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RESEARCH ARTICLE

TOOTH BRUSHING FREQUENCY AND RINSING HABITS AND THEIR EFFECTS ON ORAL HYGIENE INDEX SCORES (OHIS) AMONG THE SCHOOL CHILDREN IN MEERUT

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ABSTRACT

**Background:** Plaque control, which involves its active removal, is a responsibility undertaken personally by individuals for better oral hygiene. Tooth brushing and oral rinsing are mechanical cleaning procedures which are considered to be the most reliable methods of effective plaque removal and thus prevention of periodontal diseases.

**Objective:** To assess the tooth brushing frequency and rinsing habit and its effects on oral hygiene index scores (OHIS) among the school children in Meerut.

**Methods:** Study population consisted of 503 randomly selected school children 05-18years in Meerut. Participants were examined by a dentist to assess their oral hygiene index Score (OHIS). Questionnaire on oral hygiene measures, their brushing and rinsing habits was completed by a social worker.

**Results:** The results of this study show that the majority of the school children brushed their teeth once a day. Female children had better brushing habits than males. Only oral rinsing with normal water at night before sleep is significantly better than doing nothing but it's not equivalent to brushing before sleep.

**Conclusions:** For improvement oral hygiene among school children regular tooth brushing and rinsing habit is important factors. Motivation to apply instructions given on oral health care and regular reinforcement are essential.

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INTRODUCTION

Plaque is a tenaciously adherent deposit that forms on all tooth surfaces. It consists of an organic matrix containing a dense concentration of bacteria. Small amounts of plaque are compatible with gingival and periodontal health, but larger amounts for prolonged periods lead to the development of periodontal diseases. Plaque becomes visible on the surfaces of teeth when tooth brushing stops for 12–24 h. (Lang *et al.*, 1973). It can be seen with the naked eye or with the use of disclosing agents. If tooth brushing is neglected for several days plaque grows in thickness. (Cawson *et al.*, 1998) Bacterial plaque is the primary etiologic agent in the development of periodontal disease and dental caries which have been the most common diseases afflicting the human mouth. (Loe, 2000) Today, most people exercise some measure of oral hygiene especially tooth brushing however variations exist in toothbrush design, brushing techniques, frequency of brushing and brushing time. Very few people brush their teeth well enough at any time that all plaque is removed. A number of factors may affect an individual's oral hygiene practices such as age, gender, education, level of awareness and

socioeconomic status. It has been stated that there is an association between higher socioeconomic status and lower risk of unhealthy oral health related behaviours. (Bernabe, 2009) In a study of Anagnou- Varelzides *et al.* (1983) found sex and tooth brushing frequency were statistically significant in relation to oral health among school children in Athens. (Anagnou-Varelzides *et al.*, 1983)

Tooth brushing

Oral care products for home-use play an important part in the prevention and control of oral diseases such as caries and periodontal disease. Fluoride toothpaste is the most widely used topical fluoride modality for caries prevention and control worldwide. There is a body of high-quality evidence regarding the optimal concentration of fluoride in toothpaste for caries prevention, the frequency of brushing and, to a lesser extent, the amount of toothpaste to be used (particularly in young children). A number of steps can be taken to reduce the risk of caries including brushing one's teeth twice a day. American Academy of Pediatric Dentistry (2010). The benefit of brushing derives from both the mechanical removal of plaque from the teeth and the exposure of the teeth to fluoride in the toothpaste and water. Despite this relatively simple way to reduce the risk of caries, it is estimated that 17% of low income, Chicago,

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Illinois children in the fifth grade (average age 10 years) brush less frequently than twice a day. (Koerber, 2006)

### Mouth Rinses

Rinsing with water or a mouth rinse after tooth brushing is also a common practice. Ideally oral hygiene procedures should complement each other, yet the method of rinsing and the product used for rinsing (water, mouthwash liquid). Mouth rinses are effective vehicles for delivering antimicrobial or antiplaque agents, although the pharmacokinetics and mode of action of any active ingredient must be consistent with this delivery route. Mouth rinses are well accepted and widely used in combination with brushing. A study done by Nargis *et al.* (2014) revealed that tap water may not be of any help in correcting oral pH after an acidic attack. In the first attempt, despite rinsing the mouth with tap water saliva pH meaningfully continued to decrease which resulted in a mean pH of  $6.49 \pm 0.13$  ( $p < 0.001$ ). (Narges Mirjalili, 2014) The aim and objective of the study was to assess the tooth brushing frequency and rinsing habit and its effects on oral hygiene index scores (OHIS) among the school children in Meerut.

