



ORAL HEALTH STATUS OF PRESCHOOL CHILDREN IN EL-SUEZ GOVERNORATE IN RELATION TO DENTAL CARE GIVEN AND THE INFLUENCE OF ORAL HEALTH EDUCATIONAL PROGRAM

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ABSTRACT

Objectives: To record dental caries experience among group of Egyptian children in nurseries schools in El-Suez governorate, assess the effect of implementing a dental health program on oral health status of these children, refer those children who are in need for dental treatment and evaluate the achievement of dental treatment for those children & record the unmet treatment.

Methods: A total number of 442 Egyptian children were included in this study. Their ages ranged from five to six years old & selected from nurseries schools of El-Suez governorate. Clinical examination of all the study children and self-administered questionnaire were conducted at baseline, 6th month and 12th month from implementation of the program. The children who need dental treatment were referred to health insurance clinic related to their residence area (El-Suez). The children were divided into two groups; the first group was educated by posters illustrations and the second group was educated by video cartoon film.

Results: 75% of the examined children had dental caries. No statistical significant difference was found in dental caries Indices during follow up period. There was a significant positive effect of the oral health education program since more children in both poster and video groups adopted regular oral health behavior such as proper tooth brushing and healthy dietary habits. Among the children who were referred to dental treatment 34.3% went to the dentist while 65.7% didn't go to the dentist.

Conclusion: Dental caries prevalence is high among preschool children in El-Suez governorate. The oral health education program is an efficient method for improving the oral knowledge, habits and attitude of those children.

KEY WORDS: Oral health status, El-Suez governorate, oral health educational.

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INTRODUCTION

Oral health is fundamental to general health and well-being. A healthy mouth enables an individual to speak, eat and socialize without experiencing active disease, discomfort or embarrassment.¹

Dental caries in primary teeth is a preventable and reversible infectious disease process that when left untreated results in pain, bacteremia, high treatment costs, reduced growth and development, speech disorders and premature tooth loss with its sequelae of compromised chewing and harm to the permanent dentition.²

Dental caries is one of the most prevalent chronic childhood diseases worldwide and is a major problem both from a population health perspective and for individual families who have to deal with a young child suffering from toothache.³ It is a multifactorial disease that starts with microbiological shifts within the complex biofilm (dental plaque). Caries is affected by the consumption of dietary sugars, salivary flow, exposure to fluoride and preventive behaviors.⁴

Many studies were conducted in Africa and detected a serious increase in the dental caries prevalence, where 90% of the lesions were found untreated. On the contrary, developed countries experienced a significant caries reduction over the last 20 years mainly due to the higher awareness, better orientation of the public about use of fluorides and behavior modification.⁵

Although dental caries prevalence has significantly decreased among Egyptian schoolchildren in the last decade, the incidence of dental caries is still high among younger children in Egypt, This could be attributed to several factor mainly lack of oral awareness and over consumption of refined carbohydrate.⁶

Oral health promotion is a planned approach to build healthy public policies, create supportive environments, strengthen community action and develop personal skills or reorient health services in

the pursuit of oral health goals. Not only oral health promotion has a positive impact on the child's health but also positively affects the family and the community.⁷

Oral health programs have a positive significant effect on the prevalence of caries and various risk factors for caries development.⁸

The oral hygiene and personal hygiene are the cheapest form of preventive health measure. Though cheap, it is surprisingly one of the most ignored in practice especially in the underprivileged rural communities.⁹

For improving the oral health and the oral hygiene practices, fluorides in toothpaste, topical fluoride application, effective use of oral health services and establishment of school-based preventive programs should be applied.¹⁰

Thus, the aim of this study was to record dental caries experience among group of Egyptian children in nurseries schools in El-Suez governorate, to assess the effect of implementing a dental health program on oral health status of these children, to refer those children who are in need for dental treatment and to evaluate the achievement of dental treatment for those children & record the unmet treatment.

SUBJECTS AND METHODS

A total number of 442 Egyptian children were included in this study. Their ages ranged from five to six years old & selected from nurseries schools of El-Suez governorate. Data were collected in cooperation with school teachers. Clinical examination of all the study children and self-administered questionnaire were conducted at baseline, 6th month and 12th month from implementation of the program.

