



RELATIONSHIP OF AGE, SEX AND RESIDING STATUS WITH PLAQUE AND GINGIVITIS IN 6-14 YR SCHOOL GOING CHILDREN IN MEERUT DISTRICT OF INDIA

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ABSTRACT

Introduction: Oral hygiene as a means to an end is a relatively novel concept which has only attained tacit public recognition as a desirable cosmetic endeavor during this last century. Most people exercise some measure of oral hygiene, and tooth brushing seems to be the method of choice providing thorough and regular cleaning.

Aims & Objectives: To study the relationship of age, sex and residing status on plaque and gingivitis of 6-14 yr school going children.

Methodology: An epidemiological study was conducted on 3027 children irrespective of sex and residing status between the ages of 6 – 14 years. Each child patient was assessed using plaque index and the modified gingival index. A Proforma was prepared which was made to include the vital statistics of the child patient along with his dentition.

Results: The results of the study revealed that plaque index and modified gingival index was greater in 14 year children and least in 6 year children. Males had a higher plaque index and modified gingival index than females. Children of urban schools had better oral hygiene than children of rural schools.

Conclusion: It was observed that plaque was found to be significantly related to gingivitis irrespective of the age (except of 11 year old and 13 year old children), sex, and residing status.

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INTRODUCTION

Periodontal disease is the one of the most prevalent oral diseases that acquires its roots early in childhood.¹

Gingivitis is inflammation of the gingiva that does not result in clinical attachment loss. Gingivitis is a reversible disease. Epidemiological studies have demonstrated a great variation in the prevalence of gingivitis in children and adolescence in different populations, with rates ranging from 35% to 100%.

Gingivitis is prevalent, but less extensive and less severe than expected. Early morphological and histopathological research disclosed that an intimate spatial relationship existed between dental plaque and the gingival tissues.²

The severity of gingivitis is often related to plaque accumulation which has been shown to be variable with age i.e. gingival inflammation in young children is milder than older children with similar plaque deposits.

Plaque-induced gingivitis is inflammation of the gingiva resulting from bacteria located at the gingival margin. The relationship of plaque to gingival inflammation has often been postulated as the cause for gingivitis, but it was not until the elegant experimental human gingivitis studies that a plaque bacterial etiology was confirmed.^{3,4} Epidemiological data have shown plaque-induced gingivitis to be prevalent at all ages of dentate populations and this disease has been considered to be the most common form of periodontal disease.⁵

In children, the prevalence of plaque-induced gingivitis continues to increase until it reaches a zenith at puberty.³ The initial changes from health to plaque-induced gingivitis may not be detectable clinically, but as plaque-induced gingivitis progresses to more advanced forms of this disease, clinical signs and symptoms become more obvious. Plaque-induced gingivitis begins at the gingival margin and can spread throughout the remaining gingival unit.

Several countries have high rates of gingival and periodontal diseases and, in spite of many technological advances which have lately been incorporated into dental practice; there are no evidences of a substantial improvement in the oral health of those countries population.

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Other factors may affect the intensity and severity of gingivitis in children, such as immunological, microbiological, and anatomic characteristics. Also the effect of demographic and socioeconomic factors on gingivitis has yet not been defined.⁷ The aim of this study was to study the relationship of age, sex and residing status on plaque and gingivitis of 6-14 yr school going children of Meerut district.

MATERIAL AND METHOD

The present study was carried out in the Department of Pedodontics and Preventive Dentistry, Subharti Dental College, Meerut.

This Study was done on 3027 children of both urban and rural region of Meerut district. Before the commencement of the survey, consent was taken from the parents/caregivers and concerned school authorities. Ethical clearance to conduct the study was obtained from the institutional review board. The proforma was designed in the Department of Pedodontics and Preventive Dentistry, Subharti Dental College Meerut. It comprised of the information regarding the child, querying name, age, sex, school name or home address, and the details of each parameter considered with specific criteria.

