

Effectiveness of Peer Group and Conventional Method (Dentist) of Oral Health Education Programme Among 12-15 year Old School Children - A Randomized Controlled Trial

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ABSTRACT

Introduction: Oral Health Education (OHE) in schools is routinely delivered by the dentist. Another approach which can be cost-effective, easily accessible and equally effective is the trained group of peer students.

Aim: The objective of the present study was to assess and compare the effectiveness of peer-led and conventional method (dentist-led), OHE on oral health status, oral health knowledge, attitude and practices among 12-15 year old government school children in Bengaluru South Zone-I at baseline, 3 months and 6 months.

Materials and Methods: The study population comprised of 450 subjects, 150 each in peer, dentist and control group. At baseline, a pre-tested 14 item questionnaire was used to assess the existing oral health knowledge, attitude and oral hygiene practices of the subjects. Clinical examination included recording of plaque index and gingival index, by a pre-calibrated examiner.

OHE was provided by the peer group and dentist (using power-point presentation, chalk and talk presentation, using charts, posters, booklets and tooth brushing demonstration models). Data was analyzed using Kruskal Wallis and Chi-square test.

Results: Both the peer-led and dentist-led OHE intervention were effective in improving oral health knowledge, attitude, oral hygiene practices and oral health status at three and six months when compared to control group. The adolescents in the peer-led group, however, exhibited statistically better oral health behavior than their counterparts in the dentist-led group and control group.

Conclusion: The two educator-led strategies (peer group and dentist) had a modest effect on the outcome variables included in the study, the results provide some evidence to show that the peer-led strategy may provide a feasible and almost equally effective alternative to the traditional dentist led strategy of oral health education.

Keywords: Adolescent, Health behavior, Oral education, Oral hygiene

INTRODUCTION

Oral health is important for general health and wellbeing and oral diseases have a considerable impact on individuals, families and the community. Children who suffer from poor oral health are 12 times more likely to have restricted-activity days than those who do not [1,2]. Oral health education, an important part of oral health promotion, has been considered an essential and basic part of dental health services. Oral health education (OHE) provides information, leading to improved awareness, adoption of healthy lifestyle and positive attitude which ultimately has an effect on oral health [3]. Schools can be considered as a healthy atmosphere for promoting children's health, self-esteem and behavioural skills. Schools can also be utilized for teaching preventive dental health practices, as they have shown positive outcomes for improving oral health and knowledge in both developed and developing countries [4-5]. Early adolescence is considered as a socially-critical period in human life, which is important in determining long-term oral health status [6-8].

Peer group students with adequate training from crucial resource persons for providing oral health education in schools, through the ways that health personnel cannot, by engaging the peers, trained peers can communicate with their peers and deliver information effectively and be effective on individuals of their own age as an available model [9-10]. OHE in schools has largely been imparted by dental professionals. But due to the factors like substantial cost, time and availability of dentists, other strategies relying on

peer groups and learners themselves, have also been utilized. As limited literature is available on effectiveness of these strategies, this study aims to compare the effectiveness of peer-led and dentist-led OHE, on oral health knowledge, oral hygiene practices and oral health status of government school children aged 12-15 years in Bangalore South Zone-I.

