

## Plaque Levels Among Gender - A Retrospective Analysis Of Plaque Index Records

Research Article

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### Abstract

Dental plaque is a yellow-greyish substance which contains bacteria and attachment on tooth hard surfaces, including on restoration. Dental plaque can cause dental caries and periodontal disease. Dental plaque accumulation can easily form if there is no adequate dental plaque control. The purpose of this study is to investigate the gender difference in maintaining the oral hygiene by evaluating the plaque score. The study was conducted in a university set up sample consisting of all patients who underwent oral screening from June 2019 - April 2020, were examined and included in our data collection. A total of 1240 case sheets were reviewed. The standard index used in the study is Silness and Loe Plaque Index. The statistical analysis was done using SPSS software (SPSS version 21.0, SPSS, Chicago II, USA). The data was analysed using a chi-square test. The p value of less than 0.05 was considered to be statistically significant. 16.9% of males had good plaque scores, 46.1% had fair plaque scores and 36.9% had poor plaque scores. Nearly 27.8% of females had good plaque scores, 58.7% had fair plaque scores, 13.5% had poor plaque scores. It was observed that plaque accumulation was more in males when compared to females and this was statistically significant. (p value- 0.00<0.05) Within the limitations of the study, it was observed that females had notably better oral hygiene status when compared to the males.

**Keywords:** Gender; Oral Hygiene; Plaque Score; Oral Health.

### Introduction

Dental plaque is a yellowish-coloured substance that contains bacteria and adheres to hard surfaces of teeth, including on restoration.[1] Plaque may cause caries and periodontal disease, therefore careful hygiene should be performed to prevent plaque accumulation.[2] Maintenance of oral hygiene can be performed with plaque control. Plaque control can be done mechanically and chemically.[3] Scaling and root planing, as well as brushing after breakfast and before bedtime and the use of dental floss is included into mechanical plaque control. Plaque control is mechanically favoured by society because of its simpler method and relatively cheap cost.[3]

The main measures for controlling bacterial plaque area of a mechanical nature (toothbrushing and dental floss). However, both the absence of hygiene habits and the inability to perform correct tooth brushing can make mechanical plaque control insufficient. In general, individuals remove only around half of the plaque from their teeth even when brushing for 2 min [4]. Whereas the control of inter proximal biofilm formation requires use of an interdental oral hygiene aid, one such aid being dental floss [4, 5]. According to American Dental Association, 80% of the plaque can be removed by this method [6].

While mechanical methods of plaque removal are considered the standard for individually applied oral disease preventive practices, the high prevalence of gingival disease has prompted research into and development of adjunctive methods for controlling bio-

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films [7]. In 2002, data presented at the International Association for Dental Research (IADR) meeting supported the advantage of oral rinsing with chemotherapeutics as an adjunct for controlling plaque and maintaining gingival health [8].

Although many products have been used to control plaque and gingivitis, Chlorhexidine (CHX) is one of the most widely used and thoroughly investigated antiseptics. Years of documented research have established that CHX digluconate is safe, stable and effective in preventing and controlling plaque formation, ending existing plaque, and inhibiting and reducing gingivitis [9]. Few studies have discussed plaque induced dental caries and have found dentifrices with anti-plaque and anticariogenic properties such as in probiotic, CHX toothpaste to be effective [10]. However, the efficacy of dental floss and chlorhexidine mouthrinse is well established in reducing inter proximal gingivitis, only few studies have been conducted to compare the both. Soft bristle toothbrush is being prescribed with 0.1% CHX mouth rinse as an oral hygiene regimen for patients with avulsed teeth [11]. Few studies suggest that the adhesion of *S.mutans* and plaque accumulation was found to be more in steel crowns when compared to Zirconia [12]. The oral health is also affected by the type of nutrient intake [13]. Sreenivasan R et al has discussed the ECC in preschool children [14]. Jayashri P et al, has conducted a study to evaluate caries frequency in school going children, it was observed that the caries prevalence of 34.5% in 11 to 15 years and 50% above 15 years [15].

