop the ability to brush effectively and thoroughly. Those who have diminished manual dexterity may benefit from the use of traditional mechanical toothbrushes, rotary electric toothbrushes, or manual brushes that have been adapted or customized for each person.

Rinses

A therapeutic rinse inhibits the formation of dental biofilm that forms on the tooth surface. It contains an agent that is beneficial to the tooth surface or oral environments such as chlorhexidine, sodium benzoate, sanguinarine, fluoride, phenols, essential oil, hexetidine, sanguinarine, triclosan, and many others. (Olejnik & Jolanta, 2021). Chlorhexidine rinse has numerous applications for the treatment of the elderly. It is primarily indicated for gingivitis. However, it is effective against a variety of plaque bacteria, thus enhancing the patient's mechanical plaque control efforts. This is especially important for patients with physical and mental disabilities. It also reduces oral mucositis and candidiasis in immune-suppressed patients such as those on intensive chemotherapy. Fluoride has been known to prevent the development of caries through three important mechanisms. First, it inhibits the development of caries by being incorporated into the developing enamel in the form of fluorapatite. Secondly, it enhances the remineralization of the carious enamel. Lastly, fluoride has an anti-bacterial action. Therefore, fluorides in the form of gels, varnishes, rinses, or dentifrices play important role in the prevention of caries evident in older patients (Abdul et al. 2014). Remineralizing rinses can be used in an elderly person who continually experiences new coronal or root carious lesions because of severe xerostomia. This replaces the calcium and phosphate lost from the enamel or cementum. This is most effective when used with topical fluorides.

Electric devices

Powered toothbrushes have a major advantage over mechanical toothbrushes with increased ease and efficiency for the elderly especially those who have lost some degree of manual dexterity. These devices have enlarged handles, which may be grasped more easily than the standard manual toothbrush handle (Hughes & Jeffery, 2016). The major advantage is that they are motor driven, thus requiring little or no arm or wrist movement, and the need to make consistent movements. Some of the electric plaque removal devices are designed in such a way that the action stops if too much pressure is applied. However, an elderly

person who has congenital heart disease or any condition affecting heart valves should be cautioned about the danger of developing subacute bacterial endocarditis secondary to soft tissue trauma caused by improper use of electrical devices.

Denture care

Geriatrics using dentures should be taught by their oral health practitioner how to care for the denture and the surrounding tissues as well as the need for continued professional care. The tissues can be prevented from harm by avoiding wearing the denture constantly. Instruction for the removal of the denture before sleep is essential. The cleaning and massaging of the tissues under a denture at least once a day increases circulation and thus enhances the health of these tissues. Elderly persons who wear full or partial dentures must be taught to clean these appliances effectively. Immersion of dentures in cleansers is the recommended method that ensures safety against damage to the denture material. The patient should be instructed always to brush and rinse the denture thoroughly before and after soaking in immersion cleans. (Abdul et al., 2014).

Counseling and education

According to Tellez et al. (2019), preventive counseling for geriatric patients includes two components: education and motivation.

Patient education includes a discussion with the patient of the causes of current and past diseases and means of intervention and prevention of future diseases. Discussion of etiology should be complete, but appropriate to the level of understanding of the elderly person or caregiver using a simple yet effective model - Tell--Show--Do.

1. Explain the procedure:
2. Demonstrate the procedure:
3. Practice the technique until he has mastered the skills involved in performing it effectively.

Preventive knowledge and skills alone will not ensure the elderly person attains the goal of preventive counseling which is, the maintenance of optimal oral health status. The dental

professional and patient must establish a therapeutic alliance, whereby each is committed to performing the activities necessary to achieve this goal. The achievement of such a service goes beyond what the dental profession can do alone. It requires the involvement of other health professionals and healthcare workers of the elderly (Vergara et al., 2019).

CONCLUSION

The need for dental care among geriatrics is often necessitated by unbearable oral discomfort or emergency and in many cases, retention of teeth proves abortive. Many of the oral health issues of the geriatric population progress thereby creating oral health awareness amongst the entire population by the dental team emphasizing preventive measures and remedies for oral diseases are necessary. Proper enlightenment propels a positive change of attitude and practices of oral hygiene to keep strong and healthy teeth throughout their lifetime.

Acknowledgments: We are grateful to all authors and researchers whose works were cited in this review article. We also appreciate Dr. V. E. Adamu for his astute guidance and visionary leadership.

Ethics Approval: Nil needed.

Conflicts of Interest: The authors declare no conflict of interest.

