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Original Article

Dentistry Section

# Effectiveness of Outreach Program: A Three Year Follow-Up Study Among 12 Years School Students in Lucknow

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## ABSTRACT

**Aim:** To assess the effectiveness of outreach program in the 12 years school going children during a three year follow up period of Lucknow city.

**Materials and Methods:** A random sample of 298 school going children of age 12 years was drawn from adopted schools of Lucknow. Three years later the same population was re-examined with a population of 242 children of 15 y age group. The oral health status of these children was accessed by using WHO 1997 profoma.

**Results:** Significantly ($p<0.001$) higher proportion of children had healthy gingival, healthy periodontal status after three years. The difference in regard to crowding in the incisal segment in 2010 and 2013 was statistically highly significant ($p<0.001$).

**Conclusion:** The findings of the study showed that after providing regular dental check up and treatment camps in the three adopted schools after three year follow up study from 2010-2013 showed positive impact on the children oral hygiene status and has been estimated to be on the more positive aspect in future also.


**Keywords:** Dental caries, Periodontium, School students, Unreached community

## INTRODUCTION

Disparities in accessibilty to oral health is prevalent in our country as about 80% of dentist work in urban areas in India, compared with the rural areas where more than 70% of the Indian population reside [1].

School going children are the future of India. Irony to this in our country about 50% of schoolchildren are suffering from dental caries and more than 90% of adults are having some degree of periodontal diseases [2].

Provision of dental care for the underserved segments of the population, continues to be a subject of considerable interest to dentistry and social welfare advocates [3]. School remain always an important setting for outreach programmes, offering an efficient and effective way to reach over children and through them, families and community members [4].

Delivering dental treatments to the unreached community can be through organized dental health camps especially in the rural areas, which can be accessed through mobile dental vans [5].

Hence, the present study has been undertaken to assess the effectiveness of outreach program in the school going children during a three year follow up period of Lucknow city.

## MATERIALS AND METHODS

A prospective study was designed to evaluate the impact of outreach program on oral health status of school going children of 12 y of Lucknow for three year period. The school children of age 12 y were taken in 2010 and the same children were followed after three years when they were of 15 y in 2013.

Subjects aged 12 y in 2010 and whose parents have given voluntarily consent for examination were included for the study whereas subjects who were suffering from any systemic diseases like bleeding disorder, respiratory disease and who were undergoing any antibiotic therapy during the study period were excluded.

Ethical clearance was taken from institutional ethical committee of Sardar Patel Postgraduate Institute of Dental and Medical Sciences Lucknow and approval to carry out the study was taken from concerned schools authority. Also, Informed consent was taken from the parents.

**Methodology:** The study was carried out in two phases they are:

**Phase - I :** A random sample of 298 school going children of age 12 y was drawn from adopted schools of Lucknow on the basis of including every fifth child on the relevant school registered.

According to WHO oral health survey 1997 this age group is considered as a global indicator age group were international comparison and surveillance of disease trends occurs. The other reason is that all the permanent teeth have been erupted in the oral cavity except third molars.

The oral health status of these children was accessed by using WHO 1997 profoma. Regular outreach activity was carried out in these schools after every 4-5 months. In those outreach activities apart from screening, preventive and curative treatments along with oral health education was given.

**Phase – II:** Three years later the same population was re-examined with a population of 242 children in age group of 15 y. Losses were sustained as 56 children changed educational establishment at the age of 15 y and not all attended their designated upper schools. 15 y age group was chosen as the permanent teeth has been exposed to the oral environment for continuous three years except third molars. Again the oral health status of the school children was accessed by using WHO profoma 1997 [6].

### Survey Procedure

Single examiner interviewed and examined the subjects. Subjects were re-examined on successive days using same diagnostic criteria in order to check for intra-examiner reliability and the kappa coefficient was estimated to be 0.86.

Type III examination was done to examine the oral health status of the 15 years old school going children in 2013 by using the Community Periodontal Index Probe and plane mouth mirror under adequate natural light in school premises.

