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Effect of Educational Intervention Program of Oral Health on Knowledge and Practice among Primary School Pupils in Tanta City

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Abstract: **Oral health plays a key role in the overall health status and quality of life in children. Oral health intervention and promotion may be delivered at various setting such as hospitals, primary healthcare centers, private dental clinics, and schools. Aim of the study: The aim of this study was to investigate the effects of educational intervention program on oral health knowledge and practice among primary school pupils in Tanta city. Research design: Quasi experimental research design was used in this study. Setting: The study was conducted in 7 governmental primary schools in Tanta city which were selected based on stratified random sampling to constitute about 14% from a total number of 50 schools in both east and west educational zones. Tools: Two tools were used for data collection, Tool I: A structured interview sheet; it was composed of two main parts: Part (1): Socio-demographic data of the studied subjects, Part (2): Participants' knowledge of oral health such as number of milky and permanent teeth, its benefits and harmful habits for teeth. Tool II: Participants practice of dental care; it consisted of two parts: Part (1): Participants' reported practice of oral health care, Part (2): Observational check list sheet that contain steps of teeth brushing and flossing. Results: The result of this study revealed that, before implementation of the program, the studied pupils had low scores of knowledge and practice. There were statistically significant improvements in the pupils' total scores of knowledge and practice of oral health care immediately and three months after implementation of the program. Conclusion and Recommendation: The educational program was effective and enhanced pupils' knowledge and practice of oral health care. So, school health nurses should conduct it regularly using simple attractive audiovisual aids.**

Keywords: **primary school pupils, oral health, educational intervention program.**

1. INTRODUCTION

Oral health is an integral part of the general health and well-being of children and is now recognized as equally important in relation to general health. Oral health plays a key role in the overall health status and quality of life in children. It has been well established that oral health may affect several domains of child growth, development and socio-physical functions such as feeding, and breathing, speaking, smiling and social adaptation. Among common oral diseases, dental caries and periodontal diseases are the two main oral pathologies that remain widely prevalent and affect all populations throughout the life span. [(1-3)]

The first nationwide survey of oral health among Egyptian adults and children that conducted by WHO involved different sectors of the society. The study showed that, nearly 70% of examined children had some untreated caries experience; meanwhile, 80% were suffering from some form of periodontal disease. Preservation of healthy teeth is one of the key

health issues in childhood. Although observable improvements over the past decades, oral health is still a significant problem. According to WHO worldwide statistics, approximately 60%-90% of school-aged children and a vast majority of adults in industrialized countries suffer from dental caries. [4, 5]

Dental caries is progressive and cumulative in nature and becomes more complex over time. If untreated it can alter children's quality of life, as ability to eat and chew, the food they choose, how they look and the way they communicate. Dental caries may result in pain, infections and tooth loss. It can impact every aspect of life from personal relationships and self-confidence to school, work or even enjoying food. Good oral hygiene habits start at an early age. [7]

A number of factors have been put forward to explain the variation in prevalence and severity of dental caries that can be found not only between developing and technically developed countries, but also between rural and urban communities within the same country. These factors were preceded only by dietary factors as increasing exposure to commercialized sugar products, parental oral health, and fluoride, less availability to dental-health-care services and enamel hypo-plasia and socio-economic status. Dental caries has been assumed to be on the increase in developing countries. [8]

Oral health intervention and promotion may be delivered at various setting such as hospitals, primary healthcare centers, private dental clinics, and schools. Schools are an imperative part of health promotion. Health education in schools is effective in promoting knowledge, reforming, and improving health related beliefs and behaviors. [9, 10]

School health nurses have an important role in promoting oral health, includes mouth checks and referrals for any identified oral health disorders as a part of the comprehensive health assessment. School health nurses are in a good position to refer sick pupils for treatment as needed, deliver some oral health promotion activities within the school environment to both parents and teachers, and equip parents with up-to-date information about the importance and benefits of fluoride as well as other oral health promotion activities. [11, 12]

Health education programs at school are capable of improving the level of children´s knowledge, for better control of the health illness process, and are considered an effective and low cost option for the dissemination of knowledge about health [13]. So, this study was conducted to investigate the effects of educational intervention program on the knowledge and practice of oral and dental health among primary school pupils.

