

ORIGINAL ARTICLE

Impact of Oral Health Educational Intervention for Reduction in New Lesions of Dental Caries: Cross Sectional Study

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ABSTRACT

Oral health in the nation's evolution, especially in this globalization, an absence of illness in the population plays a key role for a fecund and well established society.

Purpose: To see the impact of oral health education intervention to improve oral health practices along-with formation of new carious lesions after oral health education after 3 months of intervention.

Study Design: Cross sectional study.

Methodology: Children (n=383) were included in present study through non-probability, convenient sampling technique. Children who fulfilled the inclusion criteria were examined with the examination tools on the dental unit office in the RHC for caries risk using a pre-validated caries risk assessment checklist and dental caries detection form.

Statistical analysis: Data analyzed by SPSS 21.0v.

Results: Majority of respondents (383) 100% didn't have access to fluoridated water supply. Only 23.5% of the respondents have literate parent's majority of them (76.5%) have illiterate parents. All the respondents 100% were at moderate risk. In comparison of risk associated with teeth missing due to caries in past 36 months, the respondents at low risk were 63.2%, High risk were 25.3% and moderate risk were 11.5%.

Conclusion: This study concluded that intervention of oral hygiene instruction has produced significant results in motivating people for cleaning teeth regularly and avoiding the use of sugary foods and beverages to maintain their oral and general health. The study has interventions of tooth brush with paste and oral hygiene instruction for motivating and treating people. **Key Words:** Early Childhood Caries, Risk Assessment, Health Education and Oral Hygiene.

INTRODUCTION

Oral health in the nation's evolution, especially in this globalization, an absence of illness in the population plays a key role for a fecund and well established society.¹ Oral health is considered as a significant determinant of general health.² Dental caries is known to have high risk of accuracy among the oral diseases as estimated 3.58 billion people are affected globally.³ Good oral health due to increased awareness has shown a decline in the prevalence of dental caries and periodontal disease thus making the population healthy.^{4,5}

A complete dental care includes dietary modifications, oral health education, regular visits to a dentist and use of fluorides.⁶ The attitude and practices of maintaining good oral health are directly related to the disease knowledge of patients with periodontitis and dental caries.⁷ Oral cavity is a hub to several diseases and is directly or indirectly linked with many health problems which may contribute to poor quality of life.⁸ Dental decay is the most commonly observed dental disease, whereas succeeded by periodontal disease.⁹ Exploring the preventive options for dental caries is also important as it reports in infancy as well as childhood due to the dietary habits of modern era and many other associated factors.¹⁰ The prevalence affecting nearly 100% of population in various parts of the world.¹¹

Oral health deals with diseases involving the mouth region and supporting intra-oral and extra-oral structures.¹²

as the oral cavity have been linked to various systemic diseases so a good oral health is indicative of good general health. Better looking teeth and esthetically pleasing smile improve self-confidence and adds a positive impact on the psychological health as well.¹² After 1948 the oral-health is considered as the "overall well-being of an individual".¹³

The oral cavity comprises of extra-oral and intra-oral structures. The oral cavity is externally bounded by skin, labial zone and cheek. It is supported by a specialized group of muscles. Inside of the oral cavity the roof of the mouth which is formed by the hard palate, further extends into the oropharynx which includes the soft palate, tonsils, and tongue.¹⁴ The Compromised or neglected oral hygiene can affect many essential daily life activities. So it is vital to find out ways to prevent oral health related diseases.¹⁵

Many people are affected by the Oral diseases globally. The dental decay is the most common among all. The children are more prone to high sugar intake and they show negligence in maintaining good oral hygiene.¹⁶ Oral-health related diseases involving teeth and gums certain mutations may compromise the quality of life. Early diagnosis and preventive strategies can reduce risk and maintain good levels of general health.¹⁵

Prevention is one of the key components in maintaining good health.⁴ Regular cleaning of all the five visible surface of the teeth and adding the medications and dentifrices which strengthen the tooth enamel maintains the oral health thus preventing the diseases.¹⁶ The primary preventive

services has decreased the rate of dental decay thus improving oral hygiene.¹⁷ Whereas in the developing world where the dentistry is not the part of the medical system, showed a rise in oral health related disorders.¹⁸ In many developing countries, the unhealthy dietary habits and limited access to the dentist are the most common etiological factors increasing the dental decay.¹⁷ Poor brushing and flossing habits that allows the sticky layer of bacteria to build up on the tooth surface rendering it to inflamed gums. Prolonged use of tobacco and poor oral hygiene has shown increased bleeding, inflammation and loosening of the teeth eventually falling out of the socket. This disease is termed as periodontal disease. Its severe form is observed in the 10% of our population.¹⁵ Hence, in the light of above description, we planned current project to see the impact of oral health education intervention to improve oral health practices along-with formation of new carious lesions after oral health education after 3 months of intervention.