MATERIALS AND METHODS

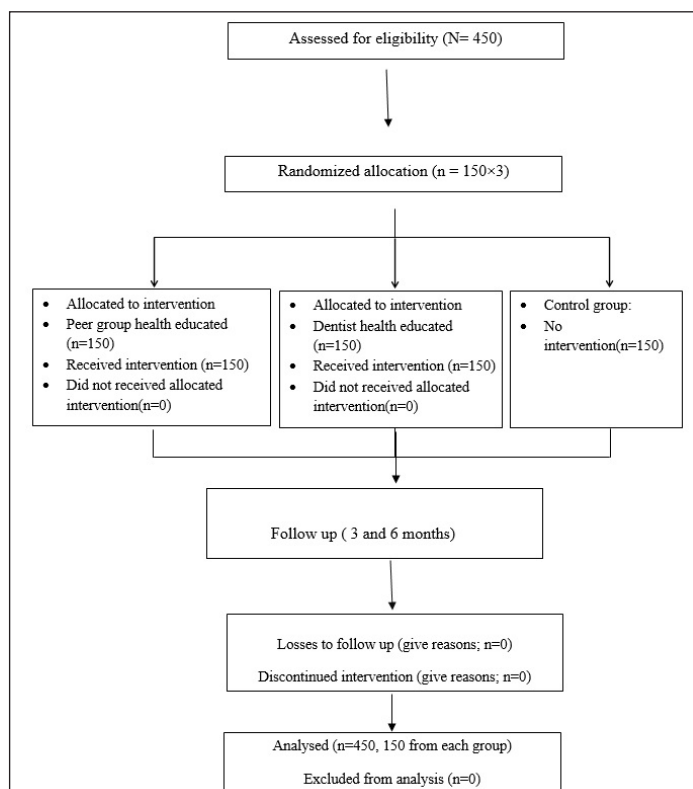
A single blind randomized controlled trial was conducted to compare the effectiveness of peer group and conventional method (dentist) of OHE. Two stage random sampling method was used for sampling; three Government High Schools of South Zone-I of Bengaluru city were taken as the place of study.

Study population and sample size: Data was collected from 450 school children of 12-15 years age group from three randomly selected Government schools in South Zone-I, Bengaluru, Karnataka. Only government schools were considered as permission for all South Zone-I schools was obtained from block education officer and required sample was obtained from three randomized schools and also it was seen that OHE programmes were seldom seen in the government schools.

Data was collected over six months from September 2013 to February 2014 among 12-15 year old government school children of Bengaluru South Zone-I [Table/Fig-1]. Ethical clearance was taken from institutional ethical review committee V. S. Dental College and Hospital, Bengaluru, Karnataka, and informed

consent was taken from principals and parents or care taker of each student participated in study.

Total 450 children (150 in each group i.e. dentist, peer and control group) were taken using formula $(z^2pq)/\Delta^2$ with $z = 1.96$ (from standard normal distribution) $p = 0.89$ (p =prevalence taken as 89 percent), $q = 1 - p = 0.11$, $\Delta = 0.05$ (5 percent margin of error).



[Table/Fig-1]: Showing allocation of study participants according to CONSORT 2010.

Inclusion criteria were children within the age group 12-15 years, children who obtained consent from their parents/guardian to participate in the study and children present on the day of examination. Exclusion criteria were physically and mentally challenged children, children with systemic disease and children undergoing orthodontic treatment. Before the start of the study, the examiner was trained and calibrated to ensure uniform interpretation for various oral health related conditions to be observed and recorded (Kappa Value, = 0.80). The pilot study was carried out with a sample of 30 children ranging in age from 12-

15 years to know the feasibility, for training and calibration of the examiner and to assess for the reliability of questions.

A structured questionnaire was constructed and content validity was done by three subject experts to assess the oral health knowledge, attitude and practices. A 14 item questionnaire was first prepared in English script and then translated into Kannada script (local language). The questionnaire was divided in three sections as knowledge, practice and attitude to assess the effectiveness of OHE.

Study tool: It was divided into two parts. Part one consisted of structured interview which recorded demographic data and 14 item questionnaire to assess oral health knowledge, practice and attitudes of students [Table/Fig-2]. Clinical assessment was done by Plaque Index (PI) (Sillness And Loe 1964) and Gingival Index (GI) (Loe And Sillness 1963). Part two consisted of delivering the health education to all three groups and using the above tools used, to assess the effectiveness of health education program at baseline, 3 months and 6 months.

Oral Health Education: For peer group health education, from the total of 150 children, five peer groups were chosen, each group consisting of five children. The dentist provided health education to peer group by chalk and talk method, power point presentations, models and charts so that it could make sessions more interactive. The duration of session for each peer group was 20 minutes. The peers were given health education thrice weekly before they could give it to the entire class room. For the conventional method (dentist) 150 students were chosen and health education was given by dentist for 20 min by using aids same as for peer group. For the school chosen as control group no health education was provided.