Clinical examination was carried out to assess the child's caries experience following the WHO, 1987¹¹, criteria for diagnosis and recording of DMF, def and dmf indices. It was conducted in the school while the child was sitting on an ordinary chair in day light. Examination was carried out using

disposable mouth mirrors and sharp explorers. The children who need dental treatment were referred to health insurance clinic related to their residence area (El-Suez).

The dental health education program was based on educating the children the methods of caries prevention and training for proper tooth brushing.

A lecture including an introduction to dental anatomy, dental caries etiology and how to maintain good oral hygiene was given to the teachers. The teacher explained oral health lecture to children once per week. The children were divided into two groups; the first group was educated by posters illustrations and the second group was educated by video cartoon film. Causes of tooth decay, cariogenic and non-cariogenic diet were clarified and emphasized through posters illustrations and video film. All the children in both groups received a toothbrush and toothpaste.

Qualitative data were presented as frequencies and percentages. Chi-square (χ^2) test was used for comparisons between the groups. McNemar’s test was used to study the changes after education program within each group.

Quantitative data were presented as mean and standard deviation (SD) values. Mann-Whitney U test was used to compare between caries indices in the two groups. Wilcoxon signed-rank test was used to study the changes by time in caries indices.

RESULTS

The results of the study showed that 329 child (75%) of the examined children had a dental caries and 113child (25%) of the examined children caries free.

There was no statistically significant change in mean dmf or def indices after education by poster illustration at 6 months or 12 months.

There was no statistically significant change in mean dmf or def indices after education by video carton film at 6 months or 12 months.

Questionnaire results

Showed the effect of oral health education programme on children knowledge and habits:

A) Changes after education by posters

There was a significant positive effect regarding children knowledge such as usefulness of fluoridated tooth paste, importance of fluoridated tooth paste in protection of teeth, usage fluoridated tooth paste, types of sandwiches taking at school, taking fresh vegetables and fruits at school, buying sweets or juices from school and consumption of sweets.

There was a significant positive effect regarding children habits such as frequency and time of tooth brushing.

TABLE (1) The mean \pm standard deviation (SD) values and results test for comparison between caries indices before and after education by poster.

Caries index \ Time	Before program (n=229)	6 months (n=176)	12 months (n=145)	P-value
	Mean \pm SD	Mean \pm SD	Mean \pm SD	
dmf	3.5 \pm 1.5	3.5 \pm 1.9	3.5 \pm 2.1	P1= 0.758 P2 = 0.894
def	4.3 \pm 2.2	4.2 \pm 2.1	4.2 \pm 1.7	P1= 0.934 P2 = 0.877

*: Significant at $P \leq 0.05$,

P1: before program vs. 6 months, P2: Before program vs. 12 months

TABLE (2) The mean \pm standard deviation (SD) values and results for comparison between caries indices before and after education by video.

Caries index	Time	Before program (n=213)	6 months (n=158)	12 months (n=136)	P-value
		Mean \pm SD	Mean \pm SD	Mean \pm SD	
dmf		3.4 \pm 1.7	3.4 \pm 1.8	3.4 \pm 2	P1= 0.804 P2 = 0.913
def		4.4 \pm 2.1	4.4 \pm 2	4.2 \pm 1.8	P1= 0.901 P2 = 0.436

*: Significant at $P \leq 0.05$,

P1: Before program Vs. 6 months, P2: Before program Vs. 12 months

TABLE (3) The frequencies, percentages and results for comparison between questionnaire answers after 6 months and 12 months (posters group).