Aim of the study:

The aim of this study was to investigate the effect of educational intervention program on oral health knowledge and practice among primary school pupils in Tanta city

The research hypothesis:

The application of educational intervention program about oral health is expected to positively change the primary school pupils' knowledge, and practice related to oral health.

2. SUBJECTS AND METHOD

Design: A quasi experimental research design was used in this study.

Settings:

The study was conducted in seven governmental primary schools in Tanta city which were selected based on cluster sampling to constitute about 14% from a total number of 50 schools in both east and west educational zones (Four schools out of 29 schools from east zone, and three schools out of 21 schools from west zone).

Subjects:

The total study subjects were 179 pupils (90 from east and 89 from west educational zone) from 5th and 6th grades of the selected schools. One class was chosen randomly using simple random sampling technique from the previous settings. All the pupils in the chosen classes who were willing to participate were included in the study.

Tools of the study:

Two tools were used for data collection which was developed by the researchers based on literature review [14-17].

Tool I: A structured interview sheet: it was developed by the researchers based on literature review and was composed of two main parts:

Part (1): Socio-demographic data of the studied pupils as age, sex, grade, birth order, family size, parent education and occupation.

Part (2): Participants' knowledge of oral health. It consisted of 19 questions covering the following data such as, number of milky and permanent teeth, importance of teeth, importance of oral and dental health, tooth brush and tooth paste, dental problems and effect of different types of food on teeth.

Scoring system of participants' knowledge was done as follows: each question had a group of answer points, one point was awarded for each correct answer; incorrect or missed answer took zero. The scores obtained for each set of questions was summed up to get the total score for participants' knowledge. Total knowledge score for all questions reached 29 points.

The knowledge scores were classified as:-

- Poor knowledge: < 50% of the participants' total score.
- Fair knowledge: 50 - < 75% of the participants' total score.
- Good knowledge: ≥75 % of the participants' total score.

Tool II: Participants' practice of oral health care: this tool was developed by the researchers based on literature review and consisted of two parts:

Part (1): **Participants' reported practice of oral health care:** It composed of six questions that describe the pupil dental health practice as regular tooth brushing, time of brushing teeth and periodic dental checkup.

Part (2): Observational check list sheet: it was developed by the researchers to assess and evaluate participants' performance of dental care (teeth brushing and use of dental floss). It consisted of eleven consecutive steps describing the steps of both tooth brushing and the use of dental floss. The researchers used denture as a model for the teeth & gum and ask each participant pupil to brush the denture and make flossing to it. **Scoring system of the checklist:** each step was evaluated using 2- points' scale ranging from 0 to 1. Wrong or not done step scored 0, and complete correct step scored 1. The total score allotted was 11.

The total practice score was 17 (11 points for the dental brushing and flossing checklist, in addition to six points for self-reported practice).

The total practice scores were classified as:-

- Unsatisfactory: < 60% of the participant total practice score.
- Satisfactory: ≥ 60% of the participant total practice score.

Method:

- Official permission to conduct the study was obtained from Faculty of nursing and Ministry of education.
- Ethical commitment with regard to informed consent, confidentiality, and privacy was ensured before conducting the interview, pupils' right to withdraw at any time and anonymity were also assured and their names were replaced by codes during the study.
- Tools were constructed and developed by the researchers based on literature review.
- Study tools were tested for its face and content validity by 5 nursing and dentistry faculty staff.
- Reliability test was done using Cranach's alpha test. It was 0.735 for tool I and 0.776 for tool II.

- A pilot study was conducted on 10 pupils for testing feasibility and applicability of the tools and modifications were done accordingly. Some questions were omitted, other questions were added and clarification of some questions was ensured. Those students were excluded from the study subjects.

