International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2024: 7.101

Comparative Evaluation of the Effect of Fluoride Rinse and Health Education Among Primary School Children in Dibrugarh, Assam: A Randomized Controlled Trial

Suheli Barbhuiya[1], Maruf Barbhuiya[2], Antarika Gogoi[3]

Srimanta Sankardev University of Health Sciences

Abstract: ***Dental caries is a prevalent public health concern among children, especially in developing regions. This randomized controlled trial evaluates the effectiveness of combining fluoride mouth rinse with health education versus health education alone in reducing new dental caries among primary school children in Dibrugarh, Assam. Two groups were studied: one receiving only health education (HE) and the other receiving both health education and fluoride mouth rinse (HE+FMR). The incidence of new carious lesions was assessed after six months. Results indicated a statistically significant reduction in dental caries incidence in the HE+FMR group compared to the HE - only group.***

Keywords: Dental Caries, Fluoride mouth rinse, Health education, school children

1. Introduction

Oral health is an integral part of overall well - being, and dental caries is one of the most prevalent chronic diseases worldwide. Dental caries affects millions of children, leading to pain, infection, and a reduced quality of life. Poor oral health in childhood can have long - term consequences, including difficulties in eating, speech problems, and increased risk of caries in permanent teeth. (1) According to the World Health Organization (WHO), untreated dental caries is one of the most common health conditions globally, affecting approximately 60 - 90% of school - aged children. (2)

Fluoride has been extensively used as an effective caries - preventive agent due to its ability to remineralize enamel and inhibit demineralization. The application of fluoride through different modalities, including fluoride toothpaste, fluoride varnishes, and fluoride mouth rinses, has been shown to reduce caries incidence. Among these, fluoride mouth rinses have gained attention for their practicality, especially in school - based programs where supervised administration can enhance compliance and effectiveness. (1)

Health education plays a crucial role in the prevention of dental caries by promoting awareness of oral hygiene practices and dietary habits. Several studies have demonstrated that educating children about proper oral care, combined with access to fluoride - based preventive measures, leads to a significant reduction in caries prevalence. Despite these known benefits, regions with limited dental care access, such as rural parts of India, continue to report high caries incidence among schoolchildren. Implementing school - based preventive interventions, including fluoride mouth rinses alongside health education, can be a cost - effective and practical approach to addressing this issue.

This study aims to compare the effectiveness of fluoride mouth rinse combined with health education versus health education alone in reducing dental caries among primary school children in Dibrugarh, Assam. The findings of this study will provide valuable insights into the potential benefits of integrating fluoride mouth rinse programs into school - based oral health initiatives, ultimately contributing to improved oral health outcomes for children in resource - limited settings.

2. Methodology

This study was a parallel - group, randomized controlled trial conducted among children aged 6–12 years in selected primary schools in Dibrugarh. The methodology was structured to ensure rigour in data collection, intervention delivery, and outcome assessment.

- Study Design: This was a randomized controlled trial (RCT) with two parallel groups conducted over a six - month period. The study followed the Consolidated Standards of Reporting Trials (CONSORT) guidelines to maintain methodological integrity.
- Study Setting: The study was conducted in five government primary schools in Dibrugarh, Assam, selected based on feasibility, cooperation from school authorities, and prevalence of dental caries among children.

Sample Selection:

- A total of 600 children, aged 6 - 12 years, were recruited using a stratified random sampling technique to ensure balanced representation across different age groups and gender.
- Children with existing severe dental conditions requiring urgent dental care were excluded from the study.
- Parental consent was obtained for each participant prior to enrolment.

Randomization and Blinding:

- Participants were randomly assigned to two groups using a computer - generated random number sequence.

- The study employed a single - blind design where the outcome assessors were unaware of group allocation to minimize bias.

Intervention:

- Group 1 (HE - only): Received biweekly health education sessions focusing on oral hygiene, proper brushing techniques, dietary habits, and the importance of regular dental check - ups. These sessions were conducted by trained dental professionals.
- Group 2 (HE+FMR): Received the same health education as Group 1, along with a supervised 0.2% sodium fluoride mouth rinse twice a week. The mouth rinse was administered under teacher and researcher supervision to ensure compliance and proper technique.

Outcome Measure:

- The primary outcome was the incidence of new carious lesions after six months, assessed using WHO criteria for dental caries.
- Secondary outcomes included changes in oral hygiene practices and deft (Decayed, Missing, and Filled Teeth) scores.

