

A Descriptive study on Impact of socioeconomic status on gingival health 15 year old school children

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ABSTRACT

Background: Oral hygiene is the practice of keeping the mouth and teeth clean to prevent dental problems, especially the common dental caries and gingivitis, and bad breath. There are oral pathologic conditions in which a good oral hygiene is required for healing and regeneration of the oral tissues. **Aim:** The aim of the study is to determine the relationship between gingival health with socioeconomic status among 15 years old school going children of Lucknow city. **Materials & Methods:** A descriptive cross-sectional study was conducted. The schools were selected by simple random sampling method following the lottery method of selection. The Gingival Index by Loe H and Silness J with Kuppaswamy's socioeconomic status scale has been used. **Result:** 63.2% of the children examined had gingivitis. Out of which, 43.6% had mild gingivitis, 32.3% had moderate gingivitis, and 24.1% had severe gingivitis. Further, the severity of GI score was higher in males (18.3%) than in females (10.5%). In particular, children from upper socioeconomic status were found to have significantly better gingival health (Mean GI = 0.46 ± 0.29) than those children from middle or lower socioeconomic status groups. **Conclusion:** It was reported that as the socioeconomic status decreased, gingival health of the children deteriorated.

Keywords: Gingiva, Health, Socio-economic Status, Children, School.

INTRODUCTION

Oral health is a part of general health and hence, has a direct bearing on the total well-being of individuals.⁽¹⁾ Dental caries and periodontal disease, the most commonly seen oral disease show striking geographic variation, socioeconomic patterns and severity of distribution all over the world. Gingivitis progressed to periodontitis, is one of the main causes of tooth loss.⁽²⁾

Most of the times gingivitis depends on oral hygiene habits of the population, which in turn depends on the factors like cultural background, religious norms, educational level and socioeconomic status.⁽³⁾ In recent studies, socio-economic factors have been identified as predisposing factors in the development of both dental caries and periodontal disease. Low income and poor education have been reported to influence periodontal status.⁽⁴⁾

Oral health is always an inseparable part of general health and several studies in the past have revealed an association between socioeconomic factors and oral health.⁽⁵⁾ The literature on

the association between socioeconomic factors and prevalence of dental caries, periodontal diseases as well as oral premalignant and malignant lesions among adults in India is scanty.⁽⁶⁾ To cast light upon the ambiguous situation prevailing with regard to the gingival status and practices in many parts of our country, a need was felt for this study so the present study was conducted to determine the relationship between gingival health status with socio-economic status among 15 years old school going children of Lucknow city.

MATERIALS & METHODS

A Descriptive cross sectional study was conducted to determine the relationship between gingival health status and socio-economic status among 15 years old school going children of Lucknow city. For the study purpose, list of schools located within the Lucknow municipality was obtained from District School Officer (DSO), Chowk, Lucknow. The various categories of schools were government, aided and unaided private schools, thereby giving a chance to incorporate students from different socio-economic background.

The city of Lucknow was divided into four zones. From each zone, 5 schools were selected, i.e. a total of 20 schools. The schools were selected by simple random sampling method following the lottery method of selection. The ratio was maintained while selecting the samples from different areas. In every school, the classes of 8th and 9th standard were chosen. These standards have children of 15 years of age. Each class has three to four sections, and these sections were chosen for the purpose of data collection.

Before the commencement of the study, the investigator was standardized and calibrated in the department of Public Health Dentistry by faculty members to ensure uniform interpretations and understandings. A pilot study was conducted on 50 subjects to assess the validity and feasibility of the study. Internal consistency of the questionnaire was found to be good (0.87). Sample size was estimated as $(n) = 1 + 2C (SD/d)^2$

$$= 1 + 2 * 10.51 * (1.50/1.15)^2 \text{ (for } \alpha=0.05 \text{ and } 1-\beta=0.80 \text{ then constant}$$

$$C=10.51)$$

$$= 36.76 = 37$$

i.e., 37 subjects in one socio-economic status class or total 185 subjects for five socio-economic status classes. On the basis of results obtained, sample size was fixed at 1000. A total number of 250 children were examined from each zone. The self administered close-ended questionnaire was formulated in English version. The proforma consisted of two parts. First part consisted of recording general information including name, age, gender, parent's education, parent's occupation and income, family members, and oral hygiene practices. Second part consisted of Gingival Index (GI). The Gingival Index by Loe H and Silness J in 1963 was recorded.

