

# A peer group approach model of oral health promotion among orphans at Puduchery, South India

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## Abstract

**Background:** Interactions between oral and systemic health are bi-directional and complex, involving many pathways. The orphans have been sympathized with, ignored, vitrified or even hidden away in the community. Hence, providing health care services for orphans remains a challenge. Oral health education has a positive impact in lowering plaque and gingivitis scores in health educational programs. **Objective:** The objective of this study is to assess the effectiveness of peer group health promotion model among 11 to 16 year old orphans at Puduchery, South India. **Materials and Methods:** A clinical trial of 6 months duration was carried out among 72 orphans with age ranging from 11 to 16 years residing in Cluny Padmini Sneha Illam, at Puduchery, India. The baseline data regarding oral health and oral hygiene practices were obtained using a pre-tested close-ended questionnaire. Oral health education was provided to 4 randomly picked children who in turn provided the same to their peer group orphans, supervised by the investigator. Tooth brushes and fluoridated tooth pastes were provided to all the participants throughout the study period. Oral hygiene of the participants was assessed using Modified Plaque Index by Loe H and Gingival Index by Loe H and Silness at baseline, 3<sup>rd</sup> and 6<sup>th</sup> month interval. Paired Student t test was used to analyze the categorical data. **Results:** Majority of the respondents felt consuming sugar was not harmful for dental health, while 15 respondents were not sure about the outcome. When asked if oral hygiene was important for general health, 45.8% were not aware of its association. Although all the participants brushed their teeth daily, none of them reported the use of dental floss. The findings of this study indicated a statistically significant lower mean plaque score of  $0.54 \pm 0.20$  at 6<sup>th</sup> month when compared to the baseline score of  $1.76 \pm 0.24$ . Similarly, statistically significant lower gingival index score of  $0.65 \pm 0.11$  at 6<sup>th</sup> month was observed when compared to the baseline score of  $1.76 \pm 0.24$ . **Conclusions:** The results of this study indicate that oral hygiene of orphans was improved using a peer group approach model of oral health promotion.

**Key words:** Health promotion, orphans, peer group

## INTRODUCTION

India is the second most populated country in the world with an estimated population of over a billion. Although the exact number of orphans is unknown, the gravity

of the situation can be assessed by the fact that there are around 143.4 million orphans worldwide, among whom, nearly 87.6 million are in Asia alone.<sup>[1]</sup> Though they contribute to 2% of worlds' population, literature regarding their oral health status is very scarce.

A search of the literature depicts that interactions between oral and systemic health are bi-directional and complex, involving many pathways.<sup>[2]</sup> The orphans are ones who have lost their parents and are socially and economically deprived. They have been sympathized with, ignored, vitrified or even hidden away in the community. Hence, providing health care services

Access this article online	
Quick Response Code: 	Website: www.jispcd.org
	DOI: 10.4103/2231-0762.97710

for children with such special health care needs is continuing to be a challenge in the 21<sup>st</sup> century.

Profound disparities in oral health exist across different socioeconomic divisions. Poverty is one of the most important predictor of poor oral health. Children from low socioeconomic background rarely seek dental care and often do not follow preventive advice. Untreated oral diseases among them lead to general health problems, pain, interference in eating, loss in school time and also social unacceptability. Recognition of these problems is essential to provide optimum oral health for these deprived children.<sup>[3]</sup>

Kay E and Locker DA<sup>[4]</sup> reported that oral health education has a positive impact in lowering plaque and gingivitis scores in health educational programs. Dental health promotion has become an important and integral part of general health services in recent years. Literature has shown that the oral health can be improved by health education. Oral hygiene promotion is most effective among younger populations; and peer group students can be targeted both as beneficiaries and as agents of behavioral change within their families and their communities.<sup>[5]</sup>

Hence, an attempt was made to find out if the oral health of orphans could be improved by providing oral health promotion using their peer group.