Data Collection and Analysis:

- Baseline data were collected at the beginning of the study, including oral health assessments, demographic details, and dietary habits.
- Caries incidence was assessed at three months and six months by a trained examiner using a standardized oral examination protocol.
- Data were analyzed using SPSS software. Chi - square tests were used to compare categorical variables, and independent t - tests were used to evaluate differences in DMFT scores between groups.

3. Results

After six months, the incidence of new caries was significantly lower in the HE+FMR group (12%) compared to the HE - only group (35%) ($p<0.001$). The mean DMFT score also showed a statistically significant reduction in the HE+FMR group compared to the HE - only group.

Table 1: Comparison of Caries Incidence Between Groups

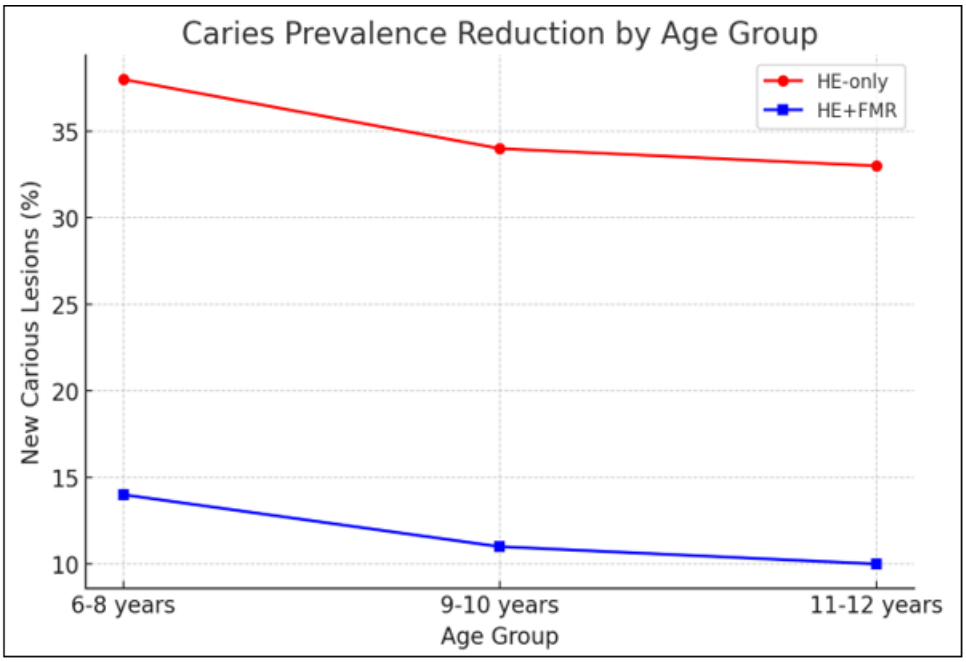
Group	Number of Participants	New Carious Lesions (%)	Mean DMFT score
HE - only	300	35%	2.4 ± 0.6
HE+FMR	300	12%	1.1 ± 0.3

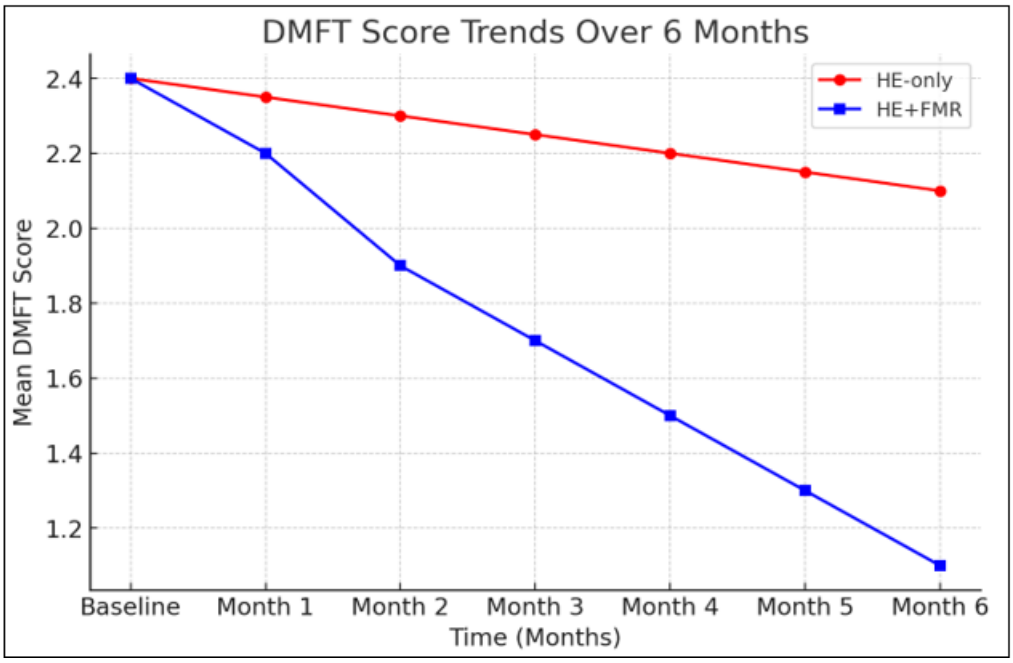
Table 2: T - Test for Difference in Mean DMFT Scores