- Face-to-face educational intervention was conducted in the class room at a mutually chosen scheduled time for all participants according their available time and through co-ordination with school administrator.

- The field work of this study was done in 5 months starting from November 2016 to March 2017. All participant pupils were informed about the program objectives at the beginning of the program to attain their active participation and cooperation during the implementation of the program.

Procedure of data collection:

- Pre -program assessment test for the pupils' knowledge and practice about oral health care were done by the researchers to detect their learning needs in the 1st week before starting the program for each school. Needs were taken into consideration when preparing the training program content. Knowledge and reported practice sheet were filled within 15-20 minutes and the observational check list was filled by the researchers within five minutes for each pupil.

- The program was applied by the researchers to ensure providing complete and accurate knowledge and practice to all pupils about oral health care.

- Methods of teaching were interactive lectures, discussion, demonstration and brainstorming. Teaching aids like film, power point presentation, and handouts were used, and real objects as brushes, dental floss and denture as a teeth model and gum

- Hand out containing the content of the educational sessions designed by the researcher, was given to each participant to use it as a future reference to refresh their knowledge.

- Each school was visited by the researchers separately at different times.

- The training program was conducted in 2 sessions; ***the 1st*** **session** was about theoretical knowledge regarding oral health care which covered; structure of the mouth, milky and permanent teeth, oral health problems, factors affecting oral health and its maintenance. ***The 2nd*** **session** was to train pupils about dental brush and tooth flossing using brushes, dental floss and denture as a model of teeth and gum. It covered the position of the brush, cleaning the showing surface of teeth, cleaning the inner surface, cleaning the tongue, use of suitable length of tooth floes, rolling of the floes on the fingers, and the use of the floes for cleaning teeth.

- Evaluation of students' knowledge and practice was done through the interview sheet (tool I part 2 and tool II). The evaluation was done before, immediately after completing educational sessions and three months later.

- **Statistical analysis:**

The data was computerized and verified using SPSS (Statistical Package for social science) version 20.0. Qualitative data were described using number and percent. Quantitative data were described using mean and standard deviation. Analysis for collected data was done through the use of several statistical tests as: Chi-square(x2) and t. test. Statistical significance was considered at p-value <0.05.

3. RESULTS

Table (1) shows the distribution of the studied pupils according to their socio-demographic characteristics. It was observed that more than half (56.4% and 50.8 %) of the studied pupils were boys in fifth grade respectively and nearly two thirds (65.9%) of them were 11years old. As regard their fathers' data, it was found that less than half (47 % and 44.7%) of them had high education and worked a professional work respectively. More than half (54.2%) of the studied pupils their mothers were house wives and nearly two fifths (43.6% and 43.0%) of their mothers had technical and high education respectively. Furthermore, less than half (48 %) of the studied pupils were the first child and the majority (83.3 %) of them their families composed of 3-5 members.

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Table (1): Distribution of the studied pupils according to their socio-demographic characteristics

Variable	Studied students	
	No	%
Sex:		
• Boys	101	56.4
• Girls	78	43.6
Grade :		
• Fifth grade	91	50.8
• sixth grade	88	49.2
Age		
• 10 years	9	5
• 11 years	118	65.9
• 12 years	43	24.1
• 13 years	9	5
Father occupation		
• Craftsman	43	24
• Worker	56	31.3
• Professional	80	44.7
• **Father education**:		
• Illiterate / read and write	20	11.1
• technical or secondary education	75	41.9
• high education / Post graduate	84	47
Mother occupation		
• House wife	97	54.2
• Working	82	45.8
Mother education		
• Illiterate / read and write	24	13.4
• Technical or secondary education	78	43.6
• High education	77	43.0
Family size:		
• 3-5 members	149	83.2
• More than 5	30	16.8
Birth order of the child		
• The first child	86	48.0
• Middle	56	31.3
• The youngest child	37	20.7

Figure (1) shows the distribution of the studied subjects according to the history of dental problems. The figure showed that slightly less than one half (49.7%) of the studied pupils had no dental problems while less than one quarter (22.9%) of them had teeth decay and 14.5 % had teeth pain and 12.8 % had teeth extraction. On the other hand, more than two thirds (67%) of the pupils didn't visit the dental clinic regularly every six months.