## MATERIAL AND METHODS

A school based cross sectional study was conducted to assess the oral health status of children. The list of schools was prepared according to the information collected from the directorate of education, Meerut. One school of Meerut city were selected from the list through simple random sampling method. Before starting the study official permission was obtained from all the concerned authorities. Principal of the school was informed about the aim and objectives of study. The study population consisted of children aged 5 to 18 year present in the school during the study. Data was collected from January 2015 to February 2015. Examination was carried out by the dentist of the department of community medicine. All selected students participants received an oral clinical examination. The examination were carried out in the school using transportable equipment. Participants were examined supine using plane mouth mirrors, standard explorers, and torch lights. An expert social worker was involved in the entry on the survey form. The questions addressed socio-demographic factors and oral health behaviour (rinsing pattern of tooth brushing frequency in a day). Subjects were asked their daily frequency of tooth brushing, the children were asked "On most days, how many times a day did you brush your teeth?" with responses of less than once a day, once a day, twice a day, and more than twice a day.

### Statistical analyses

A statistical program was used for data analyses. A ( $p < 0.05$ ) was considered to be significantly differences. Scoring of Oral Hygiene Index Simplified (OHIS) is Good (0.0-1.2) Fair (1.3-6.0) and Poor (3.0-6.0) was used for the study.

## RESULTS

**Table 1. Distribution of gender and brushing frequency**

Brushing Habit	Male	Female	Total
Daily one time brush	205 (59.4)	140 (40.6)	345 (100.0)
Daily two time brush	61 (38.6)	97 (61.4)	158 (100.0)
TOTAL	266 (52.9)	237 (47.1)	503 (100.0)

$\chi^2$ -value = 18.84; p-value < 0.001

Table no.1 suggests that the majority of the children brushed their teeth once a day. More number of females 97 (61.4%) than male 61 (38.6%) tended to brush twice daily and the difference was found to be statistically significant.

**Table 2. Distribution of gender and OHIS grading**

Ohis Grade	Males	Females
Good	183	177
Fair	60	45
Poor	23	15
Total	266	237

( $\chi^2$ -value = 2.26; p-value < 0.322)

Although female participants had habit of brushing twice a day more than males still in the overall distribution of OHIS males and females did not have statistically significant difference.

**Table 3. Distribution of participants with brushing twice or one time brushing habit (morning) according to OHIS grading**

Ohis Grade	Brushing Twice Daily	Brushing Once Daily
Good	129	231
Fair	22	83
Poor	07	31
Total	158	345

( $\chi^2$ -value = 11.58; p-value < 0.003).

Participants brushing twice daily had significantly better OHIS than participants brushing once.

**Table 4. Distribution of participants with one time brushing habit (morning) and their rinsing habit at night before sleep according to OHIS grades**

Ohis grade	Brushing once with rinse once at night before sleep	Brushing once with no rinse at night before sleep
Good	148	83
Fair	27	56
Poor	15	16
Total	190	155

( $\chi^2$ -value = 25.16; p-value < 0.0001).

OHIS of participants with rinsing habit at night was significantly better than with non rinsers before sleep.

Ohis Grade	Brushing once with rinse once at night before sleep	Brushing twice daily
Good	148	129
Fair	27	22
Poor	15	07
Total	190	158

( $\chi^2$ -value = 1.7; p-value < 0.40).

Brushing twice a day has significantly better OHIS grades than single time brushers and rinsers.

## DISCUSSION

The objectives of this study were to find the oral hygiene status and practices of a group of school children. The results of this study showed that the majority of the children brushed their teeth once a day. Oral health has an important role in the general well-being of individuals. Poor oral health is a silent epidemic that can create a burden on quality of life if neglected. Since oral health behaviors can affect the oral

health, attempting to construct good oral health behaviors can affect the general health of individuals. Indeed, the adoption of good oral health habits in childhood (Abiola Adeniyi, 2009). Many Indian children face challenges accessing dental care and suffer a disproportionate share of dental disease. Financial constraints, non availability of dental services, transportation costs and lack of basic awareness of oral health issues, are some of these challenges are found among them, (Adekoya Sofowora, 2008). A lot of the school children had a good knowledge of the ideal frequency of tooth brushing but may not actually practice it. The school age at which oral hygiene measures are commenced is of importance in establishing and maintaining the oral health of children. It is generally recommended to commence the tooth brushing as soon as the first tooth erupts. In this current study (38.06%) male and (63.04%) female students had experience of brushing habit as two times in a day. It was found to be statistically significant. A study done by Addy *et al.*, (1990) revealed that as many as one child in five may not get the benefits of brushing twice a day, (Addy, 1990). Similarly an another study done by Astrom, A.N. (2004) revealed it, (Astrom, 2004).