Understanding how gender differences in oral health behaviours affect gingival condition in young people may enable efficient prevention of periodontitis through improved therapeutic approaches against gingivitis. Previously our team has a rich experience in working on various research projects across multiple disciplines [16-30]. The aim of the present study was to assess gender-based differences in plaque scores among outpatients attending a private dental college.

## Materials And Method

### Study setting and sampling

This study is a single-center retrospective study, carried out in the Public health dentistry department in a private dental college. The present study was approved by the ethical board of the institution – Institutional ethical committee [IEC] (Ethical approval number: SDC/SIHEC/2020/DIASDATA/0619-0320) and was in accordance with the ethical standards that were stipulated. All available records of plaque index from June 2019 - April 2020, were examined and included in our data collection. A total of 1240 case sheets were reviewed. Cross verification of data for error was done by presence of additional reviewers and by photographs evaluation. Two examiners were involved in the study.

### Data collection

Acquisition of data was done from the hospital digital database which records all patient details. The collected data were grouped based on their gender and plaque scores. Gender was categorised into males and females, plaque scores were grouped according to the Silness and Loe plaque index, 1- Good (0.1 - 0.9); 2 - Fair (1.0 - 1.9); 3 - Poor (2.0 - 3.0). The data were entered in the system

in a methodical manner. For this study, data on the number of patients underwent oral prophylaxis and clinical variables such as their gender were collected. The data was then entered in excel manually and imported to SPSS for analysis. Incomplete or censored data were excluded from the study.

### Statistical analysis

The statistical analysis was done using SPSS software (SPSS version 21.0, SPSS, Chicago II, USA). Descriptive statistics were used to summarise the demographic information of the patients included in this study. Descriptive statistics is used for the acquisition of frequency distribution of the data. Association of gender with plaque scores was analysed using a chi-square test. The p value of less than 0.05 was considered to be statistically significant.

## Results And Discussion

An institutional record based study was done to assess the association of gender and plaque scores among outpatients. A total of 1240 patient records were reviewed. Percentage distribution of the study population showed that 53.95% of the study participants were males and 46.05 % were females depicting males were more prevalent than females. (Figure 1) Percentage distribution of plaque scores revealed that good plaque score was seen among 21.92% of the study population. followed by fair plaque score - 51.97% and poor plaque score - 26.11%. (Figure 2) The association between gender and plaque scores showed that 9.11% of the male population had a good plaque score, 24.92% of fair plaque score and 19.92% of poor plaque score. Nearly 12.82% of the female population had good plaque scores, 27.02% of fair plaque score and 6.21% of poor plaque score. (Figure 3)

From the current study, it was observed that both the good plaque score (0.1- 0.9) and fair plaque score (1.0- 1.9) was most prevalent in females and poor plaque score (2.0- 3.0) was more prevalent in males. P value was found to be significant - <0.05 showing that there is a significant association between gender and dental plaque score. (pearson chi-square - 90.849, df: 2, p value- 0.000)

Dental plaque, a bacterial biofilm, is one of the major etiologic agents involved in the initiation and progression of dental caries, gingivitis and periodontal disease. Therefore, effective oral hygiene involving removal and control of dental biofilm formation plays a vital role in prevention and successful treatment of dental disease.

Oral health is an integral part of general health and will not be isolated because it contributes to determining the general health condition of a private. Systemic health is closely linked to the state of the mouth. Hence, oral health and general health shouldn't be interpreted as separate entities.

The findings of this survey were similar to previous studies which have shown the most favourable attitudes of females on issues related to lifestyle and oral health. Ostberg et al. [31] conducted a survey in which it was found that girls scored more favourably on behavioural measures, showed more interest in oral health, than boys.

Gender was found to be a strong predictor of brushing frequency

Figure 1. Bar graph showing gender wise percentage distribution of study population. Males (53.95%) were more predominant than females (46.05%).

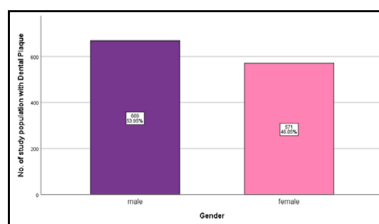


Figure 2. Bar graph showing percentage distribution of study population based on the plaque scores. Fair plaque score was most prevalent (51.97%) among the study participants, followed by poor (26.11%) and good plaque score (21.92%).

