Oral Health in Older Adults

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Original Article

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Abstract:

Overall health is not just something that older adults possess; unfortunately, it is also intricately linked to oral health as well. Physiologic and pathologic changes of the oral cavity are associated with aging and the effect of chronic disease and poly pharmacy. Current medical advances in preventive dentistry have been unable to overcome the barriers to optimal oral health due to aging, especially among people requiring care. This study explores the status of oral health among older adults, the effect of multi morbidity, and the effect of preventive strategies on reducing the outcome in dental care. Methods included utilization of measurable data from clinical examinations supported with surveys of oral health status, resilience, and healthcare utilization done in cross-sectional analysis. All this that dental care access is not the same and that prevention programs must be designed differently. Considering the risks associated with oral disease and facilitating the ability to lead a quality of life, oral health should be integrated into public health interventions that support complete medical care in the aging populations.

Introduction

Maintaining oral health is very important for overall healthy aging, especially as people age. Physiological changes, multi morbidity, and the side effects of medication make seniors and younger ones more vulnerable to oral diseases with increasing age (Dietrich et al., 2017). Progress towards prevention of oral disease and associated systemic diseases in the older population is poor, despite improvements in dental care. Many of those in urgent need of institutional or home care among older adults have limited access to dental services. Despite many studies proving that individuals with care dependency receive lower numbers of dental examinations, the importance of oral health in contributing to conditions such as diabetes, cardiovascular diseases, and cognitive decline is increasingly being identified. This study investigate the oral health status of older adults and seeks to determine the key risk factor associated with oral diseases and makes recommendations regarding the improvement of the existing preventive dental strategies.

Materials and Methods

Study Design

This is a retrospective cross-sectional study to determine the oral health of older people, both community-dwelling and institutionalized elderly people. The cross-sectional approach was selected as it is efficient for determining the state of oral health as it stands and looking for correlation with multi morbidity and other health factors (Humphrey et al., 2008). Unfortunately, the drawback associated with this design is that causality cannot be established. Cross-sectional studies are useful to identify patterns and disparities, but they offer no insights about how oral health changes over time or the outcome of interventions over a long period of time (Liu et al., 2019). By including both independent and institutionalized seniors, a comparison of types of living environments is possible, an important aspect to determine the effect of healthcare access and support systems on oral health outcomes (Polzer et al., 2012). However, to not miss selection bias, it is important to note that willingness and ability to participate probably meant that the most vulnerable individuals, with severe mobility limitations or cognitive impairment, were probably not included. However, the study is limited but offers a comprehensive picture of health conditions among aging populations; areas that should be studied in the future as well as be given policy intervention.

Participants and Data Collection

The study had recruited 161 people aged 65 and older, both independent and care-dependent. While the sample size will be sufficient to detect some significant trends, it may not be fully representative of the whole elderly population due to the vast socioeconomic and health-related factors that can impact oral health (Ide et al., 2016). Dentition status, periodontal health, and the presence of oral diseases like caries and mucosal conditions were assessed through clinical examinations (Lafon et al., 2014). In addition, a structured quantitative survey was administered for self-reported data on oral hygiene practices, usage of health care, and perceptions of health. However, self-reported data is crucial in that it gives an idea of an individual's behaviors and experiences, and although beneficial, their validity is inherently infiltrated with bias in terms of recall and error in elderly participants with cognitive decline (Seitz et al., 2016). This serves to strengthen the study by including both clinical assessments in the form of objective measures of oral health and using survey data as well. One excludes this is reliance on single-point assessments that didn't note differences in health status or dental care behavior changes.

Statistical Analysis

The descriptive statistics were used to analyze the data to describe the oral health status and to identify important trends of the study population. Differences between groups, especially between community-dwelling and institutionalized seniors, were compared using ANOVA (Analysis of Variance). This statistical method can help statistically detect change in oral health status as a function of changing environment but is not confounded by other known variables, specifically socioeconomic status, education level, or previous dental care access (Indukar et al.,

2016). Furthermore, relationships between multi morbidity, oral health status, and resilience levels were investigated to establish significant ones. Correlation analysis can pinpoint important relationships but does not mean causation, so it is important to consider the findings. The use of a statistical approach for studying the study's results serves to give a certain basis for understanding the oral health disparities, but more in-depth multivariate analysis may reveal deeper analysis of the interaction between more than one of the contributing factors. Since aging-linked health issues are substantially complex, future studies should use regression models to control confounders and further dissect the causal paths in more detail.