STATISTICAL ANALYSIS

Data obtained from questionnaires and clinical examinations was analyzed by the SPSS software version 19.0. The changes in

| Mean Gingival Index Scores | Peer group | Dentist group | Control group | p-value |
|----------------------------|------------|---------------|---------------|---------|
| | M (S.D.) | M (S.D.) | M (S.D.) | |
| Baseline | 0.90 (.55) | 0.86 (.54) | 0.85 (.52) | 0.71 |
| 3 months | 0.84 (.48) | 0.85 (.54) | 0.84 (.52) | 0.12 |
| 6 months | 0.68 (.42) | 0.70 (.44) | 1.41 (.72) | 0.001* |

[Table/Fig-3]: Comparison of mean gingival index scores between the three study groups at baseline, 3 month and 6 month.
*Kruskall wallis ($p < 0.05$)

| Knowledge and Practice Questions | A | B | C | D | |
|---|--------------------------|---------------------------|----------------------|-----------------------------|-------------------|
| K1 - How many times should we brush in a day? | Once | Twice | Thrice | Four times | |
| K2 - What should we use to clean our teeth? | Toothbrush and paste | Finger | Neem stick | Toothbrush and tooth powder | |
| K3 - How often should we change toothbrush? | Less than 3 months | 3-4 months | 6-8 months | When bristles fray | |
| K4 - How long should we brush our teeth? | Less than 1 minute | 2-3 min | 3-5 min | More than 5 min | |
| K5 - Which are the common causes of tooth decay? | Irregular tooth brushing | Acid produced by bacteria | Eating excess sugars | All of above | |
| P1 - How many times do you brush teeth in a day? | Once | Twice | Thrice | Four times | |
| P2 - What do you use to clean your teeth? | Toothbrush | Finger | Toothpowder | Others | |
| P3 - How long do you brush your teeth? | Less than 1 minute | 2-3 min | 3-5 min | More than 5 min | |
| P4 - How often you eat chocolates and biscuits? | Several times a day | Daily | 2-4 times a week | Once a week | |
| P5 - How often you have soft drinks? | Several times a day | Daily | 2-4 times a week | Once a week | |
| Attitude questions | A | B | C | D | E |
| A1 - Brushing teeth can prevent tooth decay and gum disease | strongly agree | agree | uncertain | disagree | strongly disagree |
| A2 - Rinsing mouth after eating is necessary | | | | | |
| A3 - Often miss school due to dental pain | | | | | |
| A4 - Regular visits to dentists is necessary | | | | | |

[Table/Fig-2]: 14 -item questionnaire of knowledge, practice and attitude.

plaque and gingival scores at all intervals were analyzed through Kruskal Wallis test. Differences in proportions for knowledge, attitude and practices scores of questionnaire were compared using the Chi square test. A difference was considered to be of statistical significance if the p-value was <0.05.

RESULTS

The present study was conducted to compare the effectiveness of peer-led and dentist-led OHE. A total of 450 children completed the study. In peer group majority 57.3% were females. In dentist group and control group males were in majority with 53.3% and 50.4% respectively. The mean age group among peer, dentist and control group was 13.2±1.03, 13.4±1.04 and 13.8±0.93 respectively.

Mean Gingival and Plaque Index Scores (GI and PI): The mean gingival index scores reduced in both peer and dentist groups after six months of intervention which was statistically significant with p-value <=0.001 [Table/Fig-3]. When compared to baseline mean plaque index scores between peer and dentist group decreased at 3 months and 6 months of intervention which was statistically significant with p-value <0.006 and p-value <0.001 [Table/Fig-4].

Effectiveness on Knowledge aspects of oral health: Regarding the knowledge on frequency and material, the knowledge of both study groups (peer and dentist) had not increased from baseline to six months. Knowledge regarding the time for changing toothbrush and time taken for brushing had considerably increased in both study groups, from baseline to six months when compared to control group which was statistically significant with p-value <0.001. The knowledge regarding the common cause of tooth decay had increased in both peer group and dentist group at six month with greater percentage of students answering irregular tooth brushing p-value <0.001 [Table/Fig-5].

