PREVALENCE OF GINGIVAL RECESSION AND RISK FACTORS IN DENTAL HOSPITAL POPULATION OF CHITWAN, NEPAL

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ABSTRACT

INTRODUCTION

Gingival recession is characterized by the apical migration of marginal periodontal tissues below the cemento-enamel junction, leading to clinical attachment loss and root exposure. This condition can result in various issues, including sensitivity, caries, and aesthetic concerns. The prevalence, extent, and severity of gingival recession can vary significantly across populations, with age being a significant factor. This study aimed to evaluate the prevalence, extent, and severity of gingival recession among patients attending Chitwan Medical College in Nepal.

MATERIAL AND METHODS

A cross-sectional survey was conducted from July to September 2023, involving 621 patients assessed for gingival recession. A total of 250 participants aged 20 to 60 years were included, divided into four age groups. The apico-coronal height of gingival recession was measured using a William's graduated periodontal probe, and recession was recorded when more than 1 mm of root surface was exposed.

RESULTS

Of the 250 subjects examined, 169 (67.60%) exhibited gingival recession, affecting 2,496 out of 6,775 teeth (36.84%). The prevalence of gingival recession increased with age, ranging from 48.68% in the 20-29 year age group to 90.56% in the 50-60 year group. Males demonstrated a higher prevalence and severity of recession compared to females. Additionally, a significant correlation was found between smoking, supragingival calculus, and the occurrence of gingival recession. The relative risk of recession was notably higher in moderate to heavy smokers compared to non-smokers.

CONCLUSION

The study confirms a high prevalence of gingival recession among adults in Nepal, with significant associations observed with age, gender, smoking habits, and dental calculus.

KEYWORDS

Gingival recession, Periodontology, Risk factors

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https://doi.org/10.3126/jucms.v13i01.78085

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INTRODUCTION

Gingival recession is characterized by the positioning of the marginal periodontal tissues below the cemento-enamel junction.[1] This condition can affect a single tooth, multiple teeth or be widespread throughout the mouth. Recession is often accompanied by the apical movement of marginal gingiva on one or more surfaces, leading to clinical attachment loss and root exposure. This can result in various clinical issues, including sensitivity to hot and cold, caries, cervical root abrasions, erosions, plaque retention, and aesthetic concerns for the patient.

Several factors contribute to the development of gingival recession, including excessive or insufficient tooth brushing, destructive periodontal disease, tooth misalignment, alveolar bone dehiscence, and thin marginal tissue covering a non-vascularized root surface, shallow vestibules, inadequate attached gingiva width, frenal pull, and trauma from occlusion.[2] While gingival recession is commonly observed in adults, its prevalence, extent, and severity can vary significantly among different study populations. Prevalence refers to the number of cases of gingival recession, extension pertains to the number of teeth affected, and severity indicates the total root surface area exposed due to recession, measured by the apico-coronal height of the gingival recession.[3]

The likelihood of individuals experiencing gingival recession increases with age, with incidences ranging from 8% in children to 100% in those over 50.[4] Although some researchers suggest that recession may be a physiological process associated with aging, there is no compelling evidence to support a natural shift in the gingival attachment. The gradual apical migration of the marginal gingiva is likely the result of cumulative minor pathological changes and/or repeated minor trauma to the gingiva, or may be associated with increasing periodontal disease in populations with limited access to dental care.[5]

Numerous epidemiological studies have examined the prevalence and severity of gingival recession in Western populations. According to a national survey in the U.S., 88% of seniors aged 65 and older and 50% of adults aged 18 to 64 exhibit recession at one or more sites, with frequency and extent increasing with age. Prevalence rates among these populations range from 50% to 90%. In Norway, 51% of adults aged 18 and older have gingival recession, while studies in Iraq and Finland report prevalence rates of 73% and 68%, respectively. Similarly, 53.5% of Greek adults, 76% of Indian subjects, and 60.5% of Yemeni adults show signs of gingival recession.[6-8] Periodontal disease is more prevalent in developing countries than in developed ones, making the prevalence and severity of recession a significant concern. This study aims to evaluate the prevalence, extent, and severity of gingival recession among patients in Nepal.