OBJECTIVE

To see the impact of oral health education intervention to improve oral health practices along-with formation of new carious lesions after oral health education after 3 months of intervention.

Table-1: General Distribution of Parameters Among Subjects (n=383)

Gender	Categories	Frequency	Percentage (%)
	Male	83	21.7
	Female	300	78.3
S.Surface Caries	≥7 years	383	100
New Caries (last 12 Months)	Yes	383	100
Deep Pits & Fissures	Yes	271	70.8
	No	112	29.2
Fissure Sealants	No	383	100
Fluoridated H ₂ O Supply	No	383	100
Are The Parents Literate	No	293(76.5%)	76.5
	Yes	90 (23.5%)	23.5

Risk factors status for respondents with different age groups was presented as frequency and percentage (%) in Table-2.

Table-2: Frequency Distribution of Risk Factors Among Subjects (n=383)

Teeth missing due to caries in past 36 months	Categories	Frequency	Percentage (%)
	Low risk	242	63
	Moderate risk	44	11.5
	High risk	97	25.3
Enamel fluorosis	Normal	122	31.9
	Very mild fluorosis	99	25.8
	Questionable fluorosis	55	14.4
	moderate fluorosis	22	5.7
	mild fluorosis	85	22
Dental home	Moderate risk	383	100
Restorations with over hangs	No	273	71.3
	Yes	110	28.7
Dental/orthodontic appliance	No	383	100
Xerostomia	No	383	100
Dentition status (decayed)	1 Teeth	153	39.9
	2 Teeth	186	48.6
	3 or More Teeth	44	11.5

METHODOLOGY

Children (n=383) were included in present study through non-probability, convenient sampling technique. It was conducted in 10 RHCs including Phool Nagar and Mustafa abad, District Kasur Punjab for 18 months after approval from Ethical Review Board. Children of both sexes with age (08-16 years) visiting rural health centers for treatment of Dental and other diseases were enrolled. However, those who failed to communicate in local language were excluded. Children who fulfilled the inclusion criteria were examined with the examination tools on the dental unit office in the RHC for caries risk using a pre-validated caries risk assessment checklist and Dental Caries detection form. An informed consent from their guardians/ parent was taken. This enabled the investigators to screen out children with carious teeth.

STATISTICAL ANALYSIS: The data was summarized and analyzed on Statistical package for social sciences (SPSS) version 21.0. Appropriate Descriptive inferential statistics were performed. P-value ≤ 0.05 was taken as significant.

RESULTS:

General distribution of parameters among subjects in present study was presented as frequency and percentage (%) in

There are 29% participants are free from Hypo mineralized molars after getting and by using tooth brush with paste whereas 32% participants also free from Hypo mineralized molars who instructed through oral hygiene. Overall, 108(30%) participants are free from Hypo mineralized molars as all the participants having caries before using intervention (table-3).

Table-3: Hypo-mineralized Molars

Intervention urgency		Count and %age	Post- Intervention-Response		
			No	Yes	
Tooth Brush with Paste	Pre-Intervention-Response	Yes	Count	50	124
			% of Total	28.7%	71.3%
Oral Hygiene Instruction		Yes	Count	58	122
			% of Total	32.2%	67.8%

Almost 50% participants not brush their teeth twice a day and now they brush twice a day after getting tooth brush with paste whereas 34% participants not brush their teeth twice a day and now, they brush twice a day after getting instruction regarding oral hygiene. Overall, 52% participants not brush their teeth twice a day and now they brush twice a day after taking intervention. The insignificant relation between who brush their teeth twice a day and did not brush their teeth twice a day was seen (table-4).