Effectiveness on Practice aspects of oral health: The practice regarding the frequency of brushing, time and material used had increased at six months in both peer group and dentist

| Mean Plaque Index Scores | Peer group | Dentist group | Control group | p-value |
|--------------------------|------------|---------------|---------------|---------|
| | M (S.D) | M (S.D) | M (S.D) | |
| Baseline | 1.49 (.76) | 1.5 (.72) | 1.4 (.73) | 0.45 |
| 3 month | 1.33 (.69) | 1.57 (.65) | 1.42 (.69) | 0.006* |
| 6 month | 1.26 (.65) | 1.56 (.67) | 1.41 (.72) | 0.001* |

[Table/Fig-4]: Comparison of mean plaque index scores between the three study groups at baseline, 3 month and 6 month.*Kruskal Wallis (p<0.05).

| Q | A % | B % | C % | D % | Chi-square | p-value | | | | | | | | | |
|-----|-----|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|---------------------|
| QK1 | P | 35.3 ^a | 30.6 ^b | 32.6 ^c | 31.3 ^a | 39.3 ^b | 41.3 ^c | 18.7 ^a | 16.7 ^b | 15.4 ^c | 14.7 ^a | 13.4 ^b | 10.7 ^c | 2.295 ^a | 0.89 ^a |
| | D | 29.3 ^a | 31.3 ^b | 32.6 ^c | 36 ^a | 39.3 ^b | 38 ^c | 20 ^a | 16.7 ^b | 16.7 ^c | 14.7 ^a | 12.6 ^b | 12.7 ^c | 2.178 ^b | 0.903 ^b |
| | C | 36.7 ^a | 31.3 ^b | 29.3 ^c | 30.6 ^a | 33.3 ^b | 32 ^c | 18 ^a | 18.7 ^b | 24 ^c | 15 ^a | 17.7 ^b | 14.6 ^c | 6.608 ^c | 0.359 ^c |
| QK2 | P | 54 ^a | 54 ^b | 57.3 ^c | 16.7 ^a | 16.7 ^b | 16 ^c | 7.3 ^a | 7.3 ^b | 8.7 ^c | 22 ^a | 22 ^b | 18 ^c | 3.329 ^a | 0.767 ^a |
| | D | 55.3 ^a | 55.3 ^b | 53.3 ^c | 24 ^a | 15.3 ^b | 18 ^c | 8.6 ^a | 5.3 ^b | 6.7 ^c | 18 ^a | 24 ^b | 22 ^c | 2.332 ^b | 0.887 ^b |
| | C | 52.6 ^a | 52.6 ^b | 46 ^c | 18.7 ^a | 18.7 ^b | 27.3 ^c | 8.7 ^a | 8.7 ^b | 8.7 ^c | 203 ^a | 20 ^b | 18 ^c | 9.598 ^c | 0.143 ^c |
| QK3 | P | 29.3 ^a | 20 ^b | 20.7 ^c | 17.3 ^a | 9.3 ^b | 10.6 ^c | 40.7 ^a | 27.3 ^b | 28 ^c | 14.6 ^a | 43.3 ^b | 40.7 ^c | 4.326 ^a | 0.821 ^a |
| | D | 26 ^a | 22 ^b | 25.3 ^c | 22.6 ^a | 11.3 ^b | 10.7 ^c | 39.3 ^a | 26 ^b | 24 ^c | 12 ^a | 40.7 ^b | 40 ^c | 37.3 ^b | 0.001 ^{b*} |
| | C | 26.7 ^a | 25.3 ^b | 28 ^c | 20.7 ^a | 16 ^b | 19.3 ^c | 38 ^a | 43.3 ^b | 40 ^c | 14.6 ^a | 15.4 ^b | 12.7 ^c | 41.99 ^c | 0.001 ^{c*} |
| QK4 | P | 9.3 ^a | 5.3 ^b | 5.3 ^c | 8.7 ^a | 62 ^b | 61.3 ^c | 37.3 ^a | 16.7 ^b | 17.4 ^c | 44.7 ^a | 16 ^b | 16 ^c | 5.01 ^a | 0.542 ^a |
| | D | 15.3 ^a | 4.7 ^b | 7.4 ^c | 12.7 ^a | 60 ^b | 58 ^c | 36 ^a | 16.7 ^b | 16 ^c | 36 ^a | 18.6 ^b | 18.6 ^c | 108.9 ^b | 0.001 ^{b*} |
| | C | 11.3 ^a | 13.3 ^b | 16 ^c | 12 ^a | 9.3 ^b | 10.6 ^c | 36 ^a | 38 ^b | 37.3 ^c | 40.7 ^a | 39.4 ^b | 39.4 ^c | 105.5 ^c | 0.001 ^{c*} |
| QK5 | P | 35.3 ^a | 82.7 ^b | 78.7 ^c | 33.3 ^a | 10 ^b | 12.7 ^c | 18 ^a | 4 ^b | 4.7 ^c | 13.3 ^a | 3.3 ^b | 16 ^c | 2.64 ^a | 0.85 ^a |
| | D | 28.7 ^a | 80.7 ^b | 77.3 ^c | 38 ^a | 10 ^b | 13.4 ^c | 16 ^a | 6 ^b | 6 ^c | 17.3 ^a | 3.3 ^b | 18.6 ^c | 58.7 ^b | 0.001 ^{b*} |
| | C | 30.6 ^a | 78.7 ^b | 44 ^c | 36.7 ^a | 22.7 ^b | 28 ^c | 18 ^a | 19.4 ^b | 18 ^c | 14.7 ^a | 10.6 ^b | 36 ^c | 53.8 ^c | 0.001 ^{c*} |