MATERIAL AND METHODS

A cross-sectional survey was conducted at department of periodontics, Chitwan Medical College. All patients were been evaluated for gingival recession (GR) from july-september 2023. Convenience sampling technique was used to collect Sample, 621 patients were examined of which 250 were included into the study. Study population age ranged from 20-60 years (mean: 38.10, SD 11.68). The participants were divided four groups according to age range. The selection criteria comprised of age above 20 years with minimum number of 24 natural teeth present excluding third molars. The participants were assessed by a lone examiner to avoid inter-examiner disparities.

Group 1 20 - 29 years, 76 patients
Group 2 30 - 39 years, 66 patients
Group 3 40 - 49 years, 55 patients
Group 4 50 -60 years, 53 patient

The study sample comprised 173 males and 77 females, totaling 6775 teeth for examination. The measurement of the apico-coronal height of gingival recession was conducted using a William's graduated periodontal probe, and recession was recorded when more than 1 mm of root surface was exposed. Each tooth was assessed on four surfaces: mesial, buccal, distal, and lingual. Linear measurements were taken from the cemento-enamel junction to the gingival margin for teeth exhibiting gingival recession. If the cemento-enamel junction was obscured by calculus, covered by a restoration, or lost due to caries or cervical abrasion, its location was estimated based on the adjacent tooth.

Ethical Considerations

The institutional review committee of Chitwan Medical College in Chitwan, Nepal, reviewed and approved the study. Written informed consent was obtained from all participants before the study commenced, and all patients received treatment based on the details specified in their case sheets at the study's conclusion. (CMC-IRC/079/080-094)

Data Analysis

Prevalence was defined as the percentage of individuals with at least one tooth affected by gingival recession, while extent was the percentage of teeth per person with at least one site showing the condition. Mean gingival recession was calculated as a measure of the severity of the condition in the population, and severity was assessed based on a threshold for gingival recession.

For current smokers, total cigarette exposure was calculated and categorized separately for younger (20-35 years) and older (35-60 years) groups. The number of cigarettes smoked was recorded and classified accordingly. The presence of supragingival dental calculus was categorized into three groups based on the percentage of sites affected. Data analysis was conducted using SPSS software version 25. A weight variable was employed to adjust for the probability of selection and any deviations in the sample distribution from the target population distribution by age and gender. Pairwise comparisons of crude estimations were performed using Wald's test, and 95% confidence intervals were calculated. Additionally, multinomial logistic regression analysis was used to examine the relationship between gingival recession and potential influencing factors. Three categories were established based on the apico-occlusal dimension of the root surface exposed by gingival recession: small recessions (less than 3 mm exposed), moderate recessions (3 to 4 mm exposed), and advanced recessions (more than 4 mm exposed). Gingival recession was classified according to P.D. Miller's classification9 of marginal tissue recession. In both analyses, the multinomial logistic regression method assessed the contribution of independent variables to the likelihood of

localized or generalized gingival recession compared to nonoccurrence. The probability of recession occurrence was expressed as a relative risk ratio (RRR), which is analogous to the odds ratio in ordinary logistic regression.

RESULTS

Table 1 represents the distribution of the study population according to age and sex. The study consist 173 males and 77 females. The study revealed gingival recession in 169 subjects out of 250, which is 67.60% of the total sample examined. Among 6775 teeth of the subjects examined; 2496 displayed gingival recession corresponding to 36.84% of the total teeth examined. (Table 2). Prevalence of gingival recession increased with age. Among the study sample, the prevalence of gingival recession was 48.68% and 90.56% in age groups of 20-29 years and 50-60 years respectively. Increase in age also led to increase in the mean number of teeth with gingival recession. The mean number of teeth with gingival recession at the age group above 50-60 years (63.26%) was significantly higher than that of other age groups. Similarly the extension of gingival recession was also found to be increased with age.

