

IMPACT OF AGING AND STRESS ON THE PERIODONTAL HEALTH OF THE GERIATRIC POPULATION BEFORE AND AFTER PERIODONTAL TREATMENT IN OLD HOMES OF KARACHI, PAKISTAN

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Abstract: *Age and stress-related periodontal diseases are prevalent in the geriatric population and continue to provide a significant epidemiological concern. **Objective:** To assess the impact of ageing and stress on the periodontal health of the senior population before and after periodontal treatment **Method:** A cross-sectional study was conducted between February and October 2023. Twenty-two senior patients aged 55 to 77 were selected through purposeful random sampling, excluding those unwilling or unable to participate. A semi-structured questionnaire, translated into the native language, assessed periodontal health using the Basic Periodontal Examination (BPE). Informed consent was obtained from participants, who were assured confidentiality and the right to withdraw. Data analysis was performed using SPSS version 23, employing mean and standard deviation for continuous data and frequency tables for categorized data. Cross-tabulation and significance testing were utilized to demonstrate associations. **Results:** The results of the prevailing cross-sectional study reveal that there exists an association between moderate to elevated levels of perceived stress and the manifestation of severe instances of periodontal disease. As per the study findings, periodontitis tends to afflict individuals across older adult age demographics. **Conclusion:** The study emphasised that stress and ageing are key risk factors for periodontal diseases, underlining the importance of addressing them during therapy. Consistent oral hygiene can prevent periodontitis in older adults.*

Keywords: Ageing, Geriatric Population, Stress, Periodontal Health

Introduction

The majority of the world's elderly population is expected to live in China and South Asia in the future. Bangladesh's elderly population, along with that of China, India, Indonesia, and Pakistan, will be the most in the world by 2025 (1). Ageing is a degenerative process characterised by oxidative stress-related damage and chronic inflammation, leading to harmful processes that can impair regular cellular operations. The term "immune ageing" refers to the routine changes in innate and adaptive immunity that ageing populations have shown, indicating a declining ability to mount an immune response (2). On the contrary, stress is an individual's physical, emotional, or mental reaction to stressful life events. It is a physiological reaction of the body; it may not be when the stress trigger is experienced repeatedly by the person. Furthermore, it adversely impacts specific physiological processes, thereby instigating psychosomatic disorders (3). These days, the word "stress" is used a lot to characterise recurrently unpleasant encounters with anything from little annoyances to relationship issues, work-related demands, health issues, and crippling phobias (4).

Age, stress, and periodontal disorders have complicated relationships. Age and stress may have a direct impact, potentially through immunological and cellular senescence, and impede wound healing, as well as an indirect impact through physical deterioration of cognition and less accessibility to care. The scant epidemiological information currently available indicates that older individuals are more susceptible to periodontal disease, regardless of the nature of the association (5). Despite abundant experimental, clinical, and epidemiological investigations, the primary

processes underlying the association between stress and periodontal disease remain largely unknown (6, 7). First, these investigations have demonstrated the indirect effects of stress on the periodontium by way of alterations in lifestyle and behaviour, such as smoking, eating, oral hygiene, parafunction, etc. (6).

The proportion of elderly individuals within various populations is experiencing rapid growth. Globally, the number of individuals aged 80 and above is projected to almost triple by 2050, reaching 426 million. While this trend signifies positive advancements in longevity, it poses challenges for dental and nursing professionals due to the increased demand for assistance in dental care and daily oral hygiene among older people. With extended life expectancy and a higher number of natural teeth retained, there is a heightened susceptibility to oral diseases such as periodontitis, an inflammatory condition affecting the tissues supporting the teeth. Periodontitis results from an imbalance in the microbial biofilm on the root surface beneath the gum line (8). Without intervention, it can lead to alveolar bone loss and eventual tooth loss, impacting chewing function, aesthetics, and overall quality of life (9). Hence, addressing the oral health needs of the ageing population remains a critical concern (10). Those over 65 have an estimated number of teeth that range from 20.0 to 22.5 (9). Different nations and racial and ethnic groups have different levels of periodontal disease, and periodontitis is associated with dental caries—The most frequent cause of adult tooth loss (11). The periodontal health of the senior population is affected by several factors, including systemic illnesses, patient compliance, age-related changes, and dental procedures. Personalised treatment approaches are