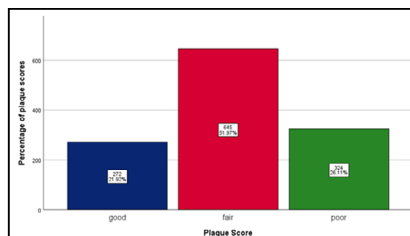


Figure 3. Bar graph showing association between gender and plaque score. The X axis denotes gender and Y axis denotes the number of patients with dental plaque. Blue colour denotes good plaque score, red colour represents fair plaque score and green colour represents poor plaque score. Fair plaque score and good plaque score was more commonly observed in females. Poor plaque score was more in males. (Chi Square test, p value=0.000 (p<0.05 statistically significant)).

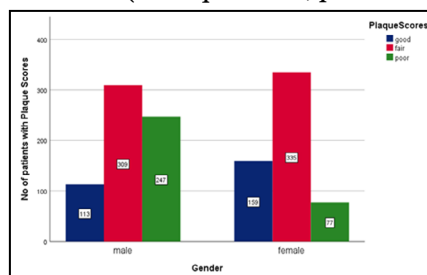


Table 1: The table shows that out of 669 males 16.9% had good plaque scores, 46.2% had fair plaque scores and 36.9% had poor plaque scores. Out of 571 females 27.8% had good plaque scores, 58.7% had fair plaque scores and 13.5% had poor plaque scores. Fair plaque score and good plaque score was more commonly observed in females. Poor plaque score was more in males. P value was 0.000. This depicts that there is a significant difference between gender and dental plaque scores. (p<0.05 statistically significant).

		Gender		Total N(%)	Chi-square value	p value
		Male N (%)	Few male N(%)			
Plaque Score	Good	113 (16.9%)	159 (27.8%)	272 (21.93%)	90.849	0
	Fair	309 (46.2%)	335 (58.7%)	644 (51.93%)		
	Poor	247 (36.9%)	77 (13.5%)	324 (26.12%)		
Total		669 (100%)	571 (100%)	1240 (100%)		

in earlier studies as well. Hodge et al. [32] found that the reasons for more frequent tooth brushing were aesthetic or caused by social norms in the case of women. Verbrugge [33] found that the reasons for more frequent dental visits among women could be aesthetic or women may have a greater sensitivity toward illness and discomfort and a willingness to seek help. Study conducted by Kiruthika P et al has observed that, majority of the endodontist prefer rotary instruments and few opt to use mtwo files in their practice [34] Increased plaque retention can lead to cavity formation. Sealants are used in prevention of cavity formation. Jayashri P et al conducted two studies on sealants, one was on pit and fissure sealants on permanent molars and found Clinpro sealants had a better penetration property [35] the other was about conventional and hydrophilic sealants, it was observed that Ultra-seal XT hydro produced a better result compared to Clinpro 3M

ESPE [36] Sachin G et al has conducted a study on sealants and found Aegis had a better retention property lowering the caries activity [37].

Results of this survey showed that the oral health behavior of females was better than males; however, this difference was not significant. This could be probably because all the participants included in this study were dental students who had a good knowledge about maintaining oral health. Females had significantly lower values for all the three oral health indices as compared to males. These findings were similar to a study conducted by Furuta et al.,[38] who found that females had higher levels of oral health behaviours and better oral hygiene status than males. Our institution is passionate about high quality evidence based research and has excelled in various fields [39-49].

## Conclusion

Within the limits of the study, it was observed that plaque accumulation was more among males when compared to females suggesting females had better oral hygiene status when compared to males. There was a significant difference between gender and dental plaque score.

## Authors Contribution

First author, Sandhya performed the data collection by reviewing patient details, filtering required data, analysing and interpreting statistics and contributed to manuscript writing.

Second author, Dr. Leelavathi contributed to conception of study title, study design, analysed the collected data, statistics and interpretation and also critically revised the manuscript.

Third author, Dr. Senthil Murugan P participated in the study and revised the manuscript. All the three authors have discussed the results and contributed to the final manuscript.

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