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Oral Diseases of the Elderly in Nigeria: Dental Health Problem in Focus

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ABSTRACT

Oral diseases are the most common non-communicable diseases and affect people throughout their lifetime, causing pain, discomfort, disfigurement and even death. Some of the most common diseases that impact our oral health include tooth decay (cavities), gum (periodontal) and oral cancer. They are basically caused by poor brushing and flossing habits that allow plaque – a sticky film of bacteria to build up on the teeth and harden. The proportion of the older people continues to grow worldwide, especially in developing countries. Oral diseases among the elderly are fast becoming the leading cause of disability and mortality, and health and social policy-makers with face tremendous challenges posed by rapidly changing burden of chronic diseases in older people. In Nigeria today, oral health may not be perceived as a priority in older people's care, and can easily be neglected while focusing on other conditions a patient may be living with. It is against this backdrop that this paper examines oral diseases with special reference to dental health problem among the elderly. It also looks at the possible causes and effects of oral diseases among the elderly in Nigeria. The paper, suggest ways to improve older people's oral health in Nigeria.

***Keywords*:** Oral Diseases, Dental Health Problem, Elderly, Nigeria

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1. INTRODUCTION

Oral diseases are the most common non-communicable diseases and affect people throughout their lifetime, causing pain, discomfort, disfigurement and even death. Some of the most common diseases that impact our oral health include tooth decay (cavities), gum (periodontal) and oral cancer. They are basically caused by poor brushing and flossing habits that allow plaque – a sticky film of bacteria to build up on the teeth and harden. Shawn (2017) reported that the greater the number of missing teeth, the poorer the quality of health. Poor dentition also leads to issues with chewing and can negatively impact nutritional intake. The benefits of oral health are well studies and include economic, social, psychological and physical health. According to WHO (2014), oral health is a state of being free from chronic mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss and other diseases and disorder that limit an individual's capacity in biting, chewing, smiling and psychosocial wellbeing. Poorly treated and untreated dental conditions can have a significant effect on the quality of life which may lead to deterioration of the general wellbeing of man such a causing pain, discomfort, sleepless night, loss of self-esteem.

Akpata (2004) explain that dental caries experience in Nigeria varies between very low in rural areas to moderate in some urban communities. Although most studies indicate that 4-30% of Nigerians have dental caries, the prevalence of the diseases among the elderly appears to be on the increase. Traumatized anterior teeth are commonly seen in Nigeria and dental fluorosis has also been observed in Nigeria especially in the Northern part of the country. Braimoh and Alade (2019) affirm that the therapeutic dental services are available in the public and private sectors, mainly in the urban areas. As a result, most of the dentists practicing in Nigeria are located in the urban areas.

Oral health is not separated from general health but maintaining oral health is definitely difficult and different at old age. Though, few elderly have physical or mental situation that call for particular interest in the dental workplace, one should not presume that all elderly in community shares these circumstance (Braimoh & Alade, 2019). In order to achieve good health, it is necessary to know few aspects of old age dental challenge. In due course of old age, body tissue gets harder collection of waste products in the body cells and loss of lubrication leads to impaired functions of various organs. Thus, aging is a natural process. Old age should be regarded as a normal, inevitable biological phenomenon.

However, there is the need for more information about older people's oral health, especially dental health problem to better understand the full scale of the issue and the extent of the problems for older people now and in the future. It is in this context that this paper explore dental health problem among the elderly. It also looks at the possible causes and effects of oral diseases among the elderly. Finally, the paper suggests ways to improve older people's oral health.

2. LITERATURE REVIEW

2. 1. Oral Diseases of the Elderly

The proportion of the older people continues to grow worldwide, especially in developing countries. Oral diseases among the elderly are fast becoming the leading cause of disability and mortality, and health and social policy-makers with face tremendous challenges posed by

rapidly changing burden of chronic diseases in older people. In Nigeria today, oral health may not be perceived as a priority in older people's care, and can easily be neglected while focusing on other conditions a patient may be living with. However, while data on this issue are limited in Nigeria, analysis by the faculty of Dental Surgery England suggests that a large number of older people could be experiencing serious oral health problem. Using the most recent Adult Dental Health Survey (which covers England, Wales and Northern Ireland) and the latest population data from the office of National Statistics, the faculty estimates that at least 1.8 million people aged 65 and over have an urgent dental condition. Such conditions' as defined by the Adult Dental Health Survey (where the sensitive tissue inside the tooth is exposed), oral sepsis or extensive decay in untreated teeth (Bhayat & Chikte, 2019).