Question	Time	Before program (n=229)	6 months (n=176)	12 months (n=145)	P-value	P-value
		n (%)	n (%)	n (%)	P1	P2
Frequency of brushing						
No brushing		20 (8.7)	4 (2.3)	11 (7.6)	<0.001*	0.004*
Once/Day		99 (43.2)	82 (46.6)	72 (49.7)	<0.001*	<0.001*
Several times/Week		31 (13.5)	21 (11.9)	14 (9.6)	0.002*	<0.001*
2 times or more/day		79 (34.5)	69 (39.2)	48 (33.1)	0.002*	<0.001*
Time of brushing						
In the morning		26 (12.4)	26 (15.1)	20 (14.9)	<0.001*	<0.001*
At night		69 (33)	68 (39.5)	59 (44)	<0.001*	<0.001*
Morning and night		95 (45.5)	67 (39)	46 (34.3)	<0.001*	<0.001*
Other times		19 (9.1)	11 (6.4)	9 (6.7)	<0.001*	<0.001*
Do you know if using fluoridated tooth paste is useful or harmful to your teeth?						
Harmful		2 (0.9)	0 (0)	0 (0)	0.154	0.245
Useful		157 (68.6)	124 (70.5)	101 (69.7)	<0.001*	0.001*
Don't know		70 (30.6)	48 (27.3)	42 (29)	<0.001*	<0.001*
No answer		0 (0)	4 (2.3)	2 (1.3)	0.002*	<0.001*
If useful, what is the importance of fluoridated tooth paste in protection of teeth?						
No importance		0 (0)	2 (1.1)	0 (0)	0.075	Not computed
Little importance		8 (3.5)	11 (6.2)	9 (6.2)	<0.001*	<0.001*
Important		57 (24.9)	57 (32.4)	45 (31)	<0.001*	<0.001*
Very important		95 (41.5)	62 (35.2)	47 (32.4)	<0.001*	<0.001*
Don't know		57 (24.9)	44 (25)	44 (30.3)	0.116	<0.001*

Do you use fluoridated tooth paste?					
Yes	162 (70.7)	125 (71)	110 (75.9)	0.090	<0.001*
No	28 (12.2)	19 (10.8)	10 (6.9)	<0.001*	<0.001*
Don't know	36 (15.7)	32(18.2)	25 (17.2)	<0.001*	<0.001*
Refuse	3 (1.3)	0 (0)	0 (0)	0.066	0.066
Where do you have breakfast?					
At home	40 (17.5)	18 (10.2)	12 (8.3)	<0.001*	<0.001*
At school	127 (55.5)	102 (58)	87 (60)	<0.001*	<0.001*
Both	62 (27)	56 (31.8)	46 (31.7)	<0.001*	<0.001*
What types of sandwiches do you take at school?					
Beans – Cheese – Eggs or Luncheon	104 (45.4)	104 (59.1)	83 (57.2)	<0.001*	<0.001*
Jam – Halawa – dates or honey	33 (14.4)	13 (7.4)	19 (13.1)	<0.001*	<0.001*
Both	92 (40.2)	59 (33.5)	43 (29.7)	<0.001*	<0.001*
Do you take fresh vegetables and fruits at school?					
Yes	45 (19.7)	67 (38.1)	56 (38.6)	<0.001*	<0.001*
No	89 (38.9)	48 (27.3)	48 (33.1)	<0.001*	<0.001*
Sometimes	95 (41.4)	61 (34.6)	51 (35.2)	<0.001*	<0.001*
Do you buy sweets or juices from school?					
Yes	96 (41.9)	49 (27.8)	58 (40)	<0.001*	<0.001*
No	52 (22.7)	64 (36.4)	34 (23.4)	<0.001*	<0.001*
Sometimes	81 (35.4)	63 (35.8)	53 (36.5)	0.080	<0.001*
When do you take sweets?					
After breakfast	0 (0)	73 (41.5)	55 (37.9)	<0.001*	<0.001*
After lunch	8 (3.5)	50 (28.4)	29 (20)	<0.001*	<0.001*
After dinner	57 (24.9)	0 (0)	0 (0)	<0.001*	<0.001*
In-between meals	95 (41.5)	53 (30.1)	61 (42.1)	<0.001*	0.055

*: Significant at $P \leq 0.05$

P1: before program vs. 6 months, P2: Before program vs. 12 months

B) Changes after education by video

There was a significant positive effect regarding children knowledge such as usefulness of fluoridated tooth paste, importance of fluoridated tooth paste in protection of teeth, usage fluoridated tooth paste, types of sandwiches taking at school, taking fresh

vegetables and fruits at school, buying sweets or juices from school and consumption of sweets.

There was a significant positive effect regarding children habits such as frequency and time of tooth brushing.

TABLE (4) The frequencies, percentages and results for comparison between questionnaire answers after 6 months and 12 months (video group).