In the development of this instrument, special consideration was given to developing a questionnaire, which was completed independently, without assistance. It was, therefore, important that the readability level of the questionnaire was pitched appropriately. Care was taken to avoid long sentences, complex terminology, acronyms or abbreviations, double-barrelled and leading questions.

Ethical clearance (CPGIDSH/EC/026-018 Dated: 8 October 2018) was obtained from the ethical clearance committee of the University. Children who had completed 15 years or running in 15th year of life on the date of the examination, who were willing to participate and who were present on the day of the study were included. Children who had and were undergoing orthodontic treatment were excluded from the study. The study was carried out from the months of September 2018 to December, 2018. The study was conducted within the working hours of schools, as per the time allotted by principals of respective school. Written consent was taken from the principal of each schools and all children were informed about the study purpose and method.

The examination was done by the investigator who was assisted by an alert and co-operative recording clerk. The respective class teachers were used as co-ordinators in the survey. The Gingival Index by Loe H and Silness J developed in 1963 was recorded.⁽⁷⁾ Examination was done using mouth mirror and periodontal probe under adequate illumination.

Groups were also compared by one way analysis of variance (ANOVA) and the significance of mean difference between the groups was done by Tukey HSD (honestly significance difference) post hoc test after ascertaining the normality by Shapiro-Wilk test and the homogeneity of variance by Levene's test. A two-sided ($\alpha=2$) significance level $p<0.05$ was considered statistically significant. All analyses were performed on STATISTICA (window version 6.0).

Immediately after the survey, oral health education was given to the children regarding the method of tooth brushing and oral hygiene practices using posters and models. Survey findings were reported to the concerned school authorities.

RESULTS

The present study determines the relationship between gingival health with socio-economic status among the school going children of Lucknow city aged 15 years. A total of 1038 children were selected randomly from different schools of Lucknow city. There were 629 males (60.6%) and 409 females (39.4%). The %age of male children was higher than females.

The socio-economic status (SES) of studied children were evaluated according to Kuppaswamy's socioeconomic scale (1976) updated by Dr. Neeta Kumar et al. in 2012, and summarized in Table 1. The studied children mostly belong to Upper middle and Lower middle class accounting 59.3% of total population. The mean GI of male children was higher than

female children. Comparing the mean GI of two genders, t test revealed significantly higher GI of males as compared to females (1.79 ± 0.27 vs. 1.13 ± 0.31 , $t=36.28$; $p<0.001$).

Table 1: Distribution of children according to socioeconomic status

Socio-economic status	Number of children examined	Percentage (%)
Upper	138	13.3
Upper middle	281	27.1
Lower middle	335	32.3
Upper lower	173	16.7
Lower	111	10.7

The SES wise GI of studied children are summarized in Table 2 showed that as SES decreases; mean GI increases. Further, Tukey test also revealed significantly ($p<0.001$) higher mean GI especially in Lower middle, Upper lower and Lower SES groups as compared to both Upper and Upper middle SES groups.

Table 2: Mean values of GI according to Socioeconomic status

SES	N	Mean	SD	F (4,1033 DF)	p Value
Upper	138	0.46	0.29	1685.00	$p<0.001$
Upper middle	281	0.72	0.32		
Lower middle	335	1.51	0.25		
Upper lower	173	2.14	0.30		
Lower	111	2.47	0.27		

The association between GI severity (No/Mild/Moderate/Severe) and SES of studied children are summarized in Table 3. Among children, mostly had No GI (36.8%) followed by

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Mild (27.6%), Moderate (20.4%) and Severe the least (15.2%). Comparing the proportions of GI severity among different SES groups, χ^2 test revealed significant association between GI severity and SES ($\chi^2=144.40$, $p<0.001$). In other words, Severe GI severity significantly ($p<0.001$) associated especially with both Upper lower and Lower SES. Further, the Severe GI severity was higher in males (18.3%) than females (10.5%).