2. 2. Oral Health Status in Aged People

Adequate nutrition is a vital factor in promoting the health and wellbeing of the aged. Inadequate nutrition may contribute to an accelerated physical and mental degeneration, pleasure in participating in an active social life and consequently quality of life. Poor oral health can be a detrimental factor to nutritional status and health (Bhayat & Chikte, 2018). Disorder of the oral cavity has contributed to poor eating habits in the elderly. Caloric requirements usually decrease in the elderly because of a decline in the basal metabolic rate, brought on by reduced lean muscle mass and lower exercise levels (Peterson & Vamamoto, 2005).

Dental status is considered to be an important contributing factor to health and adequate nutrition in elderly (WHO, 2018). Missing dentition and ill-fitting dentures cause difficulty in chewing and perception of taste of foods.

2. 3. Change in the Teeth with Aging

The gradual changes taking place in the dental tissues after the teeth are fully formed are referred to as age changes (Bhayat & Chikte, 2019). Dental carries is the disease of dental hard tissues characterized by loss of minerals from the teeth with subsequent cavity formation (Kiyak & Reichmuth, 2005).Approximately 70% of older adults have missing teeth (Bhayat & Chikte, 2019). Missing teeth and oral disease have significant effects on the psychological, psychological and social aspects of older adults. Periodontitis is the primary cause of missing teeth among order adults, with approximately 25% of missing teeth caused by severe periodontitis. Also, Periodontitis (sore and swollen around the teeth is a chronic inflammatory disease that is associated with systematic diseases such as diabetes, cardiovascular diseases and respiratory diseases. Periodontitis disease has a very strong genetic component in general, it progresses with age. The rate of breakdown seems primarily dictated by genes that affect the inflammatory process (Razak, Richard, Thankachan, Hafiz, Kumar & Sameer, 2014).

Dental needs of elderly people often differ significantly from those of young persons. Elderly patients need to deal with the "ravages of time", disease, unhealthy life style, bad habits, poor diet, genetics, lack of dental treatment and excessive or unwise dental treatment. Progression can be slow down by careful home care and professional treatment. The microscopic changes taking place with age in the teeth change in form and occur with age. Wears and attritions affect the tooth form (Bhayat & Chikte, 2019).

The perikymeta and imbrications lines are lost, giving the enamel surface a flat appearance with less detail than in newly erupted teeth. The altered surface structure gives the teeth in older individuals a different pattern of light reflection, which causes a change in the

observed color. Changes in the dentin, both in quantity (thickness) and quality also result in a gradual loss of transparency. Pigmentation of anatomical defects, corrosion products and inadequate oral hygiene may also change the tooth color (WHO, 2014). All the changes in enamel are based on long-exchange mechanism. It becomes less permeable and possibly more brittle to increase with age (Federal Interagency Forum on 3 Aging-Related Statistics, 2016).

2. 3. 1. Tooth loss – Edentalism

Is prevalent among older people all over the world. It is highly associated with socio-economic status (Shawn, 2017). This is the absence or complete loss of all natural dentition (teeth). Tooth loss has long been considered an inevitable part of the aging process, significant changes in oral health patterns has occurred in the twentieth century relative to the rate of edentulismin the United States. Periodontal disease takes its toll on the bones and gums that support teeth, so as the destruction of these structures worsens, the teeth become loose and fall out or they end up needing to be extracted. Amongst the elderly, old filings, dry mouth, gum recession, and plaque may all play a role in edentulism (Phanchbhai, 2012).

Edentulian can lead directly to impairment, functional limitation, physical, psychological and social disability and handicap. The impart of edentulism on general health should be examined by analyzing the major dimensions of health, such as physical symptoms and functional capacity, social functioning and perception of wellbeing (Park, 2011). Several prospective and cross sectional studies have supported the association between tooth loss, diet and nutrition. Impaired dentition imposes dietary restriction and affects food taste, food selection, food preparation and food eating patterns.

Results of a study by locker indicated that 39% of edentuloss elders were prevented from eating foods they would like to eat, 29% reported a decline in their enjoyment of food and 41% avoided eating with others (Shawn, 2017). Suboptimal diets may prevent edentulous individuals from meeting recommended dietary allowances and lead to compromised nutritional states, especially in edentulous subjects without dentures (WHO, 2018).