Question	Time	Before program (n=213)	6 months (n=158)	12 months (n=136)	<i>P-value</i>	<i>P-value</i>
		n (%)	n (%)	n (%)	<i>P1</i>	<i>P2</i>
Frequency of brushing						
No brushing		15 (7)	0 (0)	2 (1.5)	<0.001*	<0.001*
Once/Day		96 (45.1)	70 (44.3)	66 (48.5)	0.001*	<0.001*
Several times/Week		35 (16.4)	16 (10.1)	16 (11.8)	<0.001*	<0.001*
2 times or more/day		67 (31.5)	72 (45.6)	52 (38.2)	<0.001*	<0.001*
Time of brushing						
In the morning		23 (11.6)	14 (8.9)	26 (19.4)	<0.001*	<0.001*
At night		90 (45.5)	68 (43)	56 (41.8)	<0.001*	<0.001*
Morning and night		79 (39.9)	72 (45.6)	49 (36.6)	<0.001*	<0.001*
Other times		6 (3)	4 (2.5)	3 (2.2)	0.066	0.250
Do you know if using fluoridated tooth paste is useful or harmful to your teeth?						
Harmful		2 (0.9)	1 (0.6)	0 (0)	0.257	0.317
Useful		156 (73.2)	118 (74.7)	92 (67.6)	<0.001*	<0.001*
Don't know		55 (25.8)	39 (24.7)	44 (32.4)	<0.001*	<0.001*
No answer		0 (0)	0 (0)	0 (0)	Not computed	Not computed
If useful, what is the importance of fluoridated tooth paste in protection of teeth?						
No importance		2 (0.9)	0 (0)	0 (0)	0.060	0.317
Little importance		9 (4.2)	27 (17.1)	24 (17.6)	<0.001*	<0.001*
Important		56 (26.3)	48 (30.4)	38 (27.9)	<0.001*	<0.001*
Very important		103 (48.4)	58 (36.7)	32 (23.5)	<0.001*	<0.001*
Don't know		43 (20.2)	25 (15.8)	39 (28.7)	<0.001*	<0.001*
Do you use fluoridated tooth paste?						
Yes		159 (74.6)	125 (79.1)	113 (83.1)	<0.001*	<0.001*
No		22 (10.3)	6 (3.8)	4 (2.9)	<0.001*	<0.001*
Don't know		32 (15)	27 (17.1)	19 (14)	<0.001*	<0.001*
Refuse		0 (0)	0 (0)	0 (0)	Not computed	Not computed
Where do you have breakfast?						
At home		26 (12.2)	18 (11.4)	12 (8.8)	0.008*	<0.001*
At school		103 (48.4)	79 (50)	72 (52.9)	<0.001*	<0.001*
Both		84 (39.4)	61 (38.6)	52 (38.3)	<0.001*	<0.001*

What types of sandwiches do you take at school?					
Beans – Cheese – Eggs or Luncheon	99 (46.5)	81 (51.3)	69 (50.7)	<0.001*	<0.001*
Jam – Halawa – dates or honey	9 (4.2)	7 (4.4)	5 (3.7)	0.500	0.125
Both	105 (49.3)	70 (44.3)	62 (45.6)	<0.001*	<0.001*
Do you take fresh vegetables and fruits at school?					
Yes	57 (26.8)	63 (39.9)	55 (40.4)	<0.001*	<0.001*
No	83 (39)	23 (14.6)	23 (16.9)	<0.001*	<0.001*
Sometimes	73 (34.2)	72 (45.6)	58 (42.6)	<0.001*	<0.001*
Do you buy sweets or juices from school?					
Yes	121 (56.8)	48 (30.4)	58 (42.6)	<0.001*	<0.001*
No	37 (17.4)	61 (38.6)	31 (22.8)	<0.001*	<0.001*
Sometimes	55 (25.8)	49 (31)	47 (34.6)	<0.001*	<0.001*
When do you take sweets?					
After breakfast	39 (18.3)	49 (31)	40 (29.4)	<0.001*	<0.001*
After lunch	23 (10.8)	49 (31)	29 (21.3)	<0.001*	<0.001*
After dinner	7 (3.3)	3 (1.9)	0 (0)	<0.001*	<0.001*
In-between meals	144 (67.6)	57 (36.1)	67 (49.3)	<0.001*	<0.001*

*: Significant at $P \leq 0.05$

P1: before program vs. 6 months, P2: Before program vs. 12 months

Evaluation of dental care given

Among the children who referred to dental treatment 85 children (34.3%) went to the dentist with their parent(s) while 163 children (65.7%) didn't go to the dentist with their parent(s).