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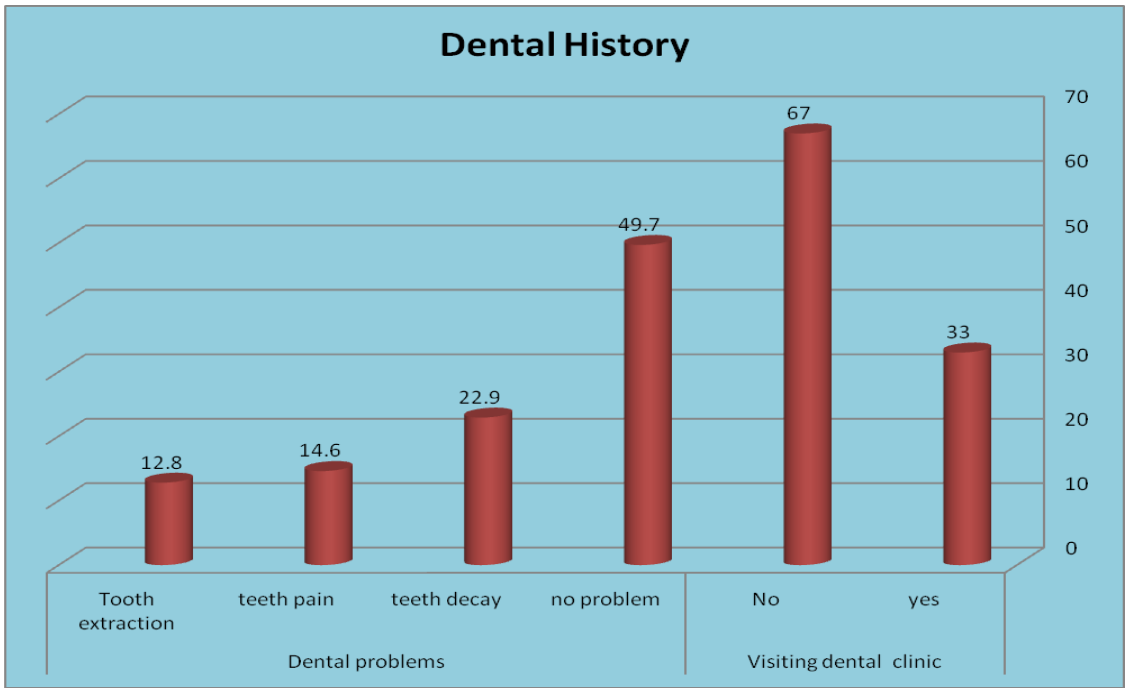

Figure (1): Distribution of the studied subjects according to history of dental problems

Table (2) shows the distribution of the studied pupils according to their knowledge about oral and dental health pre, immediate and three months after program implementation. It was clear that before the implementation of the intervention program, the highest percentages of the studied pupils had wrong or incomplete answers regarding number and benefit of milky teeth, importance of dental care, number of teeth brushing, risk factors of teeth decay, definition of plaque layer, important food for dental health harmful habits for teeth and methods of prevention of dental problems (57%, 62%, 83.2%, 49.2%, 45.3%, 86%, 75.4%, 61.5%, 88.8%,and 87.2%) respectively.

On the other hand, less than half of the studied subjects didn't know the number of permanent teeth and the time of exchanging milky teeth (44.7% and 43%) respectively. Furthermore, more than one third of the studied pupils didn't know the ideal teeth brush, type of teeth paste and the angle of holding teeth brush (39.7%, 33.5%, and 33.5%) respectively.