[Table/Fig-5]: Responses obtained for the Knowledge questions.

QK1-QK5- Knowledge questions, P, D, C – peer, dentist and control groups

A,B,C,D%- Options for the knowledge questions, a-baseline, b- 3 month, c- 6 month

* denotes significance (chi-square test p<0.05).

group. Of the total 76%, 70%, 77.3% in peer group and 65.3%, 56%, 66% in dentist group practiced once brushing, for more than 5 min, with brush, which was statistically significant (p-value 0.001). Regarding the practice of eating chocolates, biscuits and consuming soft drinks; the consumption had decreased from daily at baseline to never in peer group and 2- 4 times in dentist group when compared to control group [Table/Fig-6].

Effectiveness on Attitude aspects of oral health: Attitudes regarding “Brushing teeth can prevent tooth decay and gum disease” and “Rinsing mouth after eating is necessary”; was increased from disagree to agree in both study groups and control group, which was statistically significant with p-value <0.003 and p-value <0.001 respectively. Attitudes regarding the question “often miss school due to dental pain”, did not change, most of them still disagreed with the statement, which was statistically significant (p-value <0.001). Regarding the question “regular visits to dentists is necessary”, there was an improvement in attitude among both peer and dentist group at six months with 26.7% and 37.4 % agreeing with the statement [Table/Fig-7].

DISCUSSION

The present study was conducted to compare the effectiveness of peer-led and dentist-led OHE. Schools can be an efficient and effective way to reach children worldwide and through them, their families and community members [6-7]. In the present study 12-15 year old school children were taken as study population as this age is especially important as it is generally the age at which children leave primary school. Hence it is the last age at which reliable sample can be obtained from schools in many countries. Also, it is likely that by this age all the permanent teeth except the third molars will have erupted. Therefore age 12 years is a global indicator for surveillance and comparisons of disease trends at international level [11].

Regarding oral health knowledge, practice and attitude: It was seen that greater percentage of questions were answered correctly at 3 and 6 months when compared to baseline in both the study groups (peer and dentist) as well as the control group. In the present study the students’ knowledge regarding twice brushing and changing of brush when bristles fray, role of harmful diet in dental caries was significantly increased from baseline to 6 month after health education intervention in both peer and dentist groups. The findings of the present study were in accordance with study conducted by Goel et al., in Delhi among 10-13 year old children and with D Cruz et al., among 13-15 year old children