The most prevalent reason for not accompanying the child to the dentist as report by their parents was that the child has no complaint (40.5%) followed by they thought that teeth are deciduous and will be changed or replaced (37.4%). Other causes were that the parents had no enough time (8%) and elevated cost (7.4%). The least prevalent cause was bad experience (6.7%).

The most common treatment done was extraction

(29.4%) followed by filling (24.7%), combined extraction and medication (16.5%), medication (15.3%) and the least common one was combined filling and extraction (14.1%).

About 54.1% of parents who accompanied their children thought the child had adequate treatment while 45.9% of parents who accompanied their children thought the child had inadequate treatment.

Nearly 80.3% of the extractions done were good as assessed by the examiner while post-treatment complaint was found in 15.8% of the extraction cases. 66.5% of the fillings done were good as assessed by the examiner while post-treatment complaint was found in 19.8% of the filling cases.

TABLE (5) The frequencies and percentages of responses to treatment questionnaire.

Question	n (%)
Have you been to the dentist with your child?	85 (34.3)
Yes	163 (65.7)
No	
If no, why?	
The child has no complaint	66 (40.5)
No enough time	13 (8)
Teeth are deciduous and will be changed	61 (37.4)
Previous bad experience	11 (6.7)
Cost	12 (7.4)
Type of treatment	
Filling	21 (24.7)
Extraction	25 (29.4)
Medication	13 (15.3)
Filling + Extraction	12 (14.1)
Extraction + Medication	14 (16.5)
If yes, had he/she received adequate treatment?	
Yes	46 (54.1)
No	39 (45.9)
Dentist assessment of treatment	
Extraction	
Good	147 (80.3)
Bad	36 (19.7)
Post-treatment complaint	29 (15.8)
Filling	
Good	111 (66.5)
Bad	56 (33.5)
Post-treatment complaint	33 (19.8)

DISCUSSION

Untreated oral diseases in children frequently lead to serious general health problem, significant pain, interference with eating and lost school time. The prevalence and severity of dental caries in preschool children can be quite high as demonstrated

by several studies.¹² Thus, it is of great importance to begin preventive efforts at very young ages in the population.¹³

At global level, prevalence rates and patterns of oral disease have changed considerably over the past two decades. In most industrial countries, the prevalence of dental caries and mean dental caries experience in children has declined.¹⁴ Such changes are often ascribed to changing living conditions and lifestyles, effective use of oral health services, implementation of school based oral health care programs, adoption of regular self-care practice and use of fluoride tooth-paste.¹⁵

Against this, increasing level of dental caries among children is observed in some developing countries especially for those countries where community-based preventive oral care programmes are not established.¹⁶

In order to control the growing burden of oral diseases, a number of developing countries introduced school-based oral health programmes and preventive programmes which aiming to improve oral health behavior and status of children population.¹⁷

This study investigated the oral health status of preschool children in El-Suez governorate in relation to dental care given and the influence of oral health educational program by using posters illustrations & video cartoon film.

A total of 442 children were included in the study at baseline with 229 children in posters group and 213 children in video group. At the 6th month follow up 334 children remained in the study with 176 children and 158 children in the posters group and video group respectively. At the 12th month follow up 281 children remained in the study with 145 children and 136 children in the posters group and video group respectively. The drop-out of number was most being caused by transfer of children to other school or being absent when the

follow up were performed due to hectic political and socioeconomic condition of El-Suez governorate.

The results of this study revealed that 75% of the examined children had dental caries. This result came in agreement with WHO.⁷ report on oral health provided an overview of global caries epidemiology that confirmed its international pandemic distribution. Globally, WHO reported caries prevalence in school-age children at 60-90%.