Table 3: Sample distribution of GI with Socioeconomic status according to Severity

SES	N	Number	Mild	Moderate	Severe	χ^2 (DF=12)	p value
Upper	138	56 (40.6%)	40 (29.0%)	32 (23.2%)	10 (7.2%)	144.40	$p<0.001$
Upper middle	281	124(44.1)	93 (33.1%)	38 (13.5%)	26 (9.3%)		
Lower middle	335	150(44.8)	95 (28.4%)	49 (14.6%)	41 (12.2%)		
Upper lower	173	36 (20.8%)	38 (22.0%)	62 (35.8%)	37 (21.4%)		
Lower	111	16 (14.4%)	20 (18.0%)	31 (27.9%)	44 (39.6%)		
Total	1038	382(36.8)	286 (27.6%)	212 (20.4%)	158(15.2%)	-	-

The associations of GI with daily brushing frequency showed that the GI lowered with increasing daily brushing frequency. Comparing the mean GI between different daily brushing frequency groups, ANOVA revealed significantly different GI among the groups ($F=375.30$, $p<0.001$).

Further, Tukey test also revealed that the mean GI lowered significantly ($p<0.001$) in those who brush daily more than twice as compared to both those who brush daily Once and Twice. Further, the mean GI also lowered significantly ($p<0.001$) in those who brush daily Twice as compared to those who brush daily Once.

The associations of GI with brushing materials are summarized in Table 4 showed that the GI increases with usage of Paste to Powder to Others. Comparing the mean GI between

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different brushing materials groups, ANOVA revealed significantly different GI among the groups ($F=331.80$, $p<0.001$).

Table 4: Mean values for GI according to brushing materials

Daily brushing materials	N	Mean	SD	F (2,1035 DF)	p Value
Toothpaste	627	1.03	0.32	331.80	$p<0.001$
Toothpowder	352	1.38	0.29		
Others	59	1.96	0.31		

Further, Tukey test also revealed that the mean GI lowered significantly ($p<0.001$) in those who use Paste as compared to both Powder and Others. Further, the mean GI also lowered significantly ($p<0.001$) in those who use Powder as compared to those who use Others.

DISCUSSION

Total well being of the society is determined by the healthy population inhabiting it. As oral health is an integral part of general health, it plays a key role in improving the general well being of an individual. Many authors have worked on the various aspects of oral conditions and concluded that it has an impact on quality of life. Assessment of SES is an important aspect in community-based health research as this is a major determinant of health and nutritional status as well as of mortality and morbidity.⁸ Socio-economic disadvantage in childhood is associated with low educational attainment, risk of unemployment, job insecurity and low adult earnings for both men and women.⁹

In case of children, oral health plays a vital role. Oral health renders profound influence on children's growth and development, on their physical, mental and social aspects, their performance in school, and hence their success in their later life time.¹⁰ The link between socioeconomic status and health, including oral health, is well established. Numerous studies have demonstrated that the health of individuals from the lower end of the socioeconomic scale is markedly worse than that of individuals from the upper end. This relationship exists across a broad range of health indicators, including dental health.¹¹

A total of 1038 children aged 15 years (629 males and 409 females) belonging to different social classes were examined for gingival health and compared with gender, socioeconomic status, and oral hygiene practices. In the present study, 63.2% of the children

examined had gingivitis. Out of which, 43.6% had mild gingivitis, 32.3% had moderate gingivitis, and 24.1% had severe gingivitis. These results are in contrast to the studies of Deepak P Bhayya et al (2010)³, and Dhar V et al (2007)¹², who did their studies on school going children and have reported 81% and 84.37% overall prevalence, respectively. Similar high prevalence was seen in studies of Pandit K et al (1986)¹³, Jose et al (2003)¹⁴, and Mahesh KP et al (2005)¹⁵, all of them studied the gingival status of school going children in different parts of India.

