Assessment of gender-based periodontal health differences among cohort of Pakistani young adults - A comparative cross-sectional study

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ABSTRACT:

Objective: To analyze and evaluate the periodontal health differences and oral health behaviour among male and female Pakistani young adults.

Methodology: During January 2024 to June 2024, 400 participants (male 200, female 200) were evaluated by the Community Periodontal Index (CPI) to ascertain periodontal status and oral hygiene measures were determined using a questionnaire. To compare variables chi-square test was used, p-value of <0.05 regarded as statistically significant. SPPS used for statistical analysis .

Results: CPI Scores 1 (56%), 2 (31.5%), and 3 (2.5%) were higher in males. Both genders showed statistically significant association with CPI scores (P< 0.01). The frequency of tooth brushing was higher among females by 18.5% compared to only 6.5% of males brushing their teeth twice daily. Males (30.4%) had visited a dentist while the rate for females was 25.8%. The use of inter-dental aids was 34.5% and 7.5%, between females and males, respectively.

Conclusion: Although current tooth brushing habits fall short of the international guideline, we found males having more favourable attitude towards oral health behaviors as compared to female. To enhance oral health, it is crucial to adopt proper oral hygiene practices and utilize interdental aids.

Keywords: Periodontal Index; Health Behaviour; Periodontal Pocket; Public Health Dentistry

Introduction:

Periodontal disease is classified into gingivitis which occurs at the early stages of gum disease and periodontitis which develops if gingivitis is not treated. Clinically, gingivitis is characterized by redness with bleeding, swelling, and soreness[1,2] and can progress to a more severe form of periodontal disease i.e. destructive chronic periodontitis if the symptoms are left untreated.[3,4]Periodontal disease is mainly attributed to the accumulation of bacterial plaque, which consists of bacteria embedded in plaque.[5,6] Some common factors that may cause the onset of the disease can include inadequate or improper cleanliness of teeth and gums, elements that contribute to the accumulation of dental plaque in the oral cavity, and the habit of smoking cigarettes.[7-9] Research studies have shown that various factors, including social and economic conditions,[10,11] race,[12] parafunctional eating habits,[13,14] low educational attainment,[15] and certain medical conditions such as diabetes, kidney disease, cardiovascular disease, respiratory disease,[16] malnutrition,[17] and stress[18] significantly contribute to the development of periodontal disease. Medical studies indicate a correlation between gender and perceptions of overall health.[19,20] There are two primary frameworks that explain gender disparities in health and illness: (i) the biological/genetic model, which examines variations in genetics, hormones, and physiological factors, and (ii) the sociocultural model, which highlights the differences in societal expectations related to work and family roles for each gender.[21]

Gender differences also have been related to periodontal health conditions and oral health behavior[22] and self-rated oral health.[23] A study has shown that male adults were more at risk, compared to females, of developing chronic periodontitis.[24,25] Some studies have found that young girls were more anxious about their oral health and so had more satisfactory oral hygiene routines which resulted in better oral hygiene standing than young boys.[26-28] A similar study was conducted on 14–15-year-old subjects that demonstrated that poor self-rated oral health was significantly associated with the male gender.[29] The incidence of periodontal health-related problems differs globally and is more dominant in developing than developed countries.[30] The study reported the prevalence of gingivitis ranged from 23 to 77% in young Latin American individuals.[31] Data collected from a Swedish epidemiological study reported that 5 to 15% of the participants had advanced destructive periodontal disease.[32] An American survey in the late 80s to mid -90s reported that gingivitis was common in 50% of the adult citizenry, >5mm and 7mm of clinical attachment loss (CAL) in 30 and 90-year-old subjects respectively.[33] Similarly, a survey conducted in Britain declared that 42% and 70% of individuals aged ranging from 35 to 44 years and 55 to 64 years with CAL >3.5 mm respectively.[34] Other Surveys conducted among young adults in Sweden,[35,36] Chile,[37] Brazil,[38] and China[39] also revealed significant levels of clinical attachment loss indicating the presence of periodontal disease. Assessing periodontal health in young adults is vital and can be summarized through several key factors, including early detection of disease, prevention of complications, and the establishment of healthy oral habits. In addition, evaluating the differences in periodontal health