Table-4: Brushes Twice a Day

Intervention urgency		Count and %age	Post- Intervention Response		P-Value	
			No	Yes		
Tooth Brush with Paste	Pre-Intervention Response	No	Count	16	88	0.058
			% of Total	9.2%	50.6%	
		Yes	Count	19	51	
			% of Total	10.9%	29.3%	
Oral Hygiene Instruction		No	Count	19	62	0.97
			% of Total	10.6%	34.4%	
		Yes	Count	23	76	
			% of Total	12.8%	42.2%	
			% of Total	9.9%	42.4%	
			Yes	Count	42	
	% of Total	11.9%	35.9%			

There are 47% participants risk free caries after use tooth paste who are at risk of caries before using tooth brush with paste and 44% participants risk free caries after oral hygiene instruction who are at risk of caries before getting of oral hygiene instruction whereas overall 44% participants risk free caries after getting intervention who are at risk of caries before getting any intervention (table-5).

Table-5: Child High Risk Of Caries

Intervention urgency		Count and %age	Post- Intervention Response		
			No	Yes	
Tooth Brush with Paste	Pre-Intervention Response	Yes	Count	83	91
			% of Total	47.7%	52.3%
Oral Hygiene Instruction		Yes	Count	80	100
			% of Total	44.4%	55.6%

Almost 24% participants shifted at low risk after use of tooth brush with paste from high risk who not using tooth brush with paste and 7% participants shifted approximately at low risk after getting oral hygiene instruction from high risk before taking oral hygiene instruction whereas overall 15% participants shifted at low risk after taking any intervention from high risk before not taking any intervention. The significant values described the significant impact of interventions on dental caries risk (table-6).

Table-6: Overall Dental Caries Risk

Intervention urgency		Count and %age	Post- Intervention Response			P-Value	
			Low risk	Moderate risk	High risk		
Tooth Brush with Paste	Pre-Intervention Response	Moderate risk	Count	12	4	0.000*	
			% of Total	6.9%	2.3%		0.0%
		High risk	Count	42	46		70
			% of Total	24.1%	26.4%		40.2%
Oral Hygiene Instruction		Low risk	Count	9	0	0.000*	
			% of Total	5.0%	0.0%		0.0%
		Moderate risk	Count	113	22		0
			% of Total	62.8%	12.2%		0.0%
	High risk	Count	13	9	14		

		% of Total	7.2%	5.0%	7.8%	
		% of Total	2.5%	0.0%	0.0%	
	Moderate risk	Count	125	26	0	
		% of Total	35.3%	7.3%	0.0%	
	High risk	Count	55	55	84	
		% of Total	15.5%	15.5%	23.7%	

DISCUSSION

Oral disease, as estimated by the Global Burden of Disease affected half of the world’s population (3.58 billion people) in which dental caries (tooth decay) was found to be the most prevalent.¹⁹ Oral health is considered pivotal for general health as it prevents many problems leading to certain diseases. It is the basis of overall health, wellbeing and quality of life. ²⁰After the oral health education intervention, about 31% of participants have improved oral hygiene and reduced level of dental caries by using toothbrush with paste and oral hygiene instruction This is similar to the study conducted on the children where 25% of the participants showed improvement²¹ the interventions have shown significant results, which exhibit that motivation and education need to be increased and personalized to incline them for the improvement of their oral health.¹⁹

Cleaning teeth twice a day plays a key role in our oral health. The participants not brushing twice a day, now they have initiated brushing by 9% with the intervention of tooth brush with paste, while about 11% with the intervention of oral hygiene instruction²¹. Overall, 10% of participants began using brushes more than twice a day. Which is similar to the results reported in another study i.e. 20.6%.²⁰ This finding was in contrast to the study done in Egypt, which found that 45.7% of primary schoolchildren.²² Children are more likely to have problems and diseases. They have high risks of getting caries. The participants have shown significant results as about 48% and 44% children became risk free from caries using tooth brush with paste and oral hygiene instruction respectively. This was similar in study conducted in Libya where it was reported to be 87%.²⁰