### Data Analysis

Data was analysed using SPSS software version 17. Data analysis began with tabulation of results. The values were represented in number % and mean ± SD. The Chi-Square test was used to test the significant differences in proportions.

| Oral Hygiene status | 2010 | | 2013 | |
|---|---|---|---|---|
| | 12 Year Male | 12 Year Female | 15 Year Male | 15 Year Female |
| Debris Index Simplified (DI-S) | 1.210 | 1.101 | 0.728 | 0.428 |
| Calculus Index (CI-S) | 1.040 | 0.915 | 0.324 | 0.097 |
| Oral Hygiene Index Simplified (OHI-S) | 2.250 | 2.052 | 1.05 | 1.228 |

**[Table/Fig-1]:** Distribution of subjects according to Oral Hygiene Status

| Age Group | Total population/ Year | Population Distribution | DT | Mean DT | MT | FT | Mean FT |
|---|---|---|---|---|---|---|---|
| 12 Year Males | 298 (2010) | 163 | 398 | 2.4 | 0 | 0 | 0 |
| 12 Years Females | | 135 | 391 | 2.9 | 0 | 0 | 0 |
| 15 Years Males | 242 (2013) | 131 | 228 | 1.7 | 0 | 159 | 1.2 |
| 15 years Females | | 111 | 235 | 2.1 | 0 | 156 | 1.4 |

**[Table/Fig-2]:** Distribution of children according to number of mean decayed, missing and filled teeth

| Factors | In 2010 (12 years) | | In 2013 (15 years) | |
|---|---|---|---|---|
| | n | % | N | % |
| **Gingival index** | | | | |
| Healthy gingiva | 189 | 63.42 | 224 | 92.56 |
| Mild gingivitis | 89 | 29.86 | 18 | 7.44 |
| Moderate gingivitis | 15 | 5.03 | 0 | 0 |
| Severe gingivitis | 5 | 1.67 | 0 | 0 |
| Total | 298 | 100 | 242 | 100 |
| Chi-square value | $x^2$=64.97; p<0.001 | | | |

**[Table/Fig-3]:** Distribution of children in relation to gingival index

| Factors | In 2010 (12 years) | | In 2013 (15 years) | |
|---|---|---|---|---|
| | n | % | N | % |
| **Community periodontal index** | | | | |
| Healthy | 145 | 48.65 | 238 | 98.35 |
| Bleeding | 49 | 16.44 | 3 | 1.24 |
| Calculus | 104 | 34.89 | 1 | 0.41 |
| Total | 298 | 100 | 242 | 100 |
| Chi-square value | $x^2$=167.442; p<0.001 | | | |

**[Table/Fig-4]:** Distribution of children in relation to community periodontal index

## RESULTS

In total, at baseline 298 students were included in the study out of which 163 (54.7%) were males and 135 (45.30%) were females. Fifty six children (18.79 %) were lost to follow-up after three years. Among the 242 children examined (in 2013), who were aged 15 y, 131 were males (54.13%) and 111 were females (45.87%), the distribution of which is almost the same as that of the baseline.

At baseline all the children (298:100%) brushed their teeth only once daily. However, significantly (p<0.001) more number of children (136:56.2%) brushed their teeth twice a day after three years while 106 (43.8%) of them still brushed their teeth once a day. In the present study at baseline, all the children had consumed sugar twice a day (100%).