Table 1. Gender and age distribution

Gender	Age Group				Total
	20-29	30-39	40-49	50-60	
Male	54	43	35	41	173 (69.20%)
Female	22	23	20	12	77 (30.80%)
	76 (30.4%)	66 (26.4%)	55 (22.0%)	53 (21.2%)	250

Table 2. Prevalence and extension of gingival recession according to age group

Age Group (Years)	Total no. of teeth	Prevalence		
		No. of subjects with GR	No. of teeth with GR	Mean no. of teeth with GR/subject
20- 29 (N=76)	1634	37 (48.68%)	184 (11.26%)	2.42
30- 39 (N=66)	1970	39 (59.09%)	554 (28.12%)	8.39
40- 49 (N=55)	1720	45 (81.81%)	840 (48.83%)	15.27
50 -60 (N=53)	1451	48 (90.56%)	918 (63.26%)	17.32
Total (N=250)	6775	169 (67.60%)	2496 (36.84%)	9.98

The mean number of teeth with gingival recession per subject at 20-29 years age group (2.42) was significantly less than at the age groups above 50-60 years (17.32) (Table 2). Among age groups 20-29 and 30-39 years, Class I gingival recession was more prevalent i.e. 76.09% and 75.45 % respectively whereas Class III and Class IV gingival recessions were more prevalent in older age groups (Table 3).

Table 3. Scoring of the severity of gingival recession based on Miller's classification

Age Group (Years)	Severity of Gingival Recession				Total
	Class I No. of Teeth	Class II No. of Teeth	Class III No. of Teeth	Class IV No. of Teeth	
20- 29	140 (76.09)	28 (15.21)	11 (5.97)	5 (2.71)	**184**
30- 39	418 (75.45)	75 (13.54)	45 (8.12)	16 (2.89)	**554**
40- 49	192 (22.85)	255 (30.35)	266 (31.67)	127 (15.12)	**840**
≥ 50	71 (7.76)	114 (12.41)	364 (39.65)	369 (40.12)	**918**
Total	**821 (32.89)**	**472 (18.92)**	**686 (27.49)**	**517 (20.71)**	**2496**

In individuals above 35 years, males consistently showed higher prevalence and extent of recession than their counter parts. The percentage of teeth with recession ≥2 mm (0.008) and ≥5 mm (0.001) was relatively more for males than females. The relative risk of males having recession ≥1 mm was 1.9 times more when compared to females (Table 4).

Table 4. Assessment of risk for having gingival recession more than 1 mm in subjects of age above 35 years

Variables	Localized recession		Generalized recession	
	RRR	CI	RRR	CI
Sex				
Male	1.9*	1.2-3.7	1.1	0.9-2.7
Female	1	–	1.0	–
Smoking				
Non smokers	1.0	–	1.0	–
Light smokers	1.5	0.7-2.4	1.3	0.6-3
Moderate	1.9	0.7-2.4	1.7	0.7-3.5
Heavy	2.2	0.9-2.5	3.1*	1.4-6.9
Calculus				
<25%	1.0	–	1.0	–
25–50%	1.3	0.7-2.4	1.6	1.1-3.4
>50%	1.6	0.8-2.8	4.1**	2-8.5

**Statistically significant, ** = Statistically highly significant, RRR = Relative risk ratio, CI = Calculus index*

Table 5. Assessment of risk for having gingival recession more than 1 mm in subjects of age below 35 years

Variables	Localized recession		Generalized recession	
	RRR	CI	RRR	CI
Smoking				
Non smokers	1.0	–	1.0	–
Light smokers	1.4	0.7-2.6	1.2	0.4-2.8
Moderate	1.6	0.8-2.6	1.8	0.8-3.1
Heavy	2.1	0.7-2.8	3.2*	1.3-6.1
Calculus				
<25%	1.0	–	1.0	–
25–50%	1.5	0.7-2.2	1.4	1.3-3.6
>50%	1.7	0.8-2.6	4.4**	2.1-8.3

**Statistically significant, ** = Statistically highly significant, RRR = Relative risk ratio, CI = Calculus index*

The prevalence of recession in smokers was relatively high when compared to normal individuals. Individuals who were moderate to heavy smokers below 35 years having recession ≥1 mm had significant higher prevalence of recession compared to nonsmokers. The relative risk for localized recession was 2.1 for moderate to heavy smokers and for generalized recession it was 3.2 for the same (Table 5). The relative risk for recession ≥1 mm in subjects above 35 years in moderate to heavy smokers is 2.2 for localized recession and 3.1 for generalized recession. Young subjects who were heavy smokers and individual ≥35 years who were moderate to heavy smokers had a significantly higher prevalence of recession.