Cleaning is the hallmark of our daily practices. Prevention and care are far better than medication where observation, instruction and reflection play critical role in dealing routine matters. It is a saying, prevention is better than cure, with an extension, an ounce of prevention is better than a pound of cure. The participants were asked about their routine of cleaning teeth. The responses have exhibited practice of never, once a week and 2-3 times a day by 2%, 5% and 8% who never cleaned their teeth earlier, about 3 and 41 per cent in once a week and about 40% in 2-3 times a day. The intervention of oral hygiene instruction has enhanced results by 8%, 15% and 22 % in never cases and 55% in 2-3 times a day. Overall, the outcomes were improved by 5, 10 and 15% in never cases, about 2% and 20% in once a week cases and by 48 percent in 2-3 times a day in high risk participants. These figures show similarity to the reported literature.²² Such measures can motivate the people for cleaning and enhance the routine practices of the people, which ultimately reflect in their better oral health.²³

It has been asked to the participants, whether you use toothpaste to clean your teeth. The responses have shown that about 5%, 21% and 20% started cleaning teeth with

the intervention of toothbrush with paste on and off, once a day and 2-3 times a day respectively. Higher results have exhibited with the intervention of oral hygiene instruction by 8, 24% and 34% with the use of on and off, once a day and 2-3 times a day. Overall, the participants have improved by about 7%, 23% and 27% with the use of on and off, once a day and 2-3 times a day correspondingly which different significantly in the study conducted on dental graduates they reported 87% increase in brushing after the intervention.²²

Cleaning teeth using fluoride toothpaste makes teeth clean and strong. In response to the question to use of toothpaste containing fluoride, the results have displayed that participants began using fluoride toothpaste with the intervention of tooth brush with paste by about 5, 28 and 65 per cent on and off, once a day and 2-3 times a day respectively. While, the intervention of oral hygiene instruction has motivated the participants by 8%, 24% and 39% correspondingly with on and off, once a day and 2-3 times a day. As a whole, these interventions have improved the results and people began using fluoride toothpaste by 52% 2-3 times a day which is similar to the results reported in another study i.e. 48.3%.¹⁹

The intervention of oral hygiene instruction has motivated participants and avoided them to use cola drinks by 29% and 56% who were using drinks daily, while by 16% to consumers once a week respectively. As a whole, cola drinks were evaded by about 27% and 61% in everyday and once a week consumer, while about 12% who consume once a week. These outcomes have displayed great improvements in regular consumers of everyday and once a week. Which relates to the literature as the complex carbohydrate diet and the one rich in fibers help reduce the dental decay Dental caries is a diet-related disease that continues to be a problem for certain dental patients. Frequent consumption of fermentable carbohydrates that have low oral clearance rates increases the risk for enamel caries and perhaps is even more dangerous for root surfaces.²⁰

Limitations: Our limitations included time with financial constrains and limited resources. No genetic workup was done for enrolled subjects.

CONCLUSION

This study concluded that intervention of oral hygiene instruction has produced significant results in motivating people for cleaning teeth regularly and avoiding the use of sugary foods and beverages to maintain their oral and general health. The study has interventions of tooth brush with paste and oral hygiene instruction for motivating and treating people. The intervention of oral hygiene instruction has exhibited remarkable and long-lasting outcomes as it educates the children how to deal with teeth, mouth and eating and drinking routines, which ultimately affect their oral health.

Author's Contribution: FI & MSR: Conceptualized the study, analyzed the data, and formulated the initial draft.

MT & SH: Contributed to the histomorphological evaluation.

MA & AH: Contributed to the analysis of data and proofread the draft.

AAK: Contributed to data collection.

TL: Contributed to the proofreading the manuscript for intellectual content.