Studies have demonstrated that diet in edentulous subjects consists of food that is low in fiber and high in saturated fat with a significant lack of intake of high –fiber foods such as breads, fruits, and vegetables while consuming more cholesterol and saturated fats (Bhayat & Chikte, 2019).

2. 3. 2. Xerostomia

Dry mouth is a common complaint in older people and the condition is reported in approximately 30% of the population aged 65 and older. Persons suffering from dryness of the mouth are likely to experience dental caries in addition to difficulties in chewing, eating and communicating (Bhayat & Chikte, 2019). A reduced unstipulated salivary flow and subjective oral dryness are significantly associated with age and the female gender. Drug induced xerostomia is most common in old age because high proportions of older adults take at least one medication that cause salivary dysfunction (Administration on Aging, 2015).

Drying irritates the soft tissues in the mouth which can make them inflamed and more susceptible to infection without the cleansing effects of saliva, tooth decay and other oral health problems becomes more common without adequate saliva to lubricate your mouths, wash away food and neutralized the acids produced by plaque, extensive decay can occur or fungal germs in check (Hirotomi, Yoshihara, Ogawa & Miyazaki, 2015).

2. 3. 3. Denture Related Conditions

Denture stomatitis is a common and oral mucosal lesion of clinical importance in old age population. The prevalence rate of stomatitis is reported within the range of 11-67% in complete denture wearers. In many cases of denture stomatitis, colonization of yeast to the fitting surface of the prosthesis is observed. Other factors of stomatitis include allergic reaction to the denture base material or manifestations of systemic disease (Braimoh & Alade, 2019).

The prevalence of denture stomatitis correlates strongly to denture hygiene or the amount of denture plaque. Usage of denture at night, neglect of denture soaking at night and use of defective and unsuitable dentures are also risk factors for denture stomatitis and alsotobacco and alcohol. The lower the level of education the higher the prevalence of stomatitis, denture stomatitis is one of the most common oral health problems among elderly population with removable dentures. This is pertains to a number of pathological symptoms in the oral cavity caused by wearing acrylic dentures. Dentures may produce a micro-environment conducive to the growth of candida.

This may be due to the acrylic, reduced saliva flow under the surface of the denture fitting and poor oral hygiene (Epstein 1990; Guida 1988, Shulman 2012 Cited in Wider 2016). Long-term and continuous use of a denture along with poor denture and oral hygiene promote the development of a biofilm (plaque) on the surface of the prosthesis (Gendreau 2011; Salenro 2011 Cited in Berkey& Bars, 2016). The biofilm colonize the surface and penetrates into the cracks and imperfections of the denture material (Ramage 2004 Cited in WHO, 2014). The mucosa in contact with the denture then becomes inflamed.

The problem may be compounded by physical disabilities that reduce an individual's ability to maintain good oral hygiene and also by illnesses such as diabetics mellitus, immunosuppressant and medications, all of which can disturb the balance of the oral flora, leading to an increase in Candida as an opportunistic inflection (candidacies) (DorockaBobkowska, 2010; Kulak-Ozkan, 2002; Webb, 1988; Wilson, 1998 Cited in Draimoh & Alade, 2019). Symptoms of denture stomatitis vary in their severity, from asymptomatic to pain and irritation (Altarawneh, 2013). Occasionally, the overgrowth of Candida can be very severe and lead to discomfort, altered taste, dysphagia and a burning sensation in the mouth (Maciag, 2014 Cited in Wider, 2016). Candidiasis is very common and an under diagnosed condition among the elderly (Akpan 2002).

The correct diagnosis is important for the appropriate management and prevention of the condition. In most instances, it can be prevented with regular oral hygiene and in the case of poor fitting dentures, can be eliminated with a new set of well-adapted dentures. As the symptoms and the severity of the infection vary, infection most often may resolve with hygiene and topical antifungal in uncomplicated cases.

Good oral hygiene is extremely important and the removal of denture plaque is necessary for maintaining the health of oral soft tissues and for the prevention of denture stomatitis (Sciubba 2015 cited in Braimoh & Alade 2019).

2. 4. Oral Health Programmes for Older People

Several reports worldwide have shown that use of professional dental health services is low among older people. In many developing countries elderly people share the problem of poor access to oral health care as these countries have shortage in dental manpower. Impaired mobility impedes access to care, particularly for those who reside in rural areas with poor public

transport. Given that some older people may experience financial hardship following retirement, the cost or perceived cost of treatment, together with lack of dental care tradition and negative attitudes to oral health, may deter them from visiting a dentist (Paganini-Hill, White & Atchison, 2012).