| Q | | A % | | | B % | | | C % | | | D % | | | χ^2 | p-value |
|-----|---|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------|---------------------|
| QP1 | D | 76 ^a | 43.3 ^b | 46.7 ^c | 17 ^a | 54.7 ^b | 51.3 ^c | 2.7 ^a | 0.7 ^b | 0.7 ^c | 4 ^a | 1.3 ^b | 1.3 ^c | 1.236 ^a | 0.539 ^a |
| | P | 65.3 ^a | 44.7 ^b | 44 ^c | 18 ^a | 50 ^b | 48 ^c | 10 ^a | 4 ^b | 6.7 ^c | 6 ^a | 1.3 ^b | 1.3 ^c | 48.59 ^b | 0.001 ^{b*} |
| | C | 72 ^a | 67.3 ^b | 65 ^c | 22 ^a | 20.7 ^b | 21.3 ^c | 2 ^a | 6 ^b | 7.3 ^c | 4 ^a | 6 ^b | 6 ^c | 43.77 ^c | 0.001 ^{c*} |
| QP2 | D | 77.3 ^a | 80 ^b | 82 ^c | 6 ^a | 6 ^b | 4 ^c | 6.7 ^a | 14 ^b | 14 ^c | 0 ^a | 0 ^b | 0 ^c | 5.505 ^a | 0.064 ^a |
| | P | 66 ^a | 76.7 ^b | 72.7 ^c | 12.3 ^a | 8 ^b | 12 ^c | 11.3 ^a | 15.3 ^b | 15.3 ^c | 10 ^a | 0 ^b | 0 ^c | 26.744 ^b | 0.001 ^b |
| | C | 67.3 ^a | 65.3 ^b | 64.7 ^c | 12 ^a | 10 ^b | 10.7 ^c | 15.3 ^a | 16.7 ^b | 11.3 ^c | 5.3 ^a | 7.3 ^b | 13.3 ^c | 50.20 ^c | 0.001 ^c |
| QP3 | D | 0 ^a | 0 ^b | 0 ^c | 0 ^a | 48 ^b | 40.7 ^c | 30 ^a | 16 ^b | 16 ^c | 70 ^a | 36 ^b | 43.3 ^c | 11.126 ^a | 0.004 ^{a*} |
| | P | 7.3 ^a | 3.3 ^b | 3.3 ^c | 7.3 ^a | 45.3 ^b | 43.3 ^c | 29.3 ^a | 16 ^b | 18.7 ^c | 56 ^a | 35.3 ^b | 34.7 ^c | 94.534 ^b | 0.001 ^{b*} |
| | C | 3.3 ^a | 4 ^b | 8 ^c | 4 ^a | 2.7 ^b | 6 ^c | 34 ^a | 35.3 ^b | 32 ^c | 58.7 ^a | 58 ^b | 54 ^c | 72.51 ^c | 0.001 ^{c*} |
| QP4 | D | 16 ^a | 12.7 ^b | 7.3 ^c | 62.7 ^a | 33.3 ^b | 31.3 ^c | 2 ^a | 1.3 ^b | 13.3 ^c | 0.7 ^a | 0.7 ^b | 0.7 ^c | 7.919 ^a | 0.441 ^a |
| | P | 18.7 ^a | 15.3 ^b | 15.3 ^c | 59.3 ^a | 31.2 ^b | 30.7 ^c | 4 ^a | 1.3 ^b | 1.3 ^c | 0.7 ^a | 0.7 ^b | 0.7 ^c | 8.022 ^b | 0.43 ^b |
| | C | 10.7 ^a | 13.3 ^b | 15.3 ^c | 60.7 ^a | 22.7 ^b | 19.3 ^c | 5.3 ^a | 4 ^b | 8 ^c | 2 ^a | 0.7 ^b | 0.7 ^c | 25.695 ^c | 0.001 ^{c*} |
| QP5 | D | 0 ^a | 0 ^b | 0 ^c | 0 ^a | 0 ^b | 0 ^c | 22.7 ^a | 20 ^b | 14 ^c | 40 ^a | 36.7 ^b | 44 ^c | 35.028 ^a | 0.001 ^{a*} |
| | P | 8.7 ^a | 0 ^b | 0 ^c | 7.3 ^a | 0 ^b | 0 ^c | 22 ^a | 23.3 ^b | 23.3 ^c | 32 ^a | 36.7 ^b | 36 ^c | 34.39 ^b | 0.001 ^{b*} |
| | C | 1.7 ^a | 6 ^b | 7 ^c | 4.7 ^a | 4.7 ^b | 7.3 ^c | 14 ^a | 16.7 ^b | 19.3 ^c | 42 ^a | 35.3 ^b | 35.3 ^c | 50.437 ^c | 0.001 ^{c*} |

[Table/Fig-6]: Responses obtained for the Practice questions.