However, after three years, significantly (p<0.001) more children reported consuming sugar once a day 172 (71.07%) while 61(25.21%) children were consuming sugar twice and only nine(3.72%) children were consuming sugar thrice daily.

| Dental Anomalies | In 2010 (12 years) | | | In 2013 (15 years) | | |
|---|---|---|---|---|---|---|
| | No. | % | Chi-square | No. | % | Chi square |
| **Crowding in the Incisal segment** | | | | | | |
| Present | 112 | 37.58% | 17.504 | 31 | 12.80% | $x^2$=42.10 ; p<0.001 (S) |
| Absent | 186 | 62.41% | | 211 | 87.19% | |
| **Spacing in the Incisal segment** | | | | | | |
| Present | 55 | 18.45% | 0.869 | 34 | 14.04% | $x^2$=1.884 p=0.170 (NS) |
| Absent | 243 | 81.54% | | 208 | 83.87% | |
| **No. of subjects with Diastema** | | | | | | |
| Present | 39 | 13.09% | 0.814 | 20 | 8.26% | $x^2$=3.192 p=0.074 |
| Absent | 259 | 86.91% | | 222 | 91.73% | |

**[Table/Fig-5]:** Distribution of children in relation to dental malocclusion

[Table/Fig-1] shows distribution of subjects according to their Oral Hygiene Status. At baseline males and females had fair Oral Hygiene Status (males 2.250: females 2.052). While, in 2013 both males and females had good oral hygiene status (males 1.05: females 1.228).

[Table/Fig-2] shows distribution of children according to mean decayed, missing and filled teeth. At baseline the mean DT component was more in females than in males (2.9:2.4) and filled was none. While, in 2013 the DT component of females was more than males (2.1:1.7) but this was less as compared to data of baseline. And the filled component of males and females was (1.2:1.4).

[Table/Fig-3] shows distribution of children in relation to Gingival Index Score. Significantly (p<0.001) higher proportion of children had healthy gingiva 224 (92.56%) after three years.

[Table/Fig-4] shows distribution of children in relation to Community Periodontal Index. After three years, significantly (p<0.001) more children had healthy periodontal status 238 (98.35%), three of them (1.24%) had gingival bleeding and only one (0.41%) had calculus.

[Table/Fig-5] shows distribution of children in relation to Dental malocclusion. The difference in regard to crowding in the incisal segment in 2010 and 2013 was statistically highly significant (p<0.001).

## DISCUSSION

A healthy life is the dream of every individual and healthy individuals are the most precious assets any country can have. Good health is no longer regarded as a privilege of the wealthy people, but is now considered a right irrespective of one's socio-economic condition. Hence, the status of dental professional will be evaluated only if the dentists seek ways and means of providing dental care to all those who need it, irrespective of whether they can afford it or not [7].

The Oro-dental diseases are emerging as considerable public health problems in India [8]. Skills and attitude in young age play a very important role. Once performed, they are deeply ingrained and are resistant to change. The challenge that exists today in many countries is to reach the whole population with adequate health care services and to ensure their utilization.

Hence, delivering dental treatments to the unreached community can be through outreach program in the form of dental health camps especially for school children and for the people in rural areas [8]. The effectiveness of the outreach program will be reflected by the improved oral health status of the served population [9].

A prospective study was designed to evaluate the impact of outreach program on oral health status of school going children of 12 y in 2010 of Lucknow for period of three years when the children will be of 15 years.

In total, 298 school going children were included in the study through stratified random sampling in 2010. After a follow-up of over three years, 56 (18.79%) were lost due to migration of students to different schools, so in the year 2013, 242 children were assessed for the outcome objectives.

The male to female ratio of the study participants was 54.7%:45.3% in 2010 and 54.13%:45.87% in 2013. A similar higher proportion of males versus females were found in a study by Nagaraja Rao G et al., [10]. However, in the studies of Jose A et al., [11] more female subjects included.

The children of the present study belonged to 12 and 15 years age group. Similar age group were studied by Jose A et al., [11] . The probable reason for choosing 12 y age is that all the permanent teeth except the third molars will have erupted and at 15 y of age all permanent teeth have been exposed to the oral environment for at least three years [6]. Therefore, the assessment of caries and periodontal diseases in adolescents will be more relevant.

All the children brushed their teeth once a day in 2010, while after 3 y, 56.2% children brushed their teeth twice a day and 43.8% of them still continued to brushed once a day. Perhaps regular reinforcement regarding oral hygiene practices to the school children could have influenced their positive oral health behaviour. Studies done by Lakhanpal M et al., [12] and Chesters et al., [13] have found that a higher frequency of tooth brushing correlates with lowered risk for dental caries.