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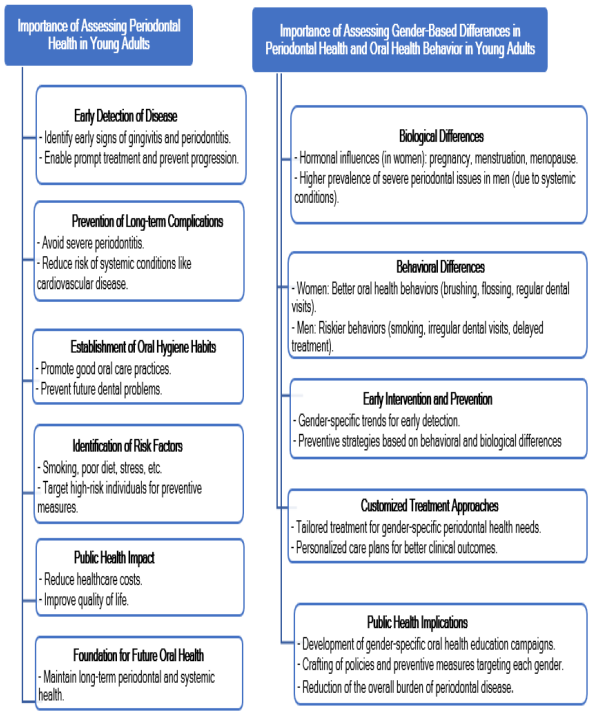
and oral health behaviors between genders is equally important, as biological and behavioral variations can significantly influence periodontal outcomes. The interplay between the importance of assessing periodontal health in young adults and the rationale for exploring gender-based differences is illustrated in Figure 1.

Figure 1: Rationale in Assessing Periodontal Health and Gender-Based Differences in Young Adults.



The literature provides insights into periodontal disease among the elderly; however, there is a notable lack of data concerning gender differences in periodontal health among young adults, particularly in Pakistan. In order to create effective guidelines for the planning and implementation of cost-efficient oral health programs and services for individuals, it is essential to investigate the relationship between oral health status and factors associated with oral health behavior. This research will support the development of successful strategies for preventing periodontal disease by examining individuals' lifestyles, behaviors, habits, and hygiene practices related to oral health.

Objective:

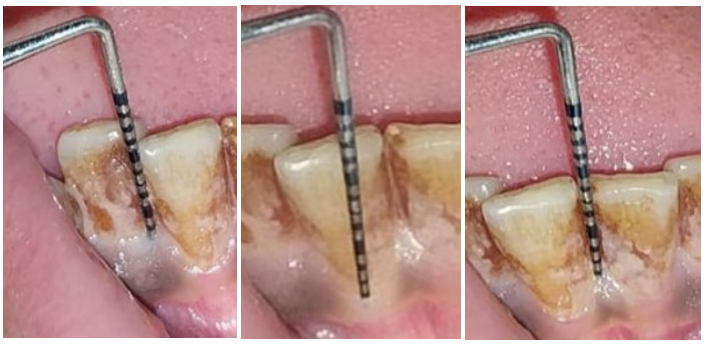
The present study aimed to analyze and evaluate the periodontal health differences and oral health behavior oral habits, and oral hygiene practices among male and female Pakistani young adults.

Methodology:

This comparative cross-sectional study was conducted at the dental Outpatient department Muhammad Dental College, Mirpurkhas, using a convenience sampling method from January 2024 to June 2024. Before commencing this research study, ethical approval was obtained from the Ethics Committee of Muhammad Dental College. There were 400 patients (200 males and 200 females), aged from 15 to 30 years were included in the study and those who were not medically fit, or not interested in taking part in the study were excluded. The objectives of this study were clearly communicated to all patients, who acknowledged that the findings would be published. Written consent was obtained from each participant before they underwent the clinical examination. Ten patients were selected randomly to pre-test the questionnaire. The periodontal clinical examination of all participants was carried out in the dental OPD by a single attuned examiner who was trained in a three-week workshop. CPI was used to examine 10 subjects on twice occasions at 1-week intervals to gain intra-examiner reliability. Results showed a good degree of intra-examiner agreement (86%) and Kappa statistics ($P< 0.05$).