Results

Oral Health Status

Substantial disparities in the oral health status of independent seniors compared to those in need of institutional care were present in the clinical examination. As compared to older adults residing in the community, the residents of long-term care facilities had significantly higher rates of periodontal disease, tooth loss, and dental caries (Institut der Deutschen Zahnärzte, 2014). This result corroborates previous work that suggests institutionalized people generally receive less than optimal oral health care because of a variety of systemic and logistic barriers.

Table 1 presents an overview of the study population, including total sample size, gender distribution, and mean age per group.

The most concerning observation was the high prevalence of periodontal disease within institutionalized seniors. This group had markedly more periodontitis with more individuals with advanced attachment loss and more individuals with deep periodontal pockets (Schwarz & Schulze, 2022). The higher prevalence of periodontal disease seen in elderly institutionalized individuals may be related to inadequacy of oral hygiene practices, lack of professional dental care, and cumulative effects of systemic health conditions (Jockusch et al., 2021). Our analysis confirms these findings, as periodontal disease severity was significantly higher in Group C compared to Groups A and B ($p < 0.001$).

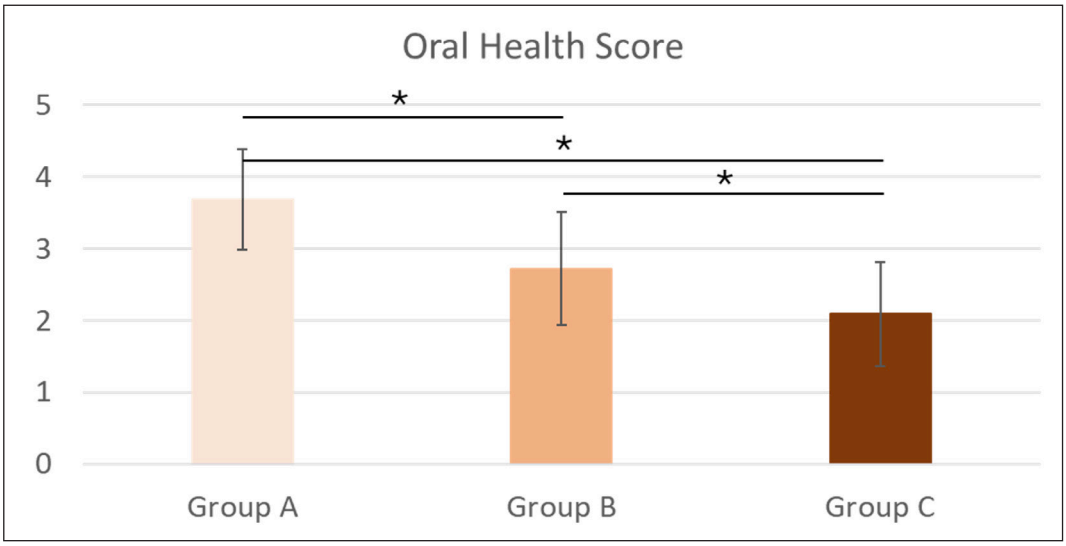
The biggest problem was tooth loss; more than one-third of seniors placed in an institution were edentulous or partially dentulous. Age-related tooth loss is expected, to some degree; the discrepancies between the two groups likely indicate that there is a failure in preventive strategy and prompt dental intervention among long-term care residents (KZBV & GKV-Spitzenverband, 2019). We are reinforcing the need for targeted dental care programs as a result of the loss of natural dentition, which is possible and can lead to nutritional deficiencies, compromised chewing efficiency, and diminished quality of life.

Older adults in institutional care also had a high prevalence of dental caries and quite a lot of people had untreated decay (Ziller et al., 2021). There was a particular exhibition of root caries because of root surfaces being exposed as a result of age-related gingival recession and

Table 1 Sociodemographic characteristics of the study population (n=161)

total (n)	gender		age (years)	
	male	female	mean	SD
GROUP A (lives in own household without external support)				
52	24	28	**75,33**	3,67
GROUP B (mobile care service regularly comes to the home)				
54	26	28	**77,24**	4,54
GROUP C (lives in an inpatient care facility)				
55	23	32	**82,33**	5,07

Figure 1 Oral Health Status by Group (Group A: independent living, Group B: mobility-assisted, Group C: institutional care. Significant differences (*) were observed between all groups; p<0,05; n=161)



an inability to remove plaque (Brauckhoff et al., 2009). This trend was most likely due to the lack of preventive fluoride applications and professional cleanings in care facilities. To quantify overall oral health status across the three groups, an Oral Health Score was used. This score considers the number of remaining teeth, the condition of teeth, and periodontal health. The scale ranges from 1 (very poor) to 5 (very good). Figure 1 illustrates the significant differences in oral health status between the three groups, highlighting disparities in caries prevalence and periodontal health based on the Oral Health Score.