In contrast, it has been observed in another similar study by Que and Hou.¹⁸ in China which reported the prevalence of dental caries was 39.65%. This may be attributed to the difference in the lifestyle, socioeconomic level, dental health awareness and availability of dental services for the children included in the study.

In this study the mean dmf in the posters group was 3.5 ± 1.5 and the mean def was 4.3 ± 2.2 while the mean dmf in video group was 3.4 ± 1.7 and the mean def was 4.4 ± 2.1 before the educational program. The changes over time in dental caries indices at 6th month and 12th month follow up were not significantly different than the baseline and these may be explained by short intervention period and short follow up period. These finding came in accordance with Petersen et al.¹⁹ in china who found no reduction in dental caries indices after follow up period of three years from implementation of OHE program.

In our study the data on oral health behavior were collected by means of self-administered questionnaire with respect to oral health knowledge, attitudes towards dental care, oral hygiene habits and dietary habits. The present study indicated a significant positive effect of the oral health education program since more children in both posters and video groups adopted regular oral health behavior such as tooth brushing, use of fluoride toothpaste and dietary habits. The effect was significant in both groups at 6th month and 12th month follow up.

This finding came in agreement with the result of study conducted by Shenoy et al.²⁰ in India who found that school dental education program was successful in improving oral health knowledge, practices, oral hygiene status, and gingival health of schoolchildren. In addition a similar finding came in agreement with the result of study conducted by Macpherson et al.²¹ in Scotland who found improvement in oral habits and attitudes after applying school based OHE program.

On assessment of the dental care given among the children who referred to dental treatment in our study, 85 children (34.3%) went to the dentist with their parent(s) while 163 children (65.7%) didn't go to the dentist with their parent(s). This result came in contrast to the result obtained by Dhar and Bhatnagar.²² in India, as all of the children included in the study were given free dental treatment as a part of the programme. This may reflect the difference in availability of treatment facilities between two studies.

In our study the most prevalent reasons for not accompanying the child to the dentist as reported by parents were that the child has no complaint (40.5%), followed by the parents thought that teeth are deciduous and will be changed or replaced (37.4%). Other causes were that the parents had no enough time (8%) and the elevated cost (7.4%). The least prevalent cause was bad experience (6.7%). This finding may be attributed to the negative parental behavior regarding the importance of dental treatment, the low level of the awareness of the parents about the importance of oral health status and their low socioeconomic level. This finding disagreed with results reported by Arora and Sharma.²³ in India who found only 15% of the parents ignored their children's decayed primary teeth as their children had no complain and thinking that they will ultimately fall while 85% of parents agreed that milk teeth needs dental care like permanent teeth.

In our study, the most common treatment done was extraction followed by restoration. In contrast, it has been observed in another study that was conducted in India by Moses et al.²⁴ who reported that the restoration was the most common treatment followed by extraction and fissure sealant. This may be attributed to the well developed dental health care system implanted in their study with more trends toward conservative approach.

School-based intervention has been suggested as a suitable approach for improving children's health and it can be efficient, effective, cost-suitable and beneficial to the entire community.^{7,25} The findings of the present study suggest that the school is an appropriate structure to implement oral health intervention programmes.

Furthermore, as health-care systems have limited resources, to select the best preventive strategy that requires the least resources is very important. To find a suitable educational programme not depending on costly professional input is of great importance particularly in countries with a developing oral health care system.^{26,27} Using the school system to provide information to parents seems to be both efficient and cost-effective.²⁸

Because of the continuing perception that oral health is separating from general health, there is a risk of marginalizing oral health promotion. It is of great important to develop globule approach to promote oral and general health of the children.²⁹

Overall, the findings of this study will form part of a baseline for the oral health assessment for children between the ages of 5 to 6 years in El-Suez governorate.

CONCLUSIONS

- 1- Dental caries prevalence is high among preschool children in El-Suez governorate.
- 2- No statistical significant difference was found in dental caries Indices during follow up period and between poster and video groups.

- 3- The oral health education program is an efficient method for improving the oral knowledge, habits and attitude of those children.
- 4- Posters illustrations and video cartoon film are effective in communication with those children guided by the assistance of their teacher.
- 5- This study reflects widespread neglect of oral health of preschool children in El Suez governorate.

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