When gender wise mean GI scores were considered, males were affected more than the females. The mean GI score of the males (1.79 ± 0.27) was significantly higher than that of the females (1.13 ± 0.31). The results of this study indicate that females had better gingival health than males, and this can be attributed to the cleanliness of the females. Similar findings were reported by Das et al (2009)¹⁶ who conducted a study on oral health status of 6 and 12 year old school going children in Bangalore city.

Gingival diseases are no different and historically have been related to lower SES.¹⁷ The ill effects of living in deprived circumstances can start early in life.¹⁸ In the present study, the mean GI score was inversely related to socioeconomic status, that is, as the socioeconomic status decreased; the mean GI score was increased. The gingival status was worsened in children belonging to lower social class. Similar findings were reported by Dummer et al (1987)¹⁹, Anagnou-vareltzide A. et al (1983)²⁰, Powel R.N (1986)²¹. In the present study, it has been shown that gingival health of children belonging to Upper socioeconomic status was significantly better, and it deteriorated as the socioeconomic status decreased. It has been attributed to the fact that socioeconomic status of an individual might affect the access to use various dental services and dental aids available.

Comparison of the severity of the gingival inflammation showed that it was significantly associated especially with both Upper lower and Lower socioeconomic status. The lowest mean GI score (0.46 ± 0.29) was found in Upper socioeconomic class and the highest mean GI score (2.47 ± 0.27) was recorded in Lower socioeconomic class. These differences were statistically significant ($p < 0.001$). Comparison of mean GI scores within different socioeconomic status groups also revealed statistically highly significant values for all groups compared ($p < 0.001$).

In the present study, there was a significant association of GI with daily brushing frequency, as the frequency of brushing increased, the mean GI score decreased ($p < 0.001$). The highest mean GI score (1.87 ± 0.27) was reported in those children who brushed their teeth once daily, and the lowest mean GI score (1.15 ± 0.30) was reported in children who brushed more than twice daily. Similar findings were reported by Pekka Kallio and Heikki Murto (1997)²², and Anagnou-vareltzide A. et al (1983)²⁰. There was a significant association between GI scores and brushing materials in the present study. The lowest mean GI score (1.03 ± 0.32) was reported in the children who used toothpaste to clean their teeth, and it increased subsequently in the children using tooth powder (1.38 ± 0.29) and others (1.96 ± 0.31). Comparing the mean GI scores between different brushing material groups revealed significantly different GI scores among the groups ($p < 0.001$).

CONCLUSION

The mean scores GI revealed a significant relation with socio-economic status. It was reported that as the socioeconomic status decreased, gingival health of the children deteriorated. The mean scores of GI, especially in Lower middle, Upper lower, and Lower socioeconomic status groups were significantly higher when compared to both Upper, and Upper middle socioeconomic status groups. This can be attributed due to the fact that oral health is a function of better oral hygiene among better educated, good income, more positive attitudes towards oral hygiene, and a greater frequency of dental visits. Therefore, the results of the present study concluded that gingival health of the school children were significantly related to their socio-economic status.