Oral health habits of girls seem to be better than those of boys. These findings support the idea that oral health intervention should be given to all children but have focus on older children, especially boys. Education should be consistent, as suggested by Tolvanen *et al.* 2010. The results revealed that (33.3%) male and (66.7%) female students had good oral hygiene, (59.1%) male and (40.9%) female students had fair oral hygiene, and (71.4%) male and (28.6%) female students had poor oral hygiene according to Oral Health Index Scale grade. Other study done by Reisine ST, Psoter W. suggested that a good oral hygiene, involving not only frequent brushing but also associated with reduced caries risk (Reisine *et al.*, 2001). M. Hooleya *et al.* found in their study that since parents are the primary social force influencing child development in the early childhood years and practices may be beneficial in the prevention of oral health problems such as dental caries, (Hooleya *et al.*, 2012).

A study Elham Bozorgmehr *et al.* (2013) showed that Tooth brushing skills and appropriateness of oral hygiene in parents can affect the frequency and quality of tooth brushing in school going children, because children learn many of behaviors from their parents. Santo *et al.* (2007), however, reported brushing twice daily among Brazilian children. The findings of Ng'ang'a and Valderhaug *et al.* (1991) in Nairobi. Found healthy oral hygiene practices irrespective of socioeconomic status. A study conducted by Jianghong Gao revealed that Frequent tooth brushing was strongly associated with lower DMFT scores in children. It was also suggested that tooth brushing should be encouraged to the children (Jianghong Gao, 2014).

### Rinsing

The use of rinsing was not popular amongst the school children. Many of them did not even know the rinsing. This is a reflection of the low dental awareness exhibited by the preponderant majority of students. In our study, school going children who do one time brush and no rinse at night, according to OHI scale it was found that had poor oral hygiene

according to Oral Health Index Scale grade. This study was similar to study of Jeboda SO in Nigerians. (Jeboda, 2008)

The factors, such as high OHIS scores, poor oral hygiene status was the strong risk indicators for identifying school children susceptible to caries. In the present study, the poor oral health status was found to be higher among the children in whom tooth brushing was once time in day and the good oral health status was found to be higher among the children who were brushed twice daily than among the children in whom brushing was done once daily. These findings are in conformity with the results of studies conducted by Mazhari *et al.* (2007). A study conducted by Amalia *et al.* in Indonesia revealed that 91.3% children brushed their teeth more than 2 times a day. (Amalia, 2011) Oral health is the mirror to general well being of an individual. Maintenance of oral hygiene forms a small yet considerably significant part in everyday life. Effective oral hygiene is actually the only efficient method to prevent caries and periodontal diseases. Thus the knowledge about basic oral hygiene measures is a must for every professional other than dentists. The school provides an ideal setting for promoting oral health and teachers form the major work force for the country in instilling good oral health behavior among children.

### Conclusion and Recommendation

The results of the study revealed that tooth brushing once daily was the most common practice among the children. A low number of participants school children reported that they brushed their teeth at least twice daily. The results of the present study support the need to develop a balanced oral health system, which will improve oral health outcomes. For improvement Oral hygiene among school children regular tooth brushing and rinsing habit is important factors. Motivation to apply instructions given on oral health care and regular reinforcement are essential. For school children who are old enough to be responsible for their own tooth brushing, health behaviour change theory addresses how to change abehaviour like tooth brushing frequency. Regular tooth brushing and rinsing prevents tooth decay. Oral health education to improve oral health status and to increase the frequency of tooth brushing and rinsing should be undertaken in the schools. The dental profession has the responsibility of not only educating the children on good oral hygiene measures but motivating them to apply the advice given.

Motivation involves an explanation of the advantages of taking professional advice as well as the disadvantages of ignoring them. Oral health care instructions accompanied with practical demonstrations may be more meaningful to school children. Involvement of school teachers in oral health education and inclusion of instructions on oral health care in the curriculum of schools may also be beneficial. Unlike the dental practitioner who visits occasionally, teachers are always on ground with the children. Their involvement in administering oral hygiene instructions may therefore make more impact through reinforcement. Traditionally, teachers carry out inspections of children's fingernails, clothing, hair, etc. There may be a need to also check on the oral hygiene of school children. Parents might encourage their children to brush more frequently. This encouragement might strengthen the children's intentions to brush twice a day.

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