Examination Procedure:

Assessment of periodontal health was done under adequate light sources in accordance with WHO protocols using a sterilized CPITN probe on the index teeth[40] and a mouth mirror. Examination was done to detect pocket depth, calculus, and bleeding retort. CPI coding (0-healthy,1- bleeding, 2- calculus, 3-4 to 5 mm pocket, 4->6mm pocket, and X indicating less than two teeth in a sextant)40 for periodontal health was obtained by measuring probing depth with the probe tip placed parallel to the tooth crown between the tooth and gum area on mesial, middle and distal aspects of each lingual and facial surfaces (Figure 2). Figure 2. Probing depths measuring around each tooth. 3 sites each labially and lingually.



At the end of the clinical examination, each patient was given the questionnaire which had to be filled out and given back to the examiner immediately. The questionnaire addressed three parts. Demographic characteristics; age, gender, oral health behavior; number of tooth-brushing times a day, use of fluoridated toothpaste (yes/no), use of dental tools to clean areas in between teeth such as dental floss or inter-dental brushes (yes/no), use of mouthwash (yes/no), gargling after meal (yes/no), cleaning tongue (yes/no) and any of the adverse oral habits (grinding/clenching teeth, biting nail/pencil, biting tongue, cheek/lip, breathing through mouth). SPSS version 17 used for statistical analysis, Variable of interest were compared using chi-square test, p-value of less than 0.05 deemed statistically significant.

Results:

Total 218 A total of 400 patients (200 males and 200 females) completed the study. The mean age was 19.4 with age ranging from 15 to 30 years.

Periodontal health status: CPI scores of patients are presented in Table 1. Gingival bleeding (CPI score 1) and calculus deposition (CPI score 2) were more widespread among patients whereas the deep pockets (CPI score 4) were found in few patients. When comparing the results between genders, the rate of bleeding (56.5%), calculus deposition (31.5%), and the incidence of deep periodontal

pockets (3%) was higher in males, whereas, in females, the rate of bleeding was (40%), calculus deposition (30.5%) and deep periodontal pocket (1%). These results showed a significant difference in periodontal status between male and female patients (P < 0.001).

Table 1. Comparison of periodontal status among males and females.

	Gender		
Periodontal Status (CPI score)	Females n = 200	Males n=200	p-value
Healthy (0)	57 (28.5%)	19 (9.5%)	0.000*
Bleeding (1)	80 (40%)	112 (56.5%)	
Calculus (2)	61 (30.5%)	63 (31.5%)	
Pocket up to 5 mm (3)	2 (1%)	5 (2.5%)	
Pocket > 6 mm (4)	0	1 (0.5%)	

***** ***Statistically significant***

Table 2. Comparison of oral health behavior among males and females.

	Gender			
Oral Health Behavior	Females n = 200		Males n = 200	
	(n)	(%)	(n)	(%)
Tooth Brushing Once a day	163	81.5	187	93.5
Twice a day	36	18	13	6.5
>Twice a day	1	0.5	0	0
Fluoridated Toothpaste	169	84.5	110	55
Interdental Aids	69	34.5	15	7.5
Gargling after meal	59	29.5	21	10.5
Use of mouth-wash	24	12	9	4.5
Tongue cleaning habit	76	38	43	21.5
Previous dental treatment	51	25.8	60	30.4

Oral health behaviors: The frequency of tooth brushing habits is presented in Table 2 revealing that a greater number of female patients (18.5%) brushed their teeth 2 or more than 2 times a day whereas brushing once a day was noticed higher by male patients (93.5%). Regarding the use of toothpaste containing fluoride, about 84.5% of females reported that they always use toothpaste containing fluoride compared to 55% of males. The answers given by the participants regarding the use of interdental tools such as brushes for interdental cleaning and dental floss, were 34.5% by females and 7.5% by males. In addition, use of mouthwash (12%), gargling after meal (29.5%), and habit of tongue cleaning (38%) were reported higher in females than in male patients. Regarding the history of dental treatment undergone by the female and male patients, the evaluations were 25.8% and 30.4% respectively.