Funding: Nil secured.

Plagiarism: The plagiarism test on this manuscript yielded a 0% score.

Originality: This review is an original work carried out by the authors. It is not copied from elsewhere.

Contributions of authors: Chika, C. C. and Fadare, A. S. wrote the review, proof-read it, and edited it.

Copyright information: The authors accept to be the copyright holders of this review.

Updates: All authors agree to continually update this Review as new information becomes available.

Responsibility: All authors agree to be responsible for the content of this review and absolve the Journal and its Editors of all responsibilities of the review and the information it portends.

Authors' ORCID iDs:

¹Ngwu, C. C.: <https://orcid.org/0000-0002-3602-7497>

²Fadare A. S.: <https://orcid.org/0000-0002-3444-4713>

Open access: This review article is distributed under the Creative Commons Attribution Non-Commercial (CC BY-NC 4.0) license. Anyone can distribute, remix, adapt, build upon this work, and license the product of their efforts on different terms provided the original work is properly cited, appropriate credit is given, any changes made are indicated and the use is non-commercial

(<https://creativecommons.org/licenses/by-nc/4.0/>). All authors agree to the Open Access policy of this journal and accept to allow this review to be distributed freely without any restrictions of subscription, registration, or payment of any amount of money.

REFERENCES

- AbdulRazak, P.,** Jose-Richard, K. M., Thankachan, R. P., Abdul-Thafiz, K. A., Nanda-Kumar, K., & Sameer, K. M. (2014). Geriatric Oral Health. *International Journal of Oral Health*. 6(6), 110-116.
- Aida, J., & Campard, G.** (2017). The relationship of oral health with general health and NCDs: a brief review. *International Dental Journal* 67(2), 14-8. <https://doi.org/10.1111/idj.12360>.
- Alan, D., & Jay, E.** (2021) *Optimizing oral health in frail older people*. Geriatric Dental Advisory.
- Anastassia, E., & Kossioni, A. M.** (2018). The association of poor oral health parameters with malnutrition in older adults: A review considering the potential implications for cognitive impairment. *Nutrients*, 10, 1709; <https://doi.org/10.3390/nu10111709>.
- Boczko, F., McKeon, S., & Sturkie, D.** (2009). Long-term care and oral health knowledge. *Journal of American Medical and Dental Association*, 10, 204-6.
- Cárdenas-Bahena, Á., Velázquez-Olmedo, L. B., Falcón-Flores, J. A., GarcíaZámamo, I. E., Montes-Salmerón, R. E., & Reza-Bravo, G. G.** (2018). Self-perception of oral health in older adults from Mexico City. *Rev Med Inst Mex Seguro Soc*.56(1), 54-63.
- Cerutti-Kopplin, D., Feine, J., Padilha, D.M., de Souza, R. F., Ahmadi, M., & Rompré, P.** (2016). Tooth loss increases the risk of diminished cognitive function: a systematic review and meta-analysis. *JDR Clin Trans Res* 1, 10-9. <https://doi.org/10.1177/238008441663310>.
- Clegg, A., Young, J., Iliffe, S., Rikkert, M. O., & Rockwood, K.** (2019). Frailty in elderly people. *Lancet*; 381, 752-62.
- Florence, M. F., Wong Yannies T. Y., & Keung Leung, W.** (2019). Oral health and its associated factors among older