QP1-QP5- Practice questions, P, D, C - peer, dentist and control groups
 A,B,C,D%- Options for the knowledge questions, a-baseline, b- 3month, c- 6 month
 * denotes significance (chi-square test p<0.05).

| Q | | A % | | | B % | | | C % | | | D % | | | E % | | | χ^2 | p-value |
|-----|---|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|----------------------|
| QA1 | D | 11.3 ^a | 6 ^b | 19.3 ^c | 14 ^a | 50.7 ^b | 44 ^c | 22 ^a | 14.7 ^b | 14.7 ^c | 33.3 ^a | 18 ^b | 13.3 ^c | 19.3 ^a | 10.7 ^b | 8.7 ^c | 8.214 ^a | 0.413 ^a |
| | P | 18.7 ^a | 8 ^b | 11.3 ^c | 19.3 ^a | 51.3 ^b | 48 ^c | 22 ^a | 14 ^b | 14 ^c | 25.3 ^a | 17.3 ^b | 17.3 ^c | 14.7 ^a | 9.3 ^b | 9.3 ^c | 32.27 ^b | 0.01 ^b |
| | C | 17.3 ^a | 17.3 ^b | 19.3 ^c | 16.7 ^a | 15.3 ^b | 16 ^c | 23.3 ^a | 4.7 ^b | 23.3 ^c | 26.7 ^a | 26.7 ^b | 26.7 ^c | 16 ^a | 16 ^b | 14.7 ^c | 26.99 ^c | 0.003 ^{c*} |
| QA2 | D | 11.3 ^a | 6 ^b | 19.3 ^c | 14 ^a | 50.7 ^b | 44 ^c | 22 ^a | 14.7 ^b | 14.7 ^c | 33 ^a | 18 ^b | 13.3 ^c | 19.3 ^a | 10.7 ^b | 8.7 ^c | 7.328 ^a | 0.511 ^a |
| | P | 18.7 ^a | 8 ^b | 11.3 ^c | 19.3 ^a | 51.3 ^b | 48 ^c | 22 ^a | 14 ^b | 14 ^c | 25 ^a | 17.3 ^b | 17.3 ^c | 14.7 ^a | 9.3 ^b | 9.3 ^c | 56.11 ^b | 0.001 ^b |
| | C | 17.3 ^a | 17 ^b | 19.3 ^c | 16.7 ^a | 15.3 ^b | 16 ^c | 23 ^a | 4.7 ^b | 23.3 ^c | 26.7 ^a | 26.7 ^b | 26.7 ^c | 16 ^a | 16 ^b | 14.7 ^c | 44.19 ^c | 0.001 ^c |
| QA3 | D | 10 ^a | 13.3 ^b | 10.7 ^c | 11.3 ^a | 10 ^b | 13.3 ^c | 15.3 ^a | 12 ^b | 18 ^c | 39.3 ^a | 42 ^b | 41.3 ^c | 24 ^a | 22 ^b | 16 ^c | 14.4 ^a | 0.071 ^a |
| | P | 10.7 ^a | 14.7 ^b | 18 ^c | 20 ^a | 11.3 ^b | 11.3 ^c | 24.7 ^a | 13.3 ^b | 12 ^c | 29.3 ^a | 38 ^b | 38 ^c | 15 ^a | 22 ^b | 20 ^c | 10 ^b | 0.265 ^{b*} |
| | C | 10 ^a | 12 ^b | 10.7 ^c | 16.7 ^a | 14.7 ^b | 14 ^c | 23.3 ^a | 22.7 ^b | 28 ^c | 36 ^a | 35.3 ^b | 32 ^c | 14 ^a | 15.3 ^b | 15.3 ^c | 18.6 ^c | 0.045 ^{c*} |
| QA4 | D | 6.7 ^a | 2.7 ^b | 6 ^c | 24.7 ^a | 36.7 ^b | 26.7 ^c | 19.3 ^a | 17.3 ^b | 27.3 ^c | 39.3 ^a | 36 ^b | 26 ^c | 10 ^a | 7.3 ^b | 7.3 ^c | 19.6 ^a | 0.142 ^a |
| | P | 6 ^a | 28 ^b | 12.6 ^c | 24.7 ^a | 26.6 ^b | 37.4 ^c | 12 ^a | 16.7 ^b | 16.7 ^c | 40.7 ^a | 21.4 ^b | 26.7 ^c | 14.7 ^a | 7.3 ^b | 6.7 ^c | 64.79 ^b | 0.00 ^{b*} |
| | C | 2.7 ^a | 6 ^b | 7.3 ^c | 20.7 ^a | 24.0 ^b | 26.7 ^c | 21.3 ^a | 16.7 ^b | 15.3 ^c | 31.3 ^a | 38.7 ^b | 34 ^c | 22 ^a | 14.7 ^b | 14.7 ^c | 25.36 ^c | 0.0013 ^{c*} |