Examination of the Children

The children for the present study were selected according to their age from the schools situated in rural and urban areas of Meerut district. The children were asked to sit on a chair to carry out the oral examination. Oral examination of children was performed under natural daylight using mouth mirror with good reflecting surface and dental explorer. The evaluation and scoring was done for the entire dentition (whole mouth basis). The tooth surfaces examined for the plaque index and modified gingival index score were the four gingival areas of the tooth i.e.: (1) Distofacial (2) Facial(3) Mesiofacial; and(4) Lingual surfaces.

Plaque was evaluated only on the cervical third of each tooth with no attention to plaque that had extended to the middle or incisal thirds. The lingual surface was considered as one unit unlike the buccal surface.

Age, sex, rural or urban parameters were evaluated by conducting a comprehensive examination of the dental status of primary teeth among 3027 children.

Each child was assessed using plaque index and the modified gingival index. The plaque index used was given by Loe (1967) and the gingival index used was given by Lobene et al (1986).

Analysis of the Data

The data collected were subjected to statistical analysis. The prevalence of various factors was expressed in numbers and in percentage (%) proportions. Z- test was used to determine significant differences between different groups if any. The significance for all the statistical tests was predetermined at a p-value of 0.05 or less.

RESULT

The sample was distributed according to age that is 6 year old to 14 year old children.(Table 1) Out of the total 3027 children of the study, 643 children were 6year old (21%) and 164 children were 14 year old (5.4%).

Table 1 Age Distribution

6YEAR	643	21%
7YEAR	466	15%
8YEAR	270	8.9%
9YEAR	309	10%
10YEAR	263	8.6%
11YEAR	277	9.1%
12YEAR	476	15%
13YEAR	159	5.2%
14YEAR	164	5.4%

The result showed that both the mean plaque index (0.75±0.33) and mean modified gingival index (0.54±0.43) were greater in 14 year old children and the lowest value of mean plaque index (0.5±0.0) and mean modified gingival index (0.3±0.38) was seen in 6 year old children.

An interesting finding was also noted that most of the tooth surfaces examined had plaque present in all the ages. The plaque index value was co related to modified gingival index value and it was observed that the two values were significant for each age group except the 11year old group (2.374<2.58) and 13yearold group (2.305<2.58). In these groups, there was no significant difference between plaque index and modified gingival index.

Amongst the 3027 children, 488 (16%) children had deciduous dentition, 1942 (64%) had mixed dentition and 597 (20%) had permanent dentition.

The result revealed that children with permanent dentition had greater mean plaque index (0.71±0.41) value and children with deciduous dentition had the least mean plaque index (0.59±0.43) value. Similarly, the mean modified gingival index value was highest in children with permanent dentition(0.50±0.46) and children with deciduous dentition had the least (0.34±0.39) value. The plaque index and modified gingival index were correlated for each type of dentition and it was noted that it showed significant (Z>2.58) results in all the three types of dentition i.e. 12.601 for deciduous, 15.555 for mixed and 14.297 for permanent dentition.

Table 2 shows distribution of the sample based on sex. The mean plaque index and mean modified gingival index were greater in male than in females.

Table 2 Gender Distribution of Children

Sex	Plaque Index	Modified Gingival Index	Z Calculation	P Value
	Mean±Standard Deviation	Mean±Standard Deviation		
Male	0.64±0.39	0.42±0.45	5.527	2.58 P<.01
Female	0.60±0.42	0.39±0.42	4.414	2.58 P<.01

The mean plaque index in male was (0.64±0.39) and in females was (0.60±0.42), whereas the mean modified gingival index in males was (0.42±0.45) and in females was (0.39±0.42). There was significant difference present between mean plaque index and mean modified gingival index in both males and females i.e. (5.5276>2.58) and (4.4120 >2.58) respectively. (Table 3)

Table 3 Comparison of plaque and gingival indices according to sex.