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essential because of the comorbidities common in this population (12). Numerous cross-sectional and longitudinal studies have documented that disease progression in adults aged 65+ has been scarce, mainly due to a low proportion of available subjects who have retained their natural dentition at older age and the difficulties associated with following older adults prospectively (13). In Pakistan, the need to perform adequate research on the elderly population is often overlooked, along with the periodontal health of this community as a whole. This study was conducted to explore how the ageing and stress of the senior population before and after periodontal treatment influence periodontal health. Thus the objective of this study was to assess the impact of ageing and stress on the periodontal health of the senior population before and after periodontal treatment

Methodology

A cross-sectional study of the senior population was done in a renowned old home in Karachi, Pakistan. The study was carried out between February and October of 2023. Geriatric patients between the ages of 55 and 77 participated in the study. The study enrolled 22 senior patients through a purposeful random sampling technique. Only individuals agreeable to answering the questionnaire's questions, physically fit, and eager to participate were included in the study. Additionally, the study excluded any patients who refused to participate and did not comprehend the nature and goals of the investigation. A semi-structured questionnaire was created and additionally translated into the native tongue. Each patient's periodontal health was evaluated using a probe developed by the British Society of Periodontology called Basic Periodontal Examination (BPE), a quick and easy screening technique for adult patients. The purpose and objectives of the study were conveyed to the respondents during the data-gathering process. Before gathering data, respondents informed written and verbal consents were obtained. Interviews were conducted in complete secrecy. They received guarantees that their identity would remain private and that the information would only be utilised for research. In addition, participants are free to leave the research at any time. Data analysis was conducted using version 23 of the Statistical Package for Social Science (SPSS) software. The mean and standard deviation were employed for continuous data, and a frequency table was used for categorised data. Frequency tables will be displayed alongside descriptive information.

Cross-tabulation and significance testing were used to demonstrate the association.

Results

The findings revealed that most of the senior population was in the 65–66 age range. Of the 22 older adults, 10.5% were 65 years of age or older, 18.2% were 61 years old, 13.6% were 62 years old, and 9.1% were 57 years old (Table 1).

In Table II, the dental hygiene practices of the senior population were examined. The results showed that 81.8% of the participants reported cleaning their teeth correctly, while 18.2% admitted not doing so. All individuals in the sample reported cleaning their teeth with supervision, indicating a reliance on external assistance or guidance for maintaining oral hygiene. Interestingly, none of the participants reported cleaning their teeth without supervision, highlighting the importance of supportive care structures or assistance in maintaining proper dental hygiene among older adults. This finding may reflect the physical or cognitive limitations associated with ageing, emphasising the need for tailored oral health programs and interventions for this demographic.

Table III analysed the correlation between age group and periodontal disease among the geriatric population. The results showed a moderate positive correlation (a coefficient correlation 0.25) between these variables. The p-value of 0.000 indicated that this correlation was statistically significant. This finding suggests that as individuals within the senior cohort age, there is a tendency for an increase in the prevalence or severity of periodontal disease. Understanding this correlation is crucial for developing targeted preventive measures and treatment strategies for managing periodontal health among older adults.

Table IV explored the correlation between stress levels and periodontal disease among the geriatric population. The table categorised periodontitis staging into different stress levels and presented the frequency distribution within each category. The p-values associated with each stage indicated statistically significant correlations between periodontal disease and stress levels. This suggests that stress may be a contributing factor to the progression or severity of periodontal disease among older adults. Therefore, addressing stress management alongside oral health interventions could yield positive outcomes in preventing or managing periodontal conditions within this demographic.