Clinical and community-based intervention project have focused on strategies and approaches in improving oral health care in older people. Such projects particularly considered the control of dental caries and periodontal disease in non-institutionalized and institutionalized population groups. Successful community – based oral health programmes for older people have been reported. A dental health promotion programme based on the concept of predisposing, reinforcing and enabling courses in Educational Diagnosis and Evaluation resulted in significant improvements in the oral health status of a volunteer group of healthy elderly persons. Oral health promotion programmes addressing self-monitoring approaches improved oral health behaviours, attitudes and health status among elderly persons (Hjertstedt, Barnes & Sjostedt, 2014; Wardh & Wikstrom, 2014).

The negative impact of poor oral conditions on the quality of life of older adults is an important public health issue, which must be addressed by policy makers. The means for strengthening oral health programme implementation are available; the major challenge is therefore to translate knowledge into action programmes for the oral health of older people.

The world health organization (WHO) recommends that countries adopt certain strategies for improving the oral health of the elderly. National health authorities should develop policies and measurable goals and target for oral health. National public health programmes should incorporate oral health promotion and disease prevention based on the common risk factors approach (Wider, 2016).

2. 5. The Oral Health of Elderly People

In 1995, in response to the global challenges of ageing populations, WHO launched a programme on ageing and health? It was designed to advance knowledge about health care in old age through targeted training and research efforts, information dissemination and policy development. The world health report 1998 emphasized the need to strengthen health promotion amongst older people. The health implications of ageing should be better elucidated and understood. Concern for the older members of the society is part of the intergenerational relationship that needs to be developed in the 21st century (WHO, 2018).

Poor oral health among old-age people is an important public health issue and a growing burden to countries worldwide. Most industrialized countries have information about the oral health status of old age people whereas such data are rare for developing countries. Data are particularly scare as regards the predominantly rural nations of Africa (WHO, 2018). The evidence available shows profound oral health disparities among older people across and within regions and countries in such surveillance systems. Essential oral health data include number of teeth present, dental caries, periodontal disease, oral cancer, oral mucosal lesions and quality of life.

Adding information on lifestyles such as consumption of tobacco and alcohol, oral hygiene status, general health status, oral health systems and living conditions to the traditional oral health surveillance variables may be useful to determine the impact of risk factors for the oral diseases among older people in each country and to design intervention programmes targeting the risks factors (WHO, 2014)

2. 6. Dental Health Problem among the Elderly in Nigeria

Most oral health surveys in Nigeria have been sporadic and based on convenience samples. The higher caries prevalence in second than first permanent molars that has been reported is most likely due to a change from traditional to western type of diet. Other health problems include malocclusion, traumatized teeth, dental fluorosis and oral tumors. The scanty oral health services available in the country are mainly in urban areas.

There is therefore a need to develop sustainable strategies for national preventive and therapeutic oral health services in Nigeria. The burden of periodontal disease in the African population is quite high, and the occurrence is related to age, oral hygiene status and socioeconomic status. In fact it constitutes a major public oral health problem and is considered a socio-economic disease in Africa. Among Nigerians, the prevalence is also high and it is the second most common cause of tooth loss. Periodontal disease is broadly categorized into gingivitis and periodontitis. Gingivitis is a reversible form of periodontal disease (Braimoh & Alade 2019).

Gingivitis is a common mild form of gum disease that causes irritation, redness and swelling of your gingival, the part of your gum around the base of your teeth. Gingivitis can cause dusky red, swollen tender gums that bleed easily especially when you brush your teeth. Untreated gingivitis can progress to gum disease that spreads to underlying tissues and bone (periodontitis), a much more serious condition that can lead to tooth loss (Adegbmbo, & Nadeef, 1999). Dental caries that used to be a disease of the affluent in Nigeria is now commonly seen among the low income individuals in the rural communities yet they do not have easy access to oral health care.

The factors militating against good oral health care delivery in Nigeria include:

a) Cultural,
b) Myth & fallacies,
c) Poverty,
d) Fear of the Dental Clinics,
e) Ignorance or low awareness,
f) Lack of access.