- institutionalized residents- A systematic review. *International Journal of Environmental research and public health*.
- Muller**, F., Shimazaki, Y., Kahabuka, F., & Schimmel, M. (2017). Oral health for an aging population: the importance of a natural dentition in older adults. *International Dental Journal* 2017; 67: 7–13. <https://doi.org/10.1111/idj.12329>
- Fulop**, T., Larbi, A., Witkowski, J. M., McElhaney, J., Loeb, M., Mitnitski, A., & Pawelec, G. (2010). *Aging, frailty, and age-related diseases*. *Biogerontology*
- Glick**, M., Williams, D. M., Kleinman, D. V., Vujicic, M., Watt, R. G., & Weyant, R. J. (2016). A new definition for oral health developed by the World Dental Federation opens the door to a universal definition of oral health. *Br Dent J*. 2016, 221(12), 792-793.
- Gonsalves**, W. C, Wrightson, A. S., & Henry, R. G. (2008). Common oral conditions in older persons. *Am Fam Physician* 78, 845–852.
- Hirotoni**, T., Yoshihara, A., Yano, M., Ando, Y., & Miyazaki, H. (2020). A longitudinal study on periodontal conditions in healthy elderly people in Japan. *Community Dent Oral Epidemiol.*, 30(6), 409–417.
- Jablonski**, R. A., Lunro, C. L., Grap, M. J., & Elswick, R. K. (2005). The role of behavioral, environmental, and social forces on oral health disparities in frail and functionally dependent nursing home elders. *Biol Res Nursing*, 7, 75-82.
- Jepsen**, S., Blanco, J., Buchalla, W., Carvalho, J. C., Dietrich, T., & Dörfer, C. (2017). Prevention and control of dental caries and periodontal disease at individual and population level: Consensus report of group 3 of joint EFP/ORCA workshop on the boundaries between caries and periodontal diseases. *J Clin Periodontol*. 44(Suppl 18), S85–93.
- Jordan**, R., & Micheelis, W. (2016). Fünfte Deutsche Mundgesundheitsstudie [Fifth German oral health survey]. Köln: Deutscher Ärzteverlag.
- Antonio**, J., Montoya, G., Lucia, A., de Mello, F., Barrios, R., Gonzalez-Moles, A. G., & Bravo, M. (2015). Oral health in the elderly patient and its impact on general well-being: A non-systematic review. *Clinical Interventions in Aging*, 10, 461–467.
- Kossioni**, A. E., Hajto-Bryk, J., Maggi, S., McKenna, G., Petrovic, M., Roller-Wirnsberger, R. E., Schimmel, M.; Tamulaitienė, M., Vanobbergen, J., & Müller, F. (2018). An Expert Opinion from the European College of Gerodontology and the European Geriatric Medicine Society: European Policy Recommendations on Oral Health in Older Adults. *J. Am. Geriatr. Soc.*, 66, 609–613.
- Hughes C.**, V., & Jeffery, A. (2016). *Mechanical and chemotherapeutic home oral hygiene*. <https://www.sciencedirect.com/topics/nursing-and-health-professions/electric-toothbrush>.
- Lee**, Y. T., Lee, H. C., & Hu, C. J. (2016). Periodontitis as a modifiable risk factor for dementia: A nationwide population-based cohort study. *J Am Geriatr Soc*. <https://doi.org/10.1111/jgs.14449>.
- Lopez**, R., Smith, P. C., Göstemeyer, G. and Schwendicke, F. (2017). Aging, dental caries, and periodontal diseases. *Journal of Clinical Periodontology* 44:S18, 145–152.
- Lu**, H. X., Chen, X. L., Wong, M., Zhu, C., & Ye, W. (2017). Oral health impact of halitosis in Chinese adults. *International Journal of Dental Hygienists*, 15(4), 85-92.
- Lyzbeth** B., Ortíz, B., Granados-García, V., Cruz-Hervert, P., Moreno-Tamayo, K., Heredia-Ponce, E., & Sánchez-García, S. (2019). The impact of poor oral health on the oral health-related quality of life (OHRQoL) in older adults: the oral health status through a latent class analysis. *BMC Oral Health*, 19, 141 <https://doi.org/10.1186/s12903-019-0840-3>.
- Mandal Arnab.**, Dharendra Kumar Singh., Humaira Siddiqui, Diptajit Das., Arka