Adverse oral habits: Adverse oral habits in both genders are shown in Table 3. The incidence of grinding or clenching teeth (5.5%), and biting tongue/cheek/lip (1.5%), was higher in females whereas, breathing through the mouth was slightly high in males (10.5%). The rate of smoking, one of the risk factors for periodontal disease, was also higher in male patients (10%).

Table 3. Distribution of gender according to adverse oral habits.

	Gender			
Adverse Oral habits	Females n = 200		Males n= 200	
	n	(%)	n	(%)
Grinding/ Clenching teeth	11	5.5%	5	2.5%
Biting tongue/ cheek/lip	3	1.5%	0	0%
Breathing through mouth	15	7.5%	21	10.5%
Biting nails/ pencil	3	1.5%	9	1.5%
Smoking	8	4%	20	10%

Discussion:

The criteria selected for evaluating periodontal health in this study adhered to the guidelines established by WHO oral health surveys.[41] This approach provides a standardized assessment of oral disease conditions and treatment requirements, facilitating the planning and evaluation of intervention programs. Regarding oral health behavior, comparatively better results were reported by females than males, as evidenced by higher CPI scores for bleeding, calculus deposition, and periodontal pockets. These results align with previous studies indicating that men are at greater risk for periodontal disease due to inadequate oral hygiene practices. [24, 25]

Good oral hygiene, effective brushing techniques, cleaning interdental spaces, and regular dental check-ups are essential for preventing periodontal diseases.[42] This study corroborates previous findings[43] that both male and female patients tend to brush their teeth once daily. However, it was noted that female patients are more likely to brush twice a day with fluoride toothpaste, utilize interdental cleaning tools, and rinse their mouths after meals. Previous research has indicated that females generally exhibit greater awareness of oral hygiene and engage more frequently in preventive dental care compared to males.[26] It is highly recommended to brush teeth twice daily, ideally after breakfast and before bedtime.[44] The superior awareness and adherence to oral health practices among females may stem from higher health literacy, societal expectations, and a greater responsiveness to health education.[28] Consequently, our results indicating that females have better periodontal health than males may be linked to their superior oral hygiene habits. The reasons for the inadequate oral hygiene among male patients could be due to ineffective practices or a lack of motivation and urgency regarding oral health issues. While they likely understand the importance of brushing, they may lack the enthusiasm or time to commit to improved oral hygiene. Regular dental visits, ideally every six months, are recommended in many countries.[45] In this study, both genders reported never having visited a dentist, possibly due to high treatment costs, insufficient

awareness, or a shortage of dental professionals. Although females adhered to proper oral hygiene practices, they exhibited a notably higher prevalence of detrimental oral habits. Bruxism was reported more often in females, aligning with research indicating that stress-induced parafunctional behaviors are more prevalent among women.43 Stress has been recognized as a factor contributing to periodontal disease, as it can result in heightened inflammation and diminished immune response.18 Despite superior oral hygiene practices, the vulnerability of females to stress-related habits may adversely affect their periodontal health. This study has several limitations. Firstly, the patient sample was not randomized, as it consisted solely of individuals who visited the dental outpatient department. Secondly, the study focused exclusively on young adults, which does not accurately reflect the broader Pakistani population. Finally, incorporating a larger sample size from various regions of Pakistan would likely yield higher quality data. Therefore, a more comprehensive evaluation and research should be undertaken on the general population to assess the oral health profile.

Conclusion:

Although current tooth brushing habits fall short of the international guideline, we found males having more favorable attitude towards oral health behaviors as compared to female.

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