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REFERENCES

- Niaz MO, Naseem M, Siddiqui SN, Khurshid Z. An outline of the oral health challenges in "Pakistani" population and a discussion of approaches to these challenges. *Journal of Pakistan Dental Association*. 2013; 22(3): 219-226.
- Mustasim H, Saeed MHB. Reorienting primary oral healthcare – Pakistan Dental Mission 2017, An IMANA-Riphah Collaboration. *Journal of Islamic International Medical College*. 2017; 12(3): 160-162.
- World Health Organization, WHO (2018). Oral health. Available at: <https://www.who.int/news-room/fact-sheets/detail/oral-health>, retrieved on March 10, 2019.
- Eskandari A, Abolfazli N, Lafzi A, Golmohammadi S. Oral health knowledge and attitudes of community health workers in East Azerbaijan, Iran. *Journal of Dentistry, Shiraz University of Medical Sciences*. 2016; 17(4): 297-300.
- Rashid MS, Ali I, Khan ZR, Bashir S, Haider SM, Hafeez N, et al. Attitude towards own oral health and hygiene: a survey of medical and dental students of Karachi, Pakistan. *Journal of Pakistan Dental Association*. 2016; 25(2): 53-58.
- Al-Qahtani SM, Abdul Razak P, Khan SDAA. Knowledge and practice of preventive measures for oral health care among male intermediate schoolchildren in Abha, Saudi Arabia. *International Journal of Environmental Research & Public Health*. 2020; 17:701-703.
- Mumtaz R, Attaullah, Khan A. A comparative evaluation of oral health knowledge, attitudes and practices of dental and pharmacy students of Riphah International University. *Pakistan Oral & Dental Journal*. 2009; 29(1): 137-140.
- Menegaz AM, Silva AER, Cascaes AM. Educational interventions in health services and oral health: systematic review. *Revista de Saúde Pública*. 2018; 52: 51-52.
- Sajjad S, Azam S. Oral health education in public schools of Rawalpindi city. *Pakistan Orthodontic Journal*. 2015; 7(2): 66-69.
- Abed R, Bernabe E, Sabbah W. Family impacts of severe dental caries among children in the United Kingdom. *International Journal of Environmental Research & Public Health*. 2020; 17: 108-109.
- Siddiqui TM, Wali A, Siddiqui SH, Heyat U, Nadeem M, Shamim M. An epidemiological study of prevalence of dental caries and periodontal disease among adults in deprived areas-Karachi. *Journal of Oral Health Research*. 2013; 4(1): 3-7.
- Koubaytari M. Student's oral health knowledge, oral health practices, and their susceptibility to oral health diseases at a Midwestern University. Mankato: Minnesota State University; 2017:1-10.
- US Department of Health and Human Services, USDHHS (2000). Oral health in America: A report of the Surgeon General. Rockville, MD: US Department of Health and Human Resources, National Institute of Dental and Craniofacial Research, National Institutes of Health. 2002:2-10
- Darby ML, Walsh M. Dental hygiene: theory and practice, 3rd edition. St. Louis, MO: Elsevier Health Sciences; 2010:3-10.
- World Health Organization, WHO (2020). Oral health. Available at: <https://www.who.int/news-room/fact-sheets/detail/oral-health>, retrieved on May 10, 2020:1-10.
- Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet*. 2018; 392: pp 789-883.
- Wyne AH, Al-Ghorabi BM, Al-Asiri YA, Khan NB. Caries prevalence in Saudi primary schoolchildren of Riyadh and their teachers' oral health knowledge, attitude and practices. *Saudi Medical Journal* 2002; 23: 77-81.
- Al Dosari AM, Wyne AH, Akpata ES, Khan NB. Caries prevalence and its relation to water fluoride levels among schoolchildren in central province of Saudi Arabia. *International Dental Journal*. 2004; 54: 424-428.
- Rashid MS, Ali I, Khan ZR, Bashir S, Haider SM, Hafeez N, Aslam MA, Bashir AH. Attitude Towards Own Oral Health and Hygiene: A Survey of Medical and Dental Students of Karachi, Pakistan. *J Pak Dent Assoc* 2016; 25(2): 53-58.
- Kaira LS, Srivastava V, Giri P, Chopra D. Oral health-related knowledge, attitude and practice among nursing students of Rohilkhand Medical College and Hospital: A questionnaire study. *JOFR*. 2012;2: 20–23.
- Bashiru BO, Omotola OE. Oral health knowledge, attitude and behavior of medical, pharmacy and nursing students at the University of Port Harcourt, Nigeria. *J Oral Res Rev*. 2016;8: 66–71.
- Jensen ME. Diet and dental caries. *Dent Clin North Am*. PMID: 10553247 1999 Oct; 43 (4):615-33.
- Raga A, Elzahaf1, Ashraf S, Elzer, Sakina Edwebi. Oral Health Practices, Knowledge, and Attitudes among Primary Schoolchildren in Derna City, Libya: A Cross Sectional Survey. April 29, 2020; 14: 53-59.