- Kanti Dey. (2017). New dimensions in mechanical plaque control: an overview. *Indian Journal of Dental Sciences* 2(9): 133-39. DOI: 10.4103/IJDS_18_17
- de Aguiar**, M. C. A., Pinheiro, N. C. G., Marcelino, K. P., de Lima, K. C. (2017). Halitosis and associated factors in institutionalized elderly persons. <https://doi.org/10.1590/1981-22562017020.170160>.
- Mohammed**, A. A. (2020). The epidemiology of edentulism and the associated factors: A literature review. *Journal of Family Med Prim Care*, 9(4), 1841-1843. https://doi.org/10.4103/jfmpc.jfmpc_11_81_19.
- Muller**, F. (2016). *Oral hygiene in geriatric patients. The Ailing patient*. In: Wismeijer D., Chen, S., Buser, D., editors. *Implant Therapy in the Geriatric Patient. ITI Treatment Guide*. Quintessence. p. 145-155.
- O'Donnell**, L. E., Smith, K., & Williams, C. (2016). Dentures are a Reservoir for Respiratory Pathogens. *J Prosthodont* 2016 25, 99-104.
- Olejnik** E., & Szymanska, J. (2021). Active ingredient of mouth wash. *Acta Poloniae Pharmaceutica* 77(6), 825-832. <https://doi.org/10.32383/appdr/128897>.
- Park's** Textbook of preventive and social Medicine (2017). 22nd eds. Banarasidas Bhanot Publishers, Pg 549. 2017.
- Petersen**, P. E., & Yamamoto, T. (2005). Improving the oral health of older people: the approach of the WHO Global Oral Health Programme. *Community Dent Oral Epidemiol.*, 33, 81-92. <https://doi.org/10.1111/j.1600-0528.2004.00219>.
- Priyadarshini**, K., Kumaresan, R., Turagam, N., & Mudrakola, D. P. (2020). A review of Geriatric Dentistry, *European Journal of Molecular & Clinical Medicine*, 7(11), 9-16.
- Plemons**, J. M., Al-Hashimi, I., & Marek, C. L. (2018). American Dental Association Council on Scientific Affairs. Managing xerostomia and salivary gland hypofunction: executive summary of a report from the American Dental Association Council on Scientific Affairs. *J Am Dent Assoc.*, 145(8), 867-873.
- Preshaw**, P. M., Henne, K., Taylor, J., Valentine, R., & Conrads, G. (2017). Changes in immune function (immune senescence) in caries and periodontal diseases: A systematic review. *Journal of Clinical Periodontology* 44, S18, 153-177.
- Rodríguez-Rodero**, S., Fernández-Morera, J. L., & Menéndez-Torre, E. (2011). Aging genetics, and aging. *Aging Dis* 2, 186-195.
- Suresh**, R. (2006). Prevention and Treatment of age-related diseases. *Springer, Aging, and periodontal disease*. 193-200.
- Delwel**, S., Binnekade, T. T., Roberto, S. G. M. Perez., C. M. P. M. Hertogh., E. J. A. S., & Lobbezoo, F. (2018). Oral hygiene and oral health in older people with dementia: A comprehensive review with a focus on oral soft tissues. *Clin Oral Invest.* 22, 93-108 <https://doi.org/10.1007/s00784-017-2264-2>.
- Takeuchi**, K., Ohara, T., Furuta, M., Takeshita, T., Shibata, Y., Hata, J. (2017). Tooth loss and risk of dementia in the community: the Hisayama Study. *J Am Geriatr Soc*, 65, e95-100. <https://doi.org/10.1111/jgs.14791>.
- Tan**, J.S. & Teo, S.Y. (2018). Caring for dependent older persons. World Science book. 5-48. <https://doi.org/10.1142/10983>.
- Tellez**, M., Myers Virtue, S., Neckritz S., Bhoopathi V, Hernandez, M., & Shearer, B. (2019). Motivational interviewing and oral health education: Experiences from a sample of elderly individuals in North and Northeast Philadelphia. *Spec Care Dentist.* 39(2), 201-207. <https://doi.org/10.1111/scd.12366>. Epub 2019 Feb 14, PMID: 30761581.
- Thomson**, W. M. (2014). Epidemiology of oral health conditions in older people. *Gerodontology* 31, 9-16.
- Tonetti**, M., Bottenberg, P., Conrads, G., Eickholz, P., Heasman, P., Huysmans, M. C. (2017). Dental caries and periodontal diseases in the aging

population: call to action to protect and enhance oral health and well-being as an essential component of healthy aging – Consensus report of group 4 of the joint EFP/ORCA workshop on the boundaries between caries and periodontal diseases. *J Clin Periodontol* 44, 135-S144.

United Nations Department of Economic and Social Affairs (2013). World Population Ageing *World Popul Ageing* 2013114. ST/ESA/SER.A/348.

Vergara, I., Mateo-Abad, M., Saucedo-Figueroa, M.C. et al. (2019). Description of frail older people profiles according to four screening tools applied in primary care settings: a cross-sectional analysis. *BMC Geriatr* 19, 342.
<https://doi.org/10.1186/s12877-019-1354-1>

World Health Organization. (2006). *Constitution of the World Health Organization*. World Health Organization. http://www.who.int/governance/eb/who_constitution_en.pdf.

World Health Organization. (2021). *Oral Health*. <https://www.euro.who.int/en/health-topics/disease-prevention/oral-health>.

World Health Organization. (2014). *WHO Oral Health Country/Area Profile*. <http://www.whocollab.od.mah.se/index.html>.

Wyatt, C. C., Wang, D., & Aleksejuniene, J. (2018). Incidence of dental caries among susceptible community-dwelling older adults using fluoride toothpaste: a 2-year follow-up study. *J Can Dent Assoc.* 80, e44.