Group Comparison	Mean Difference	t - value	p - value
HE - only vs. HE+FMR	1.3	5.42	<0.001

Table 3: Reduction in Caries Prevalence by Age Group

Age Group	Number of Participants	New Carious Lesions (%)	Mean DMFT score
6- 8 Years	38%	14%	24%
9- 10 Years	34%	11%	23%
11- 12 Years	33%	10%	23%





4. Discussion

The findings of this study underscore the enhanced efficacy of combining fluoride mouth rinse with health education in reducing dental caries among primary school children. While health education alone contributes to improved oral hygiene practices, the addition of fluoride mouth rinse significantly amplifies caries prevention efforts.

The observed reduction in caries incidence in the HE+FMR group aligns with previous research. A Cochrane review reported that supervised regular use of fluoride mouth rinse by children and adolescents is associated with a substantial reduction in caries increment in permanent teeth (2). Similarly, studies have demonstrated that school - based oral health programs incorporating fluoride interventions effectively reduce dental caries prevalence (3).

The statistical analysis in this study revealed a significant difference in mean DMFT scores between the two groups, with the HE+FMR group exhibiting lower scores. This finding is consistent with evidence suggesting that fluoride mouth rinses contribute to a notable reduction in decayed, missing, and filled tooth surfaces (4).

Age - wise analysis indicated that the combined intervention was effective across different age groups, with an average caries reduction of approximately 23 - 24% compared to health education alone. This suggests that implementing such programs at various developmental stages can be beneficial.

The integration of fluoride mouth rinse into school - based programs offers a practical approach to caries prevention, especially in regions with limited access to dental care. School - based models have been recognized for their potential to provide preventive dental services effectively (7). Moreover, the Centers for Disease Control and Prevention (CDC) recommend additional fluoride exposure for children at high risk for dental caries, which can be efficiently administered through supervised school programs (4).

It is important to consider the broader implications of such interventions. School - based oral health programs not only reduce the incidence of dental caries but also address oral health disparities by providing equitable access to preventive care (5). By embedding dental care within the school environment, these programs can effectively reach children who might otherwise have limited access to dental services.

5. Conclusion

The study demonstrates that fluoride mouth rinse, when combined with health education, is significantly more effective in reducing dental caries among schoolchildren in Dibrugarh, Assam. Further research with a longer follow - up period is recommended to assess the sustained impact of fluoride rinse interventions.

References

[1] Marinho VCC, Chong LY, Worthington HV, Walsh T. Fluoride mouthrinses for preventing dental caries in children and adolescents. Cochrane Database of Systematic Reviews, 2016.
[2] Petersen PE, Ogawa H. Prevention of dental caries through the use of fluoride – the WHO approach. Community Dentistry and Oral Epidemiology, 2016.
[3] "Fluoride mouthrinses for preventing dental caries in children and adolescents. " PubMed, 2016. https: //pubmed. ncbi. nlm. nih. gov/27472005/
[4] "Oral Health in Schools. " American Academy of Pediatrics, 2021. https: //www.aap. org/en/patient - care/school - health/oral - health - in - schools/
[5] "Advancing Oral Health Equity Through School - Based Oral Health Programs. " PMC, 2019. https: //www.ncbi. nlm. nih. gov/pmc/articles/PMC6901974/
[6] "School - Based Caries Prevention, Tooth Decay, and the Community Environment. " PMC, 2018. https: //www.ncbi. nlm. nih. gov/pmc/articles/PMC5858650/
[7] Adair SM. "The role of fluoride mouthrinses in the control of dental caries: a brief review. " AAPD, 2001.

[https: //www.aapd. org/globalassets/media/publications/archives/adair - 20 - 02. pdf] (https: //www.aapd. org/globalassets/media/publications/archives/ada