Regarding frequency of sugar intake, significantly higher proportions of children (71.07%) consumed once a day as compared to twice (100%) a day in 2010. This could be related to provision of information concerning importance of diet and nutrition for optimal oral health to children and their parents. Similar findings of frequent sugar exposure were reported by Sharma S et al., [14] in their study stated that higher exposures to sugar increased the risk of caries.

The Oral Hygiene Status of the children was fair in 2010, among males and females (2.250 and 2.052) while in 2013 the males and females had good oral hygiene status (1.05 and 1.228) respectively. This could be due to good oral health education and self motivation of the children and their parents. Similar findings were reported by Rai Balwant et al., [15] in their study stated good oral hygiene status among males and females.

Mean decayed component of the children in 2010 was 2.4 in males and 2.9 in females. However, in 2013 the mean decayed component was 1.7 among in males and 2.1 in females and mean filled component was 1.2 and 1.4 respectively among males and females. This may be due to continuous encouragement of the children to maintain good oral hygiene, less intake of sugar containing products and to seek appropriate dental care with preventive and promotive measures. In one of the study conducted by G.Sogi et al., [16] among 13-14 y old children it was found that mean decayed component among females was 3.37 and males was 2.94 concluding that females had higher mean decayed component than males.

During the study it was observed that 29.86% children had mild gingivitis in 2010 and it was reduced to 7.44% in 2013.This could be attributed to the periodic instructions given to the children to improve and maintain dental health through health education and regular screening and treatment camp for dental diseases. In contrast to study findings in most of the children mild gingivitis was present in the study conducted by Sharma S et al., [14].

Statistically significant differences were seen in CPI score among children in 2010 and 2013. At baseline 48.56% children had healthy periodontium and it was increased to 98.35% in 2013. The periodontal conditions of the Thai children correspond fairly well to the CPI data in the study done by Morgan MV et al., [17] in Indonesia.

In 2010, 37.58% children had incisal crowding which was reduced to 12.8% in 2013. The probable reason could be that parents were encouraged to obtain adequate dental care and correction of remediable defects for their children. In a study conducted by Isiekwe et al., [18] found that the prevalence of incisal crowding was 12.9% among 10-15 y old Nigerian school children. In contrast a study conducted by Al-Emra et al., [19] reported that incisor crowding was seen in 42.8% among 13-14 y old children in Saudi Arabia.

Outreach program plays a significant role in providing affordable quality oral health care to the people who cannot avail the oral health services, especially for school children as it provides an opportunity to identify youngsters at high risk for the disease so that appropriate preventive interventions can be initiated to protect unaffected teeth.

In the same line of thought this study was conducted to see the effectiveness of the outreach programme in which regular oral health care in the form of oral health education, oral screening and treatments like topical fluoride application, application of pit and fissure sealants and atraumatic restorations were provided to the school children of three adopted schools by the Department of Public Health Dentistry, Sardar Patel Post Graduate Institute of Dental and Medical Sciences. We recommend that further longitudinal cohort studies with larger sample size should be conducted.

As home is the first school of children so parents play a very important role to reinforce oral health messages. More dental auxiliaries should be trained who can be utilized in screening the children, to provide dental health education and to refer the children to the dental care centers. More of dental institutions should take the responsibility of adopting schools for school children and those with special needs.

## CONCLUSION

The findings of the study showed:

- Significantly more number of children was brushing twice a day as compared to all of them brushing once a day at baseline.
- There was a considerable decrease in mean decayed component and more children had their decayed teeth restored.
- The variations in the OHI-S scores showed marked positive results.
- Most of the children had healthy peridontium.
- Parents could also benefit from oral health education and should be advised regarding continuous dental follow-ups with dietary instructions to maintain good oral hygiene such that they pass on to their children.

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