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Effect of oral health awareness program to improve oral care of school children in Lahore city

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ABSTRACT

BACKGROUND AND OBJECTIVE: Oral health is an important index of general health. Oro-dental problems are common in children but preventable and manageable. Awareness regarding oral health at a young age might make a difference. In order to have a clear picture of our society, we planned our study to assess the effectiveness of oral health programs in school children in Lahore city.

METHODOLOGY: Quasi-experimental study, conducted over nine months (Dec 2023 to Aug 2024) at four randomly selected primary branches of Army Public School (Girls), Lahore, after ethical approval by the University of Lahore (Ref No: REC-UOL-612-12-2023). We selected 87 children through multi-cluster sampling. Data were collected through a validated questionnaire and oral examination before and after a one-month oral health awareness session. Data were analyzed using SPSS 25; for qualitative variables, frequencies and percentages were reported, whereas for quantitative variables, mean and standard deviation were calculated, and McNemar's test was applied for clinical oral examination before and after intervention.

RESULTS: Study participants (n=87); ages between 8-10 years 8(9.2%) and between 11-13 years 79(90.8%). It was observed that the oral health awareness program significantly improved the knowledge of study participants. Oral examination showed significant improvement in gingival erythema, ulceration, inflammation, and swelling ($p \leq 0.001$). However, the effect on gingival color and the presence of plaque and calculus was reported as insignificant.

CONCLUSION: The Oral health awareness program had a positive effect on school children. Children are the building blocks of society, and schools are the best place to conduct awareness programs.

KEY WORDS: Awareness, Children, Oral health Program, Pakistan, School.

INTRODUCTION

Oral health serves as a reflection of overall human well-being. Defined by the World Health Organization (WHO) as a pivotal indicator of general health, quality of life and well-being that encompasses various conditions and diseases, including dental caries, periodontal (gum) disease, tooth loss, oral cancer, orodental trauma and congenital disabilities such as cleft lip and palate [1]. The problem of dental caries remains prevalent among children, affecting 60-90% of elementary school-aged children in developed nations [2]. Pakistan is the fifth most populous developing country globally, with 23 major cities, each with a population exceeding 2 million [3]. With an estimated 37 million school-aged children (5-16 years old), around 25 million are currently enrolled in schools [4]. Pakistan bears the highest

burden of oral diseases, but the general population lacks knowledge and awareness of oral health [5]. Among school children, 56% are male and 44% are female; the prevalence of dental caries among primary teeth in elementary school-aged children is 44.7% [6].

As children become more vulnerable to dental diseases, initiatives targeting the dental well-being of school children play a crucial role in enhancing community oral health [7]. Schools are the most feasible and effective setting for implementing comprehensive dental health programs because they are cost-effective in terms of workforce, financial resources, and materials, and they yield favourable outcomes [8]. Evaluation of general oral health behaviors and lifestyles of children and their correlation with socio-behavioural risk factors, as these observations can help in tailoring oral health education programs, especially

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in a developing country where resources are limited^[9]. Considering these factors, the current study was planned to assess the effect of an awareness program with reference to dental health among the school children in Lahore city.

METHODOLOGY

The present quasi-experimental study was conducted at four randomly selected primary branches of Army Public School (Girls), Lahore, after approval from the ethical review committee of University of Lahore Ethics Review Committee (Reference# REC-UOL-612-12-203). The study duration was nine months, from December 2023 to August 2024. A multi-cluster sampling technique based on class sections was used to collect the sample size of 87 school going children between eight and thirteen years, using the WHO formula ($n = z^2 * p * ((1-p) / e^2)$), with a 95% confidence interval, a 5% margin of error and taking the expected percentage of children with decreased caries after an intervention according to the previous study as 94%^[10]. This interventional study collected data before and after the intervention. The data were collected after obtaining informed consent from the parents or guardians, in three parts: first, socioeconomic information; secondly, through the oral health awareness questionnaire^[11]; and thirdly, by clinically examining the oral cavities of school children before and after one month of the intervention. The intervention was based on an oral health educational program, in which the school children were guided regarding different oral health care procedures (tooth brushing and dental flossing) and basic oral care (Figure-I). The students aged between 8 and 13 years present on the day of the educational program were included in the study. Those below eight years or above thirteen years of age, or students who had gone through any adverse life event (death of a loved one, trauma, illness) in the last year or those under the custody of their guardians, and those whose parents were not both present were excluded. Dental models were utilized during the dental health education program to explain the oral anatomy and physiology of teeth (Figure-II). Data were collected through pre- and post-program questionnaires.

Qualified dentists used basic dental instruments of examine the school children's mouths. The basic dental instruments included dental mirrors, probes, and tweezers. We used a separate examination set for each student to ensure sterilization. The tongue depressors were also used as disposable instruments. Standardized plaque and gingival indices were used for evaluation. The data were analyzed using the Statistical Package for the Social Sciences Version 25.0. For quantitative variables, mean and standard deviation were calculated, and for qualitative variables, frequency and percentages were computed. The p-value was determined for pre- and post-conduction of clinical oral examination of the school children using McNemar's test.

RESULTS

The sociodemographic data of the recruited school children ($n=87$) were segregated into two categories as per their age: between 8-10 years and between 11-13 years. According to this, 8 (9.2%) children were falling in 8–10-year age group,

while 70 (90.8%) were lying in the age group of 11-13 years. Approximately half of the students were in 4th grade and half in 5th grade. Thirty-seven (42.5%) students were in grade 4, while 50 (57.5%) students were in grade 5. Moving towards the number of siblings, it was noted that 53 (60.9%) had 3 or more than 3 siblings (making up the majority of this category), while 16 (18.4%) and 14 (16.1%) had 2 and 1 sibling, respectively (Table-I).