2. 7. Effective Strategies to Ameliorate the Problem in Nigeria

For a broad-based approach to address low dental awareness and inadequate access to dental care there is the need for concerted efforts among:

a) The dentists,
b) The Government,
c) Non – Government Organization,
d) Training for Service and Care.

2. 7. 1. The Dentists

The role of a dentist includes provision of oral health information either to an individual or the community in such a way that they will apply it in their everyday living. This has an incisive role to play as part of a broad-based approach to adhesive inadequate awareness. Professional oral health education to the most remote of the country and this must be continuous and sustained for a length of time (Ajibola, 2001, Cited in Eke, Dye & Wei, 2015).

As properly put by Margaret Chan, the WHO director general, "the world has never posed such a sophisticated arsenal of interventions and technologies for curing disease and prolonging life, yet the gap in health outcomes continues to widen". This is demonstrated very well in oral health care delivery in the Cities and in the rural settlements in Nigeria. While the city people may have access to the best of rural health care facilities, the rural settlers do not even realize that they have an ailment and when they know they do not know where to go for treatment. The oral health team must seek them out. Dentist must be ready to practice and serve in rural communities and dental students should be made to do their community dentistry posting in some rural community (Berkey & Berg, 2016).

Dental school should be developing curricular suited to prepare future oral health care providers for working in public health service. Several programmatic and philosophical shifts need to occur in dental education to focus more on preventive dentistry. A curriculum with more emphasis on oral public health that offers community-based on-site experiences may help instill future oral health care professionals with a better understanding of the diver's issues that affect oral health care needs and access among disadvantaged populations (Braimoh & Alade, 2019).

2. 7. 2. The Role of the Government

Dentistry and oral health should be given the priority as part of general health and not be considered a specialty of medicine. There should be proper funding and attention to oral health care delivery. Presently none of the three arms of the government has any budget for dentistry at any level. This makes planning and delivery of oral health care difficult if not possible. There should be a functional dental clinic in every local government. Since more than half of the population in Nigeria is still in the rural areas where there are no facilities for dental health care delivery, mobile dental unit should be made available to visit remote towns and villages. All state hospitals must have functional dental units that are adequately equipped. The different tiers of government should also sponsor researches into dentistry and encourage training of dental personnel (Akpabiuetal., 1982 Cited in Akpata, 2014).

There is no structured oral health policy for Nigerians. Most of the common oral diseases are preventable if identified early, 90% can be treated in primary health centers. The government should ensure that oral health is integrated into the wider public health. Primary health care centers should have adequate oral health component. School children should be exposed to oral health care. Anti-natal and post-natal care should include oral health care. There should be rural allowance to encourage health workers in the villages.

2. 7. 3. Role of Non-Government Agencies

They should provide or support chairs in dental schools and give grants for community based or preventive dentistry research activities. Group like the smile Africa Dental Society promotes awareness and deliver oral health care at the door steps of people living in the villages (Olusile2010).

2. 7. 4. Training for Service and Care

The key professionals in acute and community care setting should receive training on oral health. This include nursing staff, junior doctors, pharmacists, geriatricians and all other healthcare staff who have regular contact with older people. Social health care providers should

give their staff appropriate training about oral health and care as well as ensuring that all services have an oral care policy and cover oral health as part of initial health assessments. Oral heath should always be included in the personalized care plans of those receiving social care and preventive advice on maintaining good oral health should be easily available for older people, their families and their areas.

3. CONCLUSIONS

As emphasized in the world oral health report 2003, WHO sees oral health as integral to general health and as a determinant for quality of life? The interrelationship between oral health and general health is particularly pronounced among the older people primarily because several oral diseases have risk factors in common with chronic diseases. In Nigeria, there is high burden of oral health disease, poor coordination of health services and human resources for delivery of oral health services. Previous attempts to develop an oral health policy to decrease the oral disease burden failed. However, a policy was eventually developed in November 2012 but the scanty oral health services available in the country are mainly in urban cities. Control of oral disease and illness in older adults should be strengthened through organization of affordable oral health services which meet their needs.

Education and continuous training must ensure that oral health care providers have skills in and a profound understanding of the biomedical and psychosocial aspects of care for older people. Research for better oral health should not just focus on the biomedical and clinical aspects of oral health care, public health research needs to be strengthened particularly in developing countries. Steady increase in both the absolute and relative numbers of older people, together with increase in tooth retention into old age, pose particular challenges for the oral care system.