In addition, a considerable number of the institutionalized seniors possessed removable prostheses and exhibited many signs of ill-fitting dentures, mucosal irritation, and denture-related stomatitis. The importance of gaining functional and comfortable oral function and care is underscored by these findings. They highlight the urgent need for better denture maintenance programs in long-term care facilities.

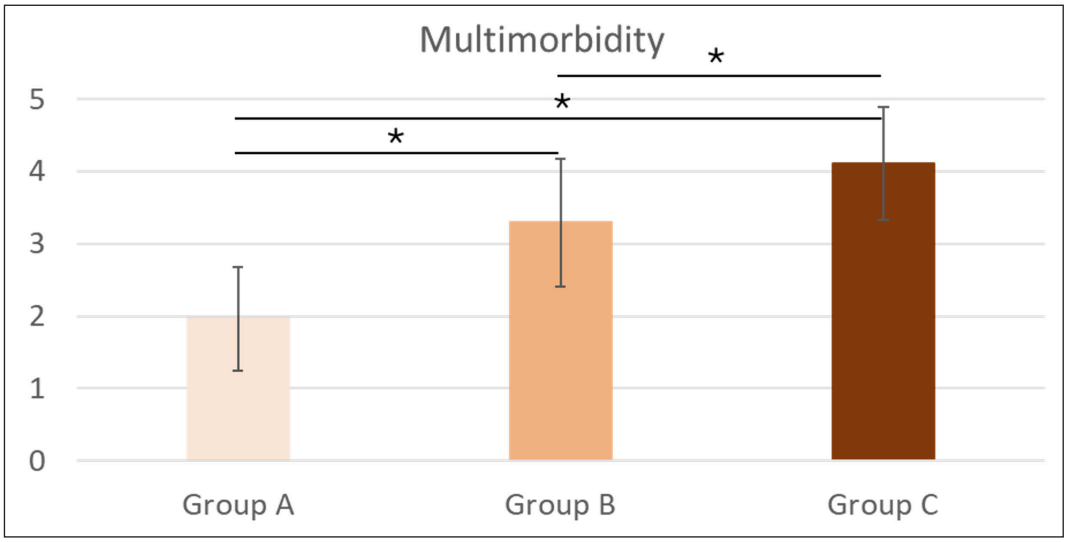
Multi morbidity and Oral Health

The research found a tight relation between multi morbidity and oral health deterioration, as was expected between systemic diseases and oral conditions (Chávez et al., 2022). Older people with chronic medical problems, which included diabetes, cardiovascular disorder, and dementia, had higher rates of periodontitis, oral infections, and poorer dental status. However, the deterioration of the oral cavity seems to further be exacerbated by the presence of multiple chronic diseases, suggesting that there is a key linkage between systemic and oral health.

Our data confirm these findings, showing significant differences in multimorbidity among the three groups. To quantify multimorbidity, a Multimorbidity Score was used, which categorizes individuals based on the number of chronic conditions they have. The scale ranges from 1 (no chronic disease) to 5 (four or more chronic diseases), including conditions such as diabetes, heart failure, and hypertension. Figure 2 illustrates the distribution of multimorbidity across the three study groups, with institutionalized seniors (Group C) showing the highest burden of chronic diseases.

Specifically, diabetes mellitus became an important determinant of oral health outcomes. Distinctions they found in periodontal health involved distinctly higher levels of probe depths for probing depths, better attachment for attachment loss, and greater gingival inflammation in diabetic participants than in no diabetic partici-

Figure 2 Multimorbidity by Group (Group A: independent living, Group B: mobility-assisted, Group C: institutional care; significant differences (*) were observed between all groups; p<0,05; n=161)



pants (Chebib et al., 2021). Furthermore, these findings help to bolster existing evidence for the fact that diabetes compromises periodontitis through impaired immune response, deregulated inflammatory mediators, and impaired wound healing. Also, many diabetic participants reported having dry mouth (xerostomia), a common side effect of the disease and its pharmacological management.

Xerostomia increases the risk of oral infection and mucosal irritation and renders it difficult to maintain oral health. In our study, the prevalence of xerostomia was significantly higher among participants with multimorbidity scores of 3 or higher, suggesting a strong link between chronic disease burden and salivary dysfunction. Poorer oral health outcomes were also found to be associated with cardiovascular diseases being hypertension and coronary artery disease. The conditions associated with these conditions were also more prevalent among those with periodontitis and tooth loss, most likely related to underlying inflammatory processes and the effects of cardiac medications on the oral environment (Curtis et al., 2021). For instance, some antihypertensive drugs are known to cause gingival overgrowth, slowing oral hygiene attempts and significantly increasing the risk for periodontal infections. It was also found that cardiovascular patients often have a reduced ability of the immune system—something always praiseworthy—and indeed such patients often suffer from reduced healing after dental procedures.