## MATERIALS AND METHODS

A clinical trial of 6 months duration was carried out among all the 72 orphans of age ranging from 11 to 16 years (mean 13.5 years  $\pm$  1.36), residing in Cluny Padmini Sneha Illam orphanage at Puduchery, South India. The official permission to conduct the study was obtained from the Institutional Review Board and written consent was taken from the caretakers of the orphanage. All the orphans who complied with the informed consent and had good general health were included in the study. Orphans who were involved in active orthodontic treatment and any other condition that would interfere with the examination procedure were excluded. The study was carried out in 2 phases: In the first phase, data regarding knowledge and attitudes related to oral health and oral hygiene practices of the orphans was collected. The above self-report data was collected by using a pre tested close-ended questionnaire. In the second phase, assessment of oral hygiene of the orphans using Modified Plaque Index by Loe<sup>[6]</sup> and Gingival Index by Loe and Silness<sup>[6]</sup> was carried out. Further, clinical assessments were

conducted at 3<sup>rd</sup> and 6<sup>th</sup> month intervals.

After the collection of data in the phase I, all the children attending the experimental orphanage took part in the Oral Health Promotion programme. Oral health education was given to 4 randomly picked orphans, who in turn provided the same to their peer group orphans, supervised by the investigator. These activities focused on integrating oral health education into the general curriculum of training and education for health. Active involvement principles and various didactic materials were chosen for the orphans; and, in order to enable the peer group to conduct oral health education, a 2-day training workshop was organized for them by the investigators with a background in dental public health. All the 4 randomly picked orphans attended the workshop, which took place prior to the programme. Training was in the value of teeth and general health, diet and nutrition, oral anatomy and tooth development, causes and prevention of dental caries and periodontal disease, self care and effective use of fluorides, and emergency oral care at the orphanage. Particular emphasis was given to oral hygiene procedures, protection of the permanent teeth and the benefits of fluoride.

All randomly picked orphans were instructed in the use of a health education manual encompassing an appropriate booklet, and a guide for including oral healthcare practices into their daily routines. The instructions to the orphans focused on general health, oral health, teeth and their functions, dental plaque and tooth decay, diet, sugar and health (general and dental), self care for oral health and the importance of dental visits. The orphans took part in daily oral hygiene instructions supervised by the peer group and were instructed in Modified Bass brushing method. Tooth brushing twice a day with use of fluoride toothpaste that were distributed during the study period was recommended. In addition, the orphanage received various macromodels, slides, posters and other didactic materials to support the oral health promotion activities. Throughout the study period activities in the orphanage were supervised by the investigators.

Clinical examination of the orphans was carried out using American Dental Association (ADA) type III examination, protocol. The oral examination was carried out under natural light, by positioning the subject such that sufficient daylight is received; however, the subject was not directly placed under the sun. The examination was carried out by a single investigator. Intra examiner reliability was assessed by

re-examining every 10<sup>th</sup> individual, and it was found to be satisfactory [ $\kappa$  value was 0.92].

### Statistical analysis

The data collected was statistically analyzed using Statistical Package for the Social Sciences (SPSS) software (version 12.0). Paired Student t test was used to analyze the categorical data. The null hypothesis for the present study was that oral health education given by peer group will not have any effect on the oral hygiene of the orphans. The alpha error was set at 5%.

## RESULTS

The present study was done to assess the effect of peer group health education on oral hygiene among orphans residing at Cluny Padmini Sneha Illam orphanage at Puduchery, South India.

Table 1 shows the age distribution of the participants of this study. Majority of the participants belong to the age group of 14 to 16 years.

Table 2 shows the response of the orphans to the pretested questionnaire. Majority of the respondents 68% (49) felt consuming sugar was not harmful for dental health, while 20.8% (15) were not sure about the outcome. When asked if oral hygiene was important for general health, 45.8% (n=33) were not aware of its association. Almost equal number of orphans [26.5% (n=19) and 27.7% (n=20)] responded affirmatively and negatively to above question. Although all the

participants brushed their teeth daily, none of them reported the use of dental floss. 77.7% (n=56) of the orphans were not aware of the ill effects of dental deposits while only 22.3% (n=16) of the orphans felt dental caries was caused by dental deposits. 65.3% (n=47) were not sure about the methods of controlling dental deposits, while 23.6% (n=17) of the respondents felt using tooth brush and tooth paste will control formation of dental deposits. 11.1% (n=8) felt tooth brush along with tooth powder was a better choice to control dental deposits.