Immediately after program implementation, the majority of the studied subjects show improvement in all items of knowledge regarding oral and dental health except for the important foods for dental health where more than three quarters of them (76.5 %) had incomplete right answer. Indeed, the majority of the studied pupils retain their knowledge about oral and dental health for the three months after program implementation as regard all the previous mentioned items of dental and oral health knowledge with slight decrease than immediate knowledge score(83.2%, 84.4%, 92.2%, 91.6%, 77.7%, 88.3%, 88.8%, 90.5%, 80.4%, 91.1%, 87.7%, 79.35, 84.95, 84.4%, 81.6%) respectively.

Table (2): Distribution of the studied pupils according to their knowledge about oral and dental health pre, immediate and three months after program implementation

Students' knowledge regarding dental health	**Pre-test** (N=179)		**Immediate post-test** (N=179)		**After 3 months post- test**(N=179)	
	No	**%**	**No**	**%**	**No**	**%**
Number of milky teeth • Right	77	43.0	174	97.2	149	83.2
Benefits of milky teeth • Right and complete answer	47	26.3	169	94.4	151	84.4

Number of permanent teeth • Right answer	68	38.0	178	99.4	165	92.2
Time of exchanging milky teeth • Right answer	66	36.9	176	98.3	164	91.6
Importance of dental care • Right and complete answer	0	0	156	87.2	139	77.7
Number of brushing teeth per day • Right answer	75	41.9	170	95.0	158	88.3
Ideal tooth brush • Right answer	61	34.1	170	95.0	159	88.8
Frequency of changing tooth brushes • Right answer	81	45.3	171	95.5	162	90.5
Duration of teeth brushing • Right answer	69	38.5	155	86.6	144	80.4
Type of toothpaste • Right answer	64	35.8	176	98.3	163	91.1
The angle of holding tooth brush • Right answer	68	38.0	171	95.5	157	87.7
Definition of teeth decay • Right answer	95	53.1	148	82.7	142	79.3
Risk factors for teeth decay • Complete right answer	9	5.0	125	69.8	111	62.0
Definition of plaque layer • Right answer	18	10.1	155	86.6	138	77.1
Impact of frequent eating or drinking sugar or starch • Right answer	110	61.5	162	90.5	152	84.9
Important foods for dental health • Complete right answer	28	15.6	39	21.8	44	24.6
Manifestation of gingivitis • Right answer	87	48.6	169	94.4	151	84.4
Harmful habits for teeth • Complete right answer	0	0	134	74.9	123	68.7
Methods of prevention of dental problems • Complete answer	17	9.5	160	89.4	146	81.6

Table (3) shows distribution of the studied students according to their total knowledge scores pre, immediate and three months after program implementation. It was observed that pre-program, most of pupils (88.8 %) had poor knowledge, while immediately and three months after the program implementation the majority of them (99.4% and 95.5%) respectively had good knowledge scores with significant difference between them (p value <001)

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Table (3): Distribution of the studied students according to their total knowledge scores pre, immediate and three months after program implementation

Total knowledge score	The studied students						t. test	P value
	Poor		Fair		Good			
	No	%	No	%	No	%		
• Pre test	159	88.8	20	11.2	0	0	46.490	< 001*
• Immediate post test	0	0	1	.6	178	99.4	163.527	< 001*
• Three months post test	0	0	8	4.5	171	95.5	132.318	< 001*

*Significant at 0.05

Table (4) shows the distribution of studied students according to their reported practice of dental hygiene pre, immediate and three months after program implementation. It was observed that, there was an improvement of the studied pupils' reported practice immediately and three months after program implementation compared to pre program intervention. However, immediately after the program, the highest frequencies of the studied pupils brushed their teeth with teeth paste twice per day after getting up and before sleeping and reported that they will go to dentist for check up regularly every six months or if they have teeth ache (88.3%, 84.2%, 69%, 74.1%, 84.4% and 98.3%) respectively. This improvement in the studied pupils reported practice was decreased slightly three months after program implementation in relation to teeth brushing, frequency of washing teeth, periodic check up and action taken when having teeth ache (88.3%, 60.7%, 81% and 91.1%) respectively compared to (48.6%, 42.5 % 29.1% and 68.7%) of the studied subjects respectively pre program implementation.