[Table/Fig-7]: Responses obtained for the Attitude questions.

QP1-QP5- Attitude questions, P, D, C - peer, dentist and control groups
 A,B,C,D%- Options for the knowledge questions, a-baseline, b- 3month, c- 6 month
 * denotes significance (chi-square test p<0.05).

in Bangalore using interventions like power point and professional instructions found significant increase in oral hygiene knowledge after nine months post-intervention [12,13]. In the current study a gradual improvement in the oral hygiene practices was observed over a period of six months after providing OHE through dentist and peer-led groups.

The present study revealed that about half of adolescents performed the recommended practice of brushing teeth twice and also the use of toothbrush when compared to control group at 3 month and 6 month among peer and dentist group which was statistically significant (p<0.001). The findings of the present study are in accordance with Ling Zhu et al., who conducted a study in China and Brazil, found that the pattern of oral health practices had improved after health education [14]. According Mallenby et al., the peer-led strategy was more effective than the adult-led strategy in improving health related behaviour, this was substantiated by the findings of the present study [15]. The attitude of children regarding the role of brushing and mouth rinsing in prevention of dental caries and periodontal diseases was improved in 3 month and 6 month (p<0.001) among peer and dentist led health education groups indicating a positive attitude in maintaining good oral health. The findings are in accordance with Ling Zhu et al., where positive attitude to prevention of dental caries and periodontal diseases was seen in Chinese adolescent students [14]. Regarding the attitudes to visit dentist, majority of children 70% in both study

groups strongly agreed that regular visits to dentist is necessary but the difference was not statistically significant when compared to baseline. The finding is in accordance with Redmond A et al., who found limited improvements in attitudes regarding visits to dentist among adolescents [16].

Regarding Oral health status: The present study showed a mean reduction of plaque and gingival scores at 3 and 6 month after educational intervention in peer and dentist group. The current study showed that the oral hygiene status of the study subjects in dentist-led, peer-led groups was significantly better than that of control group at the final assessment. The findings are in agreement with Adul Haleem et al., who found an improved oral hygiene status after health education by peers and dentist [17]. Factors contributing to reduction in plaque levels may include change of tooth brushing frequency, adoption of appropriate tooth brushing technique, change of dietary habits after health education. Other studies found similar results of significant reduction in mean plaque levels of school children after short education programme as in accordance with present study [18-20].

The peer-led education was also slightly better in improving the knowledge, attitude and practices when compared to dentist group. This could be attributed to the reason that information is imbibed better when the approach is friendly as in peer group [21-23]. There is no white collar apprehension in a peer group. Installation of thought process is constant, as quality time spent is

more among peer group and also students might be following the oral hygiene practices due to peer pressure [24].

LIMITATION

The limitations of present study are the schools used in the present study may not be representative of all the schools as only government schools were considered. Though the presentations were standardized, environmental factors such as communication barriers, efficiency of educators could have added a modifying effect on the health educational intervention.

CONCLUSION

It can be concluded from present study that both the educational interventions, peer group and dentist-led education were equally effective in improvement of oral health knowledge, practices and oral health status with peer group slightly better in improving knowledge and behaviour. Reduction in mean plaque and gingival score was seen in both peer and dentist-led health education groups. Hence the peer group approach of health education can be a feasible and equally effective alternative to traditional methods of dental health education.

Implementing an easy-to-organize and economical school-based educational intervention can improve oral cleanliness and gingival health among school children, especially in countries with a developing oral health care system.

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