Conflict of Interest: Nil

REFERENCES

- [1] Doddamani AS, Prashanth VK , Abbayya K, Yunus GY, Konakeri V, Ridhima. Oral Hygiene Status among School Going Children belonging to Different Socio-economic Status of Belgaum City Aged 12 To 15 Years. JIDA 2010; 4: No. 12.
- [2] Benoit V et al. Oral health status of children and adults in urban and rural areas of Burkina Faso, Africa. International Dental Journal, 2004; 54: 83-89.
- [3] Bhayya D.P, Shyagali T.R, Mallikarjun K. Study of oral hygiene status and prevalence of gingival diseases in 10-12 year school going children in Maharashtra, India. J Int Oral Health 2010, volume 2 (Issue 3): 21-26.
- [4] Sogi G.M, Bhaskar D.J. Dental caries and oral hygiene status of school children in Davangere related to their Socio-economic levels: An epidemiological study. . J Indian Soc Pedo Prev Dent, March (2002) 20 (4): 152-157.
- [5] Piovesan et al. Socioeconomic and clinical factors associated with caregivers' perception of children's oral health in Brazil. Community Dent Oral Epidemiol, 2011; 39: 260-267.
- [6] Chandra Shekhar BR, Reddy CVK. Oral health status in relation to socioeconomic factors among the municipal employees of Mysore city. Indian Journal of Dental Research, 22(3), 2011: 410-418.
- [7] Dafi Quteish Taani. Relationship of socioeconomic background to oral Hygiene, gingival status, and dental caries in children. Quintessence Int. 2002 Mar;33(3):195-8.
- [8] El-Gilany A., El-Wehady A., and El-Wasify M. Updating and validation of the socioeconomic status scale for health research in Egypt. Eastern Mediterranean Health Journal. Vol. 18, No. 9, 2012: 962-68.
- [9] Nicolau B et al. Associations between Socio-economic Circumstances at Two Stages of Life and Adolescents' Oral Health Status. Journal of Public Health Dentistry. Vol. 65, No. 1, Winter2005: 14-20.

- [10] Ingle N.A. et al. Effect of short Oral Health Education Intervention on Oral Hygiene of 8-10 years old School Children, Maduravoyal, Chennai. Journal of the Indian Association Of Public Health Dentistry Vol:2011 Issue:18 Suppl. I: 321-27.
- [11] Locker D. Deprivation and oral health: a review. Community Dent Oral Epidemiol 2000; 28: 161-9.
- [12] Dhar V et al. A prevalence of gingival disease, malocclusion and fluorosis in school going children of rural areas in Udaipur city. J Indian Soc Pedod Prev Dent 2007; 25(2): 103-5.
- [13] Pandit K, Kannan AT, Sarana K, Agarwal K. Periodontal disease and dental caries in primary school children in rural areas of Delhi. Indian Journal of Pediatric 1986; 53: 525-29.
- [14] Jose A, Joseph MR. Prevalence of dental health problems among school going children in rural Kerala. J Indian Soc Pedod Prev Dent 2003; 21: 147-51.
- [15] Mahesh K.P et al. Oral health status of 5 years and 12 years school going children in Chennai city- An Epidemiological study. J Indian Soc Pedo Prev Dent – March 2005: 17-22
- [16] Das UM, Beena JP, Azher U. Oral health status of 6 and 12 year old school going children in Bangalore city: An epidemiological study. J Indian Soc Pedo Prev Dent 2009;27(1): 6-8.
- [17] Dr. Brian Burt. Epidemiology of Periodontal Diseases. J Periodontol, August 2005, Volume 76; Number 8: 1406-19.
- [18] Schou L, Wight C. Does dental health education affect inequalities in dental health? Community Dental Health 1994; 11:97-100.
- [19] Dummer PMH, Addy M, Hicks R, Kingdom Anne. The effect of social class on the gingivitis and pocketing in 11 – 12 year old children in South Wales. J Dent 1987; 15 : 185-90.
- [20] Anagnou-Vareltzides A, Tsami A, Mitsis FJ: Factors influencing oral hygiene and gingival health in Greek school children. Gommuniyy Dent Oral Epidemiol 1983; 11: 321-4.
- [21] Powell RN, Gilhooly .IT, McKenna ER: Prevalence and distribution of gingivitis and dental caries in children aged 6-12 years in Brisbane primary schools. Community Dent Oral Epidemiol 1986; 14: 110-4.
- [22] Kallio P, Murtomma H. Determinants of self assessed gingival health among adolescents. Acta Odontol Scan 1997: 105-111.