Table (4): Distribution of studied students according to their reported practice of dental hygiene pre, immediate and three months after program implementation

Students' practice of dental hygiene	**Studied pupils** (No=179)					
	Pre-test		**Immediate post-**		**After 3 months post-test**	
	No	**%**	**No**	**%**	**No**	**%**
Tooth brushing						
• No	92	51.4	21	11.7	21	11.7
• Yes	87	48.6	158	88.3	158	88.3
Tooth brushing with:-	n=87		n=158			
• Soap and water	8	9.2	6	3.8	25	15.8
• Water only	6	6.9	19	12	30	19
• Teeth paste	73	83.9	133	84.2	103	65.2
Frequency of washing teeth / day	n=87		n=158			
• Once per day	12	13.8	32	20.2	45	28.5
• Twice per day	37	42.5	109	69	96	60.7
• Three times per day	38	43.7	17	10.8	17	10.8
Time of Tooth brushing	n=87		n=158			
• When I get up	5	5.7	13	8.2	13	8.2
• Before sleeping	8	9.3	1	.6	6	3.8
• After meals	11	12.6	27	17.1	44	27.8
• After getting up and before sleeping	63	72.4	117	74.1	95	60.2
Visiting the dentist :						
• Regularly every 6 months	52	29.1	151	84.4	145	81.0
• When I have teeth ache	110	61.5	25	14.0	31	17.3
• I never go	17	9.5	3	1.7	3	1.7
Actions when having teeth ache						
• Go to the dentist	123	68.7	176	98.3	163	91.1
• Put Aspocide on my teeth	13	7.3	1	.6	3	1.7
• Take prescribed drug for other persons	23	12.8	0	0	5	2.8
• Do nothing	20	11.2	2	1.1	8	4.5

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Fig (2) shows distribution of the studied subjects according to their practice of teeth brushing steps pre, immediate and three months after program implementation. It is clear that, the majority of the studied pupils didn't perform any right steps of teeth brushing pre implementation of the intervention program (86.0%). While, immediately after the program, nearly about one half of them (49.2% and 50.8 %) respectively. Three months after program implementation, about two thirds of the studied pupils (65.9%) can do three right steps out of four steps and nearly about one third of them (30.7 %) can do all the steps in a right manner.

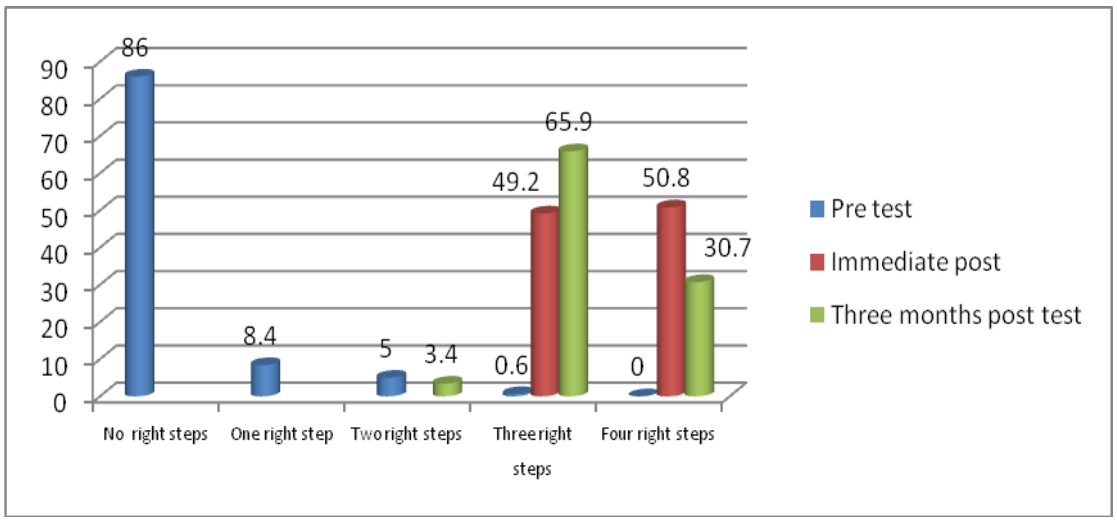

Figure (2): Distribution of the studied subjects according to their practice of teeth brushing steps pre, immediate and three months after program implementation.