Table- I: Sociodemographic factors of study population.

Sociodemographic Factors (n=87)		n (%)
Age	8-10 Years	8 (9.2)
	11-13 Years	79 (90.8)
Class	4th Grade	37 (42.5)
	5th Grade	50 (57.5)
Number of Siblings	Only Child	4 (4.6)
	1 Sibling	14 (16.1)
	2 Sibling	16 (18.4)
	3 or more than 3 Siblings	53 (60.9)
Birth order (Number among Siblings)	1 st	31 (35.6)
	2 nd	22 (25.3)
	3 rd	27 (31.0)
	4th or above	7(8.1)

Figure-I: Illustrates the facilitator demonstrating oral care to the school children using a dental model.



Figure-II: Shows the students attending the session regarding oral health awareness.



Table-II: Pre- and post-conditions of oral cavities during the clinical examination.

Variable	Pre Diseased & Post Diseased (d)	Pre Diseased & Post Healthy (c)	Pre Healthy & Post Diseased (b)	Pre Healthy & Post Healthy (a)	McNemar's Test p-value
Erythema	10	35	2	40	≤ 0.001
Ulceration	05	40	1	41	≤ 0.001
Inflammation	07	36	2	42	≤ 0.001
Gingival Color	25	10	12	40	0.831
Gum Swelling	15	30	3	39	≤ 0.001
Plaque and Calculus	18	22	10	37	0.052

The pre- and post-conditions of the oral cavities were observed, and the p-value was determined using McNemar's test. Thus, the p-value for the pre- and post-intervention clinical examinations was significant ($p < 0.05$). The p-values were also significant for erythema, ulceration, inflammation, and swelling ($p \leq 0.001$). However, the p-values were not significant for gingival colour and the presence of plaque and calculus. The contingency table for McNemar's test is shown in Table-II.

DISCUSSION

In the present study, we observed that an oral health awareness program improved the overall oral health of school children. Our findings match the observations of a study performed in India, where the selected age group was 10-15 years of school-going children. However, in our study, the age was below 13 years. The oral health education program also reduced plaque^[12]. Another interventional study conducted by Mishra and his colleagues also reported an encouraging positive impact of an oral hygiene campaign program on school children, which is in coherence with the present study, except for the time interval, as this interventional program was conducted for a time span of four months^[13]. One of the studies conducted in Saudi Arabia concluded that there was a significant difference in the results regarding the knowledge gained and practices of the children in one of the schools of Saudi Arabia, which is found to be a contradiction with our study, which states that there was no significant difference between the pre- and post results^[14].

Previous literature has shown that involvement of parents, teachers, and health care professionals is required to achieve long-term effects regarding the maintenance of oral hygiene among school children. Pilot studies have also been conducted in different regions of the world on various awareness programs among school children^[15]. However, in the present study, parents or teachers were not involved. To assess long-term effects, involvement of parents, other health professionals, and school administration should be involved^[16]. One of the oral health awareness programs conducted in Indonesia has shown that there was a positive effect on the knowledge of the school-going children. The plaque levels were reduced, and brushing effects were found to be improved in those students^[17].

The previous literature has shown that there was a significant effect of parents' educational status on the children's oral health; low socioeconomic status and educational level of

parents had resulted in poor oral hygiene of children and poor maintenance of the students^[18]. The present study did not examine the effect of parents' educational status on the oral health of school-going children. This study was conducted among school children, and similar studies can be conducted in other populations as well^[19].

In one of the studies, the perspective of the doctors regarding oral health programs has been explained regarding the oral health of the patients and children. In this study, however of the doctor's perspective has not been discussed^[20]. One of the previously published studies documented that poor oral care among patients on ventilatory support can add to predisposing illness^[21]. Similarly, another study concluded that the oral care guidelines for the geriatric population indicate that the group also requires extra care and attention for oral health. Hence, we need to further work on the geriatric population in terms of interventions^[22].

Considering gender and knowledge of oral health status among students, previous studies show that female students tend to have lower levels of oral hygiene. Also, their knowledge regarding oral hygiene was found to be low as compared to that of the male students. These findings regarding gender were not taken into account while documenting our study, which can be further recommended in the future^[23]. Last but not least, in order to achieve maximum output regarding oral health care, it is further advised to have an interdisciplinary approach with collaboration of different professions by attaining multiple public health approaches in the future.

LIMITATIONS

The limitations of the study include that the generalizability of results cannot be achieved, as the study schools do not represent both genders and all the schools of Lahore city. Moreover, the small sample size and the short post-intervention period are limitations of the study. Sociodemographic factors like parents' education and economic status were not studied.

RECOMMENDATIONS

1. Future studies should be multicentric, with longer intervals and multiple educational sessions, which will be more beneficial.
2. Other factors, such as sociodemographic factors (e.g., parents' income and socioeconomic status), should also be considered.

3. The involvement of students, parents, and health care workers should be done in further research, as a collaborative approach can produce better results. This can be enhanced by arranging oral health awareness programs/seminars for the school teachers as well.

CONCLUSION

The oral health awareness program had a positive effect on school children. Knowledge about oral hygiene, proper regular brushing and dental check-ups improves oral health. Children are the building blocks of the future, so schools are the best place to conduct awareness programs. Healthcare policymakers should keep these observations in mind and develop more targeted strategies to achieve better outcomes.

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Ayesha Fazal: The acquisition and analysis of data for the work.

Seemi Tanvir: Interpretation of data for the work.

Farrah Alia Chaudhry: Drafting the work

Faiqa Fazal: Reviewing it critically for important intellectual content

Zoyia Ahsan: Final approval of the version to be published.