Table 3 shows the mean plaque index scores of the participants at baseline, and at the 3<sup>rd</sup> and 6<sup>th</sup> month intervals. The mean plaque score which was  $1.76 \pm 0.24$  at baseline gradually reduced to  $1.40 \pm 0.19$  at 3<sup>rd</sup> month, and subsequently to  $0.54 \pm 0.20$  at the 6<sup>th</sup> month examination. Though none of the respondents were free from plaque at baseline, nearly 11.1% (n=8) were plaque free at the end of the 6<sup>th</sup> month examination. Although 27.8% (n=20) orphans had a plaque score of 3 at the baseline, all of them recorded a plaque score of 0 at the end of the study. A statistically significant difference in mean plaque scores was observed between the baseline and 3<sup>rd</sup> month values ( $t = 9.83, P < 0.001$ ); baseline and 6<sup>th</sup> month values ( $t = 32.5, P < 0.001$ ); and, 3<sup>rd</sup> and 6<sup>th</sup> month values ( $t = 26.1, P < 0.001$ ).

Table 4 shows the mean gingival index scores of the participants at baseline, and at 3<sup>rd</sup> and 6<sup>th</sup> month intervals. The mean gingival score which was  $1.73 \pm 0.24$  at baseline gradually reduced to  $1.39 \pm 0.18$  at 3<sup>rd</sup> month, and subsequently to  $0.65 \pm 0.10$  at the 6<sup>th</sup> month examination. Though none of the respondents were free from gingivitis at baseline, nearly 12.5% (n=9) were free from gingivitis at the end of the 6<sup>th</sup> month examination. Although 18.5% (n=12) orphans had a gingival score of 3 at the baseline, all of them recorded a gingival index score of 0 at the end of the study. A statistically significant difference was observed

**Table 1: Age wise distribution of the participants of the study**

Age in years	Number of subjects n (%)
11 to 12 years	10 (13.8)
12 to 14 years	23 (31.9)
14 to 16 years	39 (54.3)

**Table 2: Response of orphans to questionnaire during the study**

Particular question	Yes %	No %	Don't know %
1) Is sugar bad for your teeth?	11.2	68	20.8
2) Is oral hygiene important?	26.5	27.7	45.8
3) Do you brush your teeth daily?	100	0	0
4) Do you use dental floss daily?	0	100	0
	<b>Dental caries</b>	<b>Periodontal disease</b>	<b>Don't know</b>
5) What does dental plaque cause?	22.3%	0	77.7%
	<b>Tooth brush and paste</b>	<b>Tooth brush and powder</b>	<b>Don't know</b>
6) How can you control dental plaque?	23.6%	11.1%	65.3%

**Table 3: plaque index scores of the orphans participating in the study at the baseline and 3<sup>rd</sup> and 6<sup>th</sup> month intervals**

Examination	Plaque score				Total N (%)	Mean ± standard deviation
	0 N (%)	1 N (%)	2 N (%)	3 N (%)		
1 <sup>st</sup> visit (Base line)	0	0	52 (72.2)	20 (27.8)	72 (100)	1.75 ± 0.24
2 <sup>nd</sup> visit (3 <sup>rd</sup> month)	0	32 (44.5)	40 (55.5)	0	72 (100)	1.39 ± 0.19
3 <sup>rd</sup> visit (6 <sup>th</sup> month)	8 (11.1)	53 (73.6)	11 (15.3)	0	72 (100)	0.65 ± 0.11

**Table 4: gingival index scores of the orphans participating in the study at the baseline and 3<sup>rd</sup> and 6<sup>th</sup> month intervals**