Males	1787	59%
Females	1240	41%

The distribution of the children according to residing status is displayed in Table 4.

Table 4 Distribution of Children According To Residing Status

Rural	1218	41%
Urban	1809	59%

The result revealed that mean plaque index in children from rural region schools (0.65±0.42) was greater than from children in urban region school (0.60±0.40). The mean modified gingival index was greater in children from rural region schools (0.46±0.50) than the children from urban region schools (0.37±0.39). The results further revealed that there was relatively significant difference between mean plaque index and mean modified gingival index in both the rural (3.3748>2.58) and urban (4.7917>2.58) school children.(Table 5)

Table 5 Comparison of plaque and gingival indices according to residing status

Residing Status	Plaque Index mean±standard deviation	Modified Gingival Index Mean±Standard Deviation	Z Calculation	Z.01	P Value
Urban	0.60±0.40	0.37±0.39	3.374	2.58	P<.01
Rural	0.65±0.42	0.46±0.50	4.791	2.58	P<.01

DISCUSSION

In the present study, the mean plaque value and mean gingival index value was more in 14 year old children than 6 year old children. This is consistent with the studies by Goldberg and Ramberg.^{8,9} The higher gingival index value in older children may be attributed to the fact that children with deciduous dentition form less plaque than older children. Also, the children with deciduous teeth respond to bacterial plaque with less gingivitis than older children and adults^{9,10}. Matteson and Goldberg in 1985 suggested that once the permanent teeth start to erupt and the mixed dentition state comes, the reduced gingival reactivity starts to disappear.⁸Ramberg et al in 1994 found that young children with deciduous dentition have less plaque than the young adults with permanent teeth.⁹Schour and Matteson showed that gingivitis was more prevalent in the permanent dentition than in the deciduous dentition.¹ The results of the present study according to the age are consistent with these studies. The plaque accumulation and gingival condition worsened in older children when compared to younger children.

In the present study, a significantly higher proportion of males than females had plaque accumulation and gingivitis. The mean plaque index values were 0.64±0.39 and 0.60±0.42 for males and females, respectively. The mean modified gingival index values were 0.42±0.45 and 0.39±0.42 for males and females, respectively. The results indicated that the mean plaque and modified gingival index values in male subjects was higher than seen in females. This can be attributed to efficient brushing among females. Dummer et al observed that among Caucasians children, females had better oral hygiene practices. The results of the present study seen in males and females are consistent with the above study.¹¹These findings also reflect a greater desire for general cleanliness and more appealing appearance amongst females. In the present study, a higher percentage of females (94%) brushed at least once a day or twice a day as compared to males (93%), though the

difference was not statistically significant. The higher prevalence of gingivitis observed in males in the present study is also consistent with studies done by Addy et al in 1990, and Nyyssonan et al in 1984.^{12,13} However, a study done by Koroluck had contrasting results. The author found no significant difference between mean plaque score for males and females.¹⁴

The result of the study indicated that the children living in rural area had a significantly higher plaque index and modified gingival index value. This indicates that the children in urban region use better oral hygiene practice than the children residing in rural areas. This variation in oral hygiene status in rural and urban region can be explained by difference in oral habits and oral hygiene practices in addition to utilization of oral health services. However, whether the difference seen in these age groups (6-14 year old) can be extrapolated to adulthood to predict difference in severity of periodontitis between social classes is not clear. Nevertheless oral hygiene, plaque accumulation and gingivitis experience at young age may be relevant and clearly this is significantly affected by social class of individual concerned.

CONCLUSION

1. The mean plaque index and mean modified gingival value was greatest in 14 year children and least in 6 year children.
2. The mean plaque index and mean modified gingival value was greater in males than in females and there was significant relationship present between plaque and modified gingival index in both males and females.
3. The mean plaque index and mean modified gingival value was found greater in rural children than in urban area children.

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