There is a need to identify, develop and test innovative approaches to catering for older people's oral health needs in Nigeria. There should be a need for the provision of oral health information either to the individual or the community in such a way that they will apply it in their everyday living. Health information can help and motivate people to be responsible for their own well-being. Access to oral care facilities should be made available especially in rural areas where there are rural settlers who may not have awareness of the oral health programmes.

References

[1] A.O. Adegbmbo, M.A. Nadeef, National study of periodontal status and treatment need among Nigerians. *International Dental Journal,* 45(1999) 197-203

[2] Administration on Aging, A profile of older Americans: 2015 administration for community living. Washing, DC: U.S. Department of Health and Human Services, 2015.

[3] E.S. Akpata, Oral health in Nigeria. *International Dental Journal,* 54 (2004) 361-366.

[4] D. Berkey, R. Berg, Perindontal (gum) disease: causes, symptoms and treatments. United States: National Dental and Craniofacial Research, 2016.

[5] A. Bhayat, U. Chikte, The changing demographic profile of dentists and dental specialists in South Africa: 2005-2015. *International Dental Journal*, 68(2) (2018) 91-96

[6] A. Bhayat, U. Chikte, Human resources for oral health care in South Africa: a 2018 update. *International Journal of Environmental Research and Public Health*, 16 (2019) 1-7

[7] O.B. Braimoh, G.O. Alade, Gingiccitis and periodontitis among the elderly in Portharcourt, Nigeria: A population based study. *Journal of Oral Health Com. Dent*, 13 (1) (2019) 5-9

[8] P.l. Eke, B.A. Dye, L. Wei, Update on prevalence of periodontiis in adults in the United States: NHANES 2009 to 2012. *Journal of Periodontol*, 86 (5) (2015) 611-622

[9] Federal Interagency Forum on Aging-Related Statistic, Older Americans 2016: key indicators of well-being. Washington, D.C: US. Government printing office, 2016.

[10] T. H. Hirotomi, A. Yoshihara, H. Ogawa, H. Miyazaki, Number of teeth and 5year mortality in an elderly population. *Community Dent Oral Epidemiol*, 43(2015) 226-231

[11] J. Hjertstedt, S.L. Barnes, J.M. Sjostedt, Investigating the impact of a community based geriatric dentistry rotation on oral health literacy and oral hygiene of older adults. *Gerodontology*, 31 (4) (2014) 296-307

[12] H.M.A. Kiyak, D.D.S. Reichmuth, Barriers to and enablers of older adults' use of dental services. *Journal of Dental Education*, 69(9) (2005) 975-986

[13] O. Olusil, Improving low awareness and inadequate access to oral health care in Nigeria: The role of dentists, the government and non-governmental agencies. *Niger Med. Journal*, 51(2010) 134-136

[14] A. Paganin – Hill, S.C. White, K.A. Atchison, Dentition, Dental health habits, and dementia: the leisure world cohort study. *J. AM Geriatr Soc.* 60 (8) (2012) 1556-1563

[15] A.S. Panchbhai, Oral health care needs in the dependent elderly in Indian. *Journal of Pilliat Care*, 18 (1) (2012) 19-26

[16] K. Park, Preventive and social medicine. Jabalpur: Bhanot Publishers, 2011.

[17] P.E. Peterson, T. Yamamoto, Improving the oral health of older people: The approach of the WHO global oral health programme. *Community Dent Oral Epidemiol* 33 (2005) 81-92

[18] P Abdul Razak, K M Jose Richard, Rekha P Thankachan, K A Abdul Hafiz, K Nand Kumar and K M Sameer. Geriatric oral health: A review article. *Journal of International Oral Health*, 6 (6) (2014) 110-116

[19] Royal College of Surgeons of England, Improving older people's oral health. England: Faculty of Dental Surgery, 2018.

[20] F.K. Shawn, The effects of oral health on systemic health. *General Dentistry*, 411(35) (2017) 30-34

[21] I.M. Wardh, M.B. Wikstrom, Long-term effects of using oral care aides at a nursing home for elderly dependent residents: A pilot study. *Spec. Care Dent* 34 (2) (2014) 64-69

[22] R.S. Wider, Gingivitis and periodontitis in adultus: Classification and dental treatment Retrieved from http:llwww.upto date com/home, 2016.

[23] World Health Organization, WHO oral health country/area profile. United State: WHO, 2014.

[24] World Health Organization, Best practice approach: Older adult oral health. United State: ASTDD publishers, 2018.