Examination	Gingival score				Total N (%)	Mean ± Standard deviation
	0 N (%)	1 N (%)	2 N (%)	3 N (%)		
1 <sup>st</sup> visit (Base line)	0	7 (9.7)	53 (73.6)	12 (18.5)	72 (100)	1.75 ± 0.24
2 <sup>nd</sup> visit (3 <sup>rd</sup> month)	0	18 (25)	55 (75)	0	72 (100)	1.39 ± 0.19
3 <sup>rd</sup> visit (6 <sup>th</sup> month)	9 (12.5)	72 (87.5)	0	0	72 (100)	0.65 ± 0.11

in the mean gingival index score between the baseline and 3<sup>rd</sup> month ( $t = 9.58, P < 0.001$ ); baseline and 6<sup>th</sup> month ( $t = 34.3, P < 0.001$ ); and, 3<sup>rd</sup> and 6<sup>th</sup> month values ( $t = 29.2, P < 0.001$ ).

## DISCUSSION

Attention has been drawn towards assessing the effectiveness of oral health promotion in the recent years. A number of systematic reviews have been conducted on the available evidence. These have shown that health education can be effective in increasing knowledge, and to some extent behaviour, such as tooth brushing and healthy eating.<sup>[4,6]</sup> Use of peer groups to provide health education has been a common approach in medical field. Jordhein,<sup>[7]</sup> conducted a randomized controlled trail on Venereal diseases education in New York using on peer lead and adult lead curriculum, and found out greater improvement in knowledge among peer lead study participants. Luepker *et al.*,<sup>[7]</sup> conducted a clinical trial among grade 7 students on smoking prevention and found more non-smokers in peer-lead group, than in the adult-lead group. Similar results were also obtained by Botvin *et al.* <sup>[7]</sup> in a substance abuse study. The above studies demonstrate that peer group approach is a potential source for provision of health education and promotion to the public. However, very sparse studies are found in the literature relating to improvement of oral health by providing health education through peer group among children, especially orphans.

In this present study a closed-ended questionnaire was used to assess the baseline knowledge levels before any

form of health education was given of the orphans. Though all the participants brushed their teeth, they were not aware of its importance and its implication for removal of plaque. Further, many were not even aware of the ill effects of sugars and plaque, which demonstrates the low level of awareness among the orphans regarding oral health. In the present study, a gradual improvement in the oral hygiene of the orphans was observed over a period of six months, after providing oral health education through their peer group members. Earlier studies have shown that the frequency of gingivitis in 10 to 12 year old orphan children improved from 77% to 63% with monthly prophylaxis during a period of 1 year.<sup>[3]</sup> However, the above said study cannot be directly extrapolated as oral prophylaxis was not used to improve the oral hygiene in the present study. Further, studies have shown that repeated oral prophylaxis can result only in short term improvement in the oral hygiene.<sup>[3]</sup>

A number of studies have demonstrated that teaching in schools can be effective in terms of improving both the knowledge and health outcome measures.<sup>[3,8,9]</sup> The majority of these studies have demonstrated plaque reductions to be in the order of 30%, and independent of the setting on target group following health education.<sup>[4]</sup> However, many of the above studies have been conducted on school-going children, who are not deprived of their parents/guardian. The present study showed 67.88% reduction in gingival and plaque score following health promotion through their peer group over a period of six months. This is in similar lines to the study conducted by Biesbrock,<sup>[3]</sup> where a 51% reduction in gingival score was demonstrated.

The present study was not without any limitations. The sampled population was restricted to a single orphanage at Puduchery in South India. Further, knowledge levels of the orphans were not assessed at the end of the study. However, this was not performed because the investigator felt that the oral hygiene at the end of the study could be taken as an indirect measure for their knowledge levels. Also, the present study design did not include a control group because of the ethical concern which might arise if a certain group of the population was deprived of oral health education.

## CONCLUSION

The present study has shown a definite reduction in the mean oral plaque and gingival scores among study participants by using the medium of peer group health education. Further studies have to be conducted with a greater number of participants to extrapolate the efficacy of the peer group health education model approach.

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**How to cite this article:** Sushanth VH, Krishna M, Suresh Babu AM, Prashant GM, Chandu GN. A peer group approach model of oral health promotion among orphans at Puduchery, South India. *J Int Soc Prevent Communit Dent* 2011;1:71-5.

**Source of Support:** Nil. **Conflict of Interest:** None declared.