Furthermore, in both age group individuals with a high percentage of teeth with supragingival calculus had a significantly higher prevalence and percentage of teeth with recession. The relative risk for localized recession ≥1 mm was 4.1 for individuals less than 35 years (Table 4).

DISCUSSION

The results of this study corroborate previous findings regarding the widespread occurrence of gingival recession in adult populations. Specifically, it confirms that both the prevalence and severity of gingival recession tend to increase with age, consistent with many epidemiological studies across various age groups[5,10,11] In this study, 169

subjects (67.60%) were found to be affected by gingival recession, a prevalence that aligns with several other studies,[12] though it is slightly higher than the findings of some. Other research has reported prevalence rates ranging from 22.5% to 27.7%.[4,13] The observed relationship between the increased prevalence of gingival recession and age may be attributed to the cumulative effects of aging, periodontal disease, and prolonged exposure to factors that contribute to gingival recession.

The severity of gingival recession is defined by the extent of root surface exposure resulting from the apical shift of the marginal gingiva. Miller's classification of gingival recession, which considers the extent of recession defects and the surrounding hard and soft tissue loss, was utilized in this study.[14-15] Among the age groups analyzed, Miller's Class I exhibited the highest number of cases of gingival recession. Conversely, Class III and Class IV recessions, which are regarded as the most severe forms, were increasingly observed in older subjects, consistent with previous studies on gingival recession.[11,16]

Similar to findings in other studies, this research found no significant differences in the occurrence of gingival recession between the right and left sides of the mouth.[17] Mandibular central incisors exhibited the highest frequency of gingival recession (7.3%), followed by mandibular lateral incisors, premolars, and maxillary and mandibular first molars.[2,18] These findings align with recent epidemiological studies on the distribution of gingival recession, although there is no consensus in the literature regarding which teeth are most frequently affected. Some studies highlight maxillary canines and premolars,[10,19] while others point to maxillary premolars and molars as the most commonly affected teeth. Additionally, the current study supports findings from other studies that indicate the severity of gingival recession, based on apico-coronal height, increases with age.[15]

In this study, a higher percentage of males exhibited gingival recession compared to females, consistent with earlier research.[18,19] Maintaining good oral health is considered the most effective method for preventing and managing the progression of periodontal disease. Several risk factors are associated with gingival recession, including age, high frenal attachment, trauma from tooth brushing, calculus, and smoking. Notably, the prevalence of calculus is significantly higher in many developing countries compared to developed ones.[20] In this study, over 76% of individuals over 35 years old had more than 42% of their teeth covered with calculus, which was strongly linked to gingival recession, corroborating previous studies that demonstrated a correlation between calculus and recession.[21,22]

Cigarette smoking was found to have a strong association with both localized and generalized gingival recession in both age groups (≥35 years and ≤35 years), with statistical significance. There is a well-documented link between cigarette smoking and attachment loss,[23,24] however, the relationship between smoking and gingival recession shows some inconsistencies that may stem from variations in data reporting or study design, with some studies employing cross-sectional or case-control designs while others used 6-month follow-ups.[25] This study also revealed a high prevalence of periodontal disease, with calculus being a common finding, further suggesting a connection between these two conditions.

CONCLUSION

The cross-sectional design of this study limits the ability to establish definitive causal relationships between the investigated risk factors and gingival recession. However, it can be inferred that a high prevalence of gingival recession may be associated with poor oral hygiene and cigarette smoking, highlighting the importance of addressing these issues. Initial treatment should focus on preventive measures, such as encouraging participants to quit smoking and improve their oral hygiene practices. Given that all participants are patients, motivating them to consider surgical correction may be relatively straightforward. Further research is needed to explore the relationship between risk factors and gingival recession more comprehensively.

CONFLICT OF INTEREST

None

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