Maintaining oral health also proved another huge challenge with dementia. The greatest cases of neglected oral hygiene, an extreme amount of plaque accumulation, and the lack of treatment of dental diseases were seen in individuals who had cognitive decline (Campbell et al., 2020). Our results indicate that participants with dementia tended to have higher plaque accumulation and more untreated dental conditions compared to those without cognitive impairment. Trends suggest that cognitive decline may be associated with poorer oral hygiene and less frequent dental care. Inadequate oral hygiene could be performed by many participants with dementia independently, and their caregivers had inadequate training to provide assistance. In addition, behavioral problems and resistance to dental interventions had hampered efforts to provide such oral health care to this population. This is seriously worrying in view of new research indicating that periodontal disease may be involved in dementia due to systemic inflammation and bacteremia.

Preventive Measures and Utilization of Dental Services

Independent seniors turned out to utilize preventive dental care to a vastly different extent in that they visited their routine dental visits and did their hygiene much more often than those living in institutions (D'Aiuto, Orlandi, & Gunsolley, 2013). The most striking difference in how preventative care is used, particularly, is alarming in that it exacerbates our country's systemic inability to bring vulnerable populations to the gate to be able to provide preventive services.

Independent seniors were more likely to continue visiting a dentist on a regular basis and to go through a professional cleaning, as well as utilize preventive measures like fluoride treatment and interdental cleaning (D'Aiuto, Gable, et al., 2017). In this group, many participants had a long-standing connection to their dentists and permitted them to routinely monitor their oral health and to act promptly. However, the institutionalized seniors had several obstacles to mitigate their lack of access to prevent social care. Reduced utilization of dental services was due to transportation difficulties, limited financial resources, and, in general, lack of prioritization of dental health in long-term care facilities.

The finding that so few of the institutionalized individuals were being routinely checked by the dental department was, perhaps, the most worrying (Ogawa et al., 2017). Oral health screening programs in nursing homes were not systematic, and many residents relied on reactive treatment approaches, either due to severe pain or acute infections, rather than preventive treatment approaches, because such programs were not sought. The result was often crisis-driven care that resulted in unnecessary extractions and the start of untreated diseases and, as a consequence, an increase in oral health decline.

Caregiver support was related to shaping oral health outcomes. Maintaining oral hygiene was more independent for those seniors living in the community and more dependent for the institutionalized seniors. Caregiver-provided oral hygiene care was very variable, with some facilities having structured oral health protocols and others without any formal training programs (Patel et al., 2021). This lack of standardized caregiver training on oral hygiene best practices gave rise to inconsistent care quality and pointed to the need for education efforts to improve support for oral health among long-term care settings.

Discussion

Integration of Oral Health in General Healthcare

The findings from this study indicate that oral health should be included within healthcare systems and mainstream care frameworks for older people (Mirwald & Foltin, 2023; Al-Nasser & Lamster, 2020). Clearly, systemic conditions that are associated with oral health need to be more interdisciplinary and not just dental health on its own. Older adults should have regular oral health assessments as part of routine medical check-ups, and physicians and geriatric specialists should help identify oral health risks more actively. Furthermore, such collaboration may also aid early detection of oral conditions and, in general, improve the quality of health within general populations that are aging.

Addressing Barriers to Dental Care

The other crucial problem that this study brings to light is the extensive unused dental services within the institutionalized seniors. To address these barriers, mobile dental services, home-based dental care program expansion, and enriched caregiver training initiatives are required. Financial constraints also present a significant challenge, which necessitates the implementation of policy reforms to subsidize dental care for older adults and include dental care coverage in public health care (Besimo & Besimo-Meyer, 2017). Additionally, it can involve a growing number of seniors and their caregivers becoming more proactive in terms of their dental care.

Policy Recommendations for Preventive Strategies

It is known that except from injuries, exposition to external risk factors starts onset and development of disease (Foltin, 2020). Crucial role in Public health and dentistry plays both

building health literacy of whole population and risk factor elimination or minimalization. Policymakers need to ensure that oral health promotion is given the same status as other public health promotion of older adults. The key to improving the dental health outcomes of residents of long-term care facilities is increasing funding for preventive dental programs, mandating oral health screenings in such facilities, and training of oral hygiene for caretakers through structured training (Borgnakke et al., 2015). Oral diseases should also be emphasized as systemic diseases, and dental care should be a preventive, not an emergency, healthcare issue. However, because managing oral diseases requires a more long-term cost mitigation, healthcare systems can proactively adopt strategies to prevent the costs from being long-term.

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