Table I-Gender distribution of the senior population

| Variables | Number | Percentage |
|-----------|--------|------------|
| Gender | | |
| Male | 8 | 36.4% |
| Female | 14 | 63.8% |
| Total | 22 | 100% |

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Table II- Distribution of the senior population brushing their teeth and the method used (n = 22)

| Variables | Frequency | Percentage |
|--------------------------------------|-----------|------------|
| Do they clean their teeth properly? | | |
| Yes | 18 | 81.8% |
| No | 4 | 18.2% |
| How do they clean their teeth? | | |
| Clean the teeth with supervision. | | |
| Yes | 22 | 100% |
| No | 0 | 0% |
| Clean the teeth without supervision. | | |
| Yes | 0 | 0% |
| No | 22 | 100% |

Table III- Correlation between periodontal disease and age group

| Variables | Periodontal Disease | Age |
|-------------------------|---------------------|--------|
| Periodontal disease | | |
| Coefficient correlation | 1.000 | 0.25 |
| P value | | 0.000* |
| Age | | |
| Coefficient correlation | 0.251 | 1.000 |
| P value | 0.000* | |

Table IV- Correlation between periodontal disease and stress

| Staging of periodontitis | High level of stress | Low level of stress | p-value |
|--------------------------|----------------------|---------------------|---------|
| Stage I | 13 (10.7) | 27 (23.9) | <0.001 |
| Stage II | 27 (22.1) | 14 (12.4) | |
| Stage III | 58 (47.5) | 29 (25.7) | |
| Stage IV | 17 (13.9) | 36 (31.9) | |

Discussion

Research revealed the complex nature of dental illnesses such as periodontitis and caries. The primary causes of dental problems include poor oral hygiene practices, eating habits, brushing techniques, and ignorance. Furthermore, since oral problems are complex, prophylaxis with a single method would not be sufficient. Not every region in the nation has access to adequate dental care facilities. Thus, preventive measures like maintaining appropriate dental hygiene should be implemented to preserve good oral health (1). According to the current cross-sectional investigation results, moderate to high levels of perceived stress are linked to severe cases of periodontal disease, which is consistent with a finding of Marruganti C et al. in 2024 (14). According to the findings, periodontitis affects people of all ages often. Still, the prevalence increased with age, which is similar to a study in which Community Periodontal Index (CPI) methodologies were utilised by Bokhari et al., 2015 revealed that the senior population of 40 years and older had a four times higher likelihood of having periodontitis (15). The periodontal health of the senior population is significantly impacted by age-related changes, systemic conditions, and restorative procedures (12). Poor periodontal health is prevalent in the elderly, with a direct correlation to age, oral hygiene practices, and the presence of cardiac diseases (16). This is further exacerbated by the effects of ageing on periodontal tissues, which can intensify bone loss in elderly patients with periodontitis (17). The situation is particularly dire in nursing homes, where the periodontal health of older people is feeble (18). These findings underscore the need for individualised treatment planning, preventative measures, and supportive

periodontal therapy to maintain oral health in older people. Therefore, basic preventive measures, such as maintaining appropriate brushing methods, using toothpaste and a toothbrush, and brushing twice daily, should be taken to preserve excellent oral health (19). Additionally, it is advantageous for patients to consume less sticky food, stay away from foods high in sugar, and properly ring their mouths after consuming sweet foods (20). Hence, a small sample size and confined to only one old home are the limitations of this study design. A dental health education program should be set up to enhance the participants' understanding and application of oral and dental hygiene. Changing one's knowledge and attitude is necessary before changing one's behaviour. Therefore, people must be alert and knowledgeable to maintain good dental health. Directly assisting the older population, particularly the elderly, would be beneficial and indirectly through their family practices.

Conclusion

The study results underscore stress and ageing as substantial predisposing elements for periodontal afflictions, thereby advocating for the necessity to attentively attend to stress and the ageing process both preceding and during therapeutic interventions. This inquiry delves into the intricate mechanisms whereby stress modulates host responses to microbial agents and the course of disease advancement. Sustaining optimal oral hygiene across the lifespan is a prophylactic measure against periodontitis in the aged demographic. In conjunction with senior individuals, healthcare

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practitioners specialising in medicine and dentistry must confront and surmount impediments obstructing oral health optimisation within the geriatric population.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRB-JPMC-10/2021-01272, Dated 20, December 2022)

Consent for publication

Approved

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The authors declared the absence of a conflict of interest.

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Conception of Study, Final approval of manuscript.

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