Figure (3) shows distribution of the studied subjects according to their practice of teeth flossing steps pre, immediate and three months after program implementation. The figure illustrated that, most of the studied pupils (91.1%) didn't perform any right step of teeth flossing pre implementation of the program. Immediately after program implementation, the pupils' practice was improved as they can perform five, six or seven right steps out of seven steps of teeth flossing (35.2% to 59.2 % and 5.6%) respectively. Moreover, more than half of the studied pupils (52 %) can perform six right steps out of seven and more than one third of them (38 %) can perform five right steps out of seven after three months of program implementation.

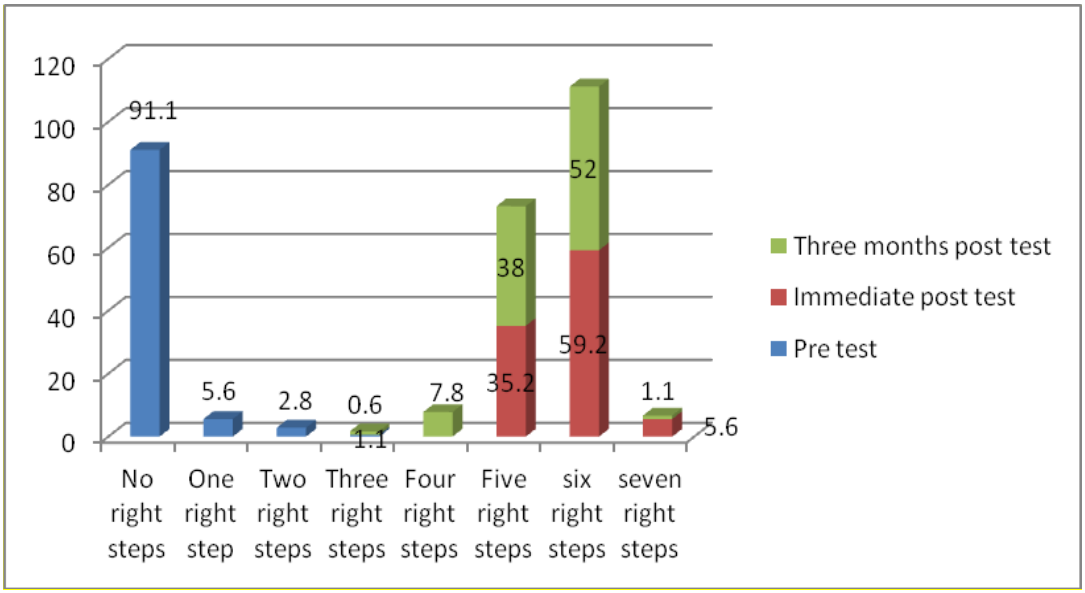

Figure (3): Distribution of the studied subjects according to their practice of teeth flossing steps pre, immediate and three months after program implementation.

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Table (5) shows distribution of the studied pupils according to their total practice scores pre, immediate and three months after program implementation. It was obvious that all of them (100.0%) had unsatisfactory practice scores before program, improved to all of them had satisfactory scores immediately after implementation of the program, this result were slightly decreased to 91.1% three months post-program. There was a significant improvement in the studied pupils' practice pre, immediate and three months after program implementation about dental care. Statistical differences were observed among pre, immediate and three months after program implantation (p value <001).

Table (5): Distribution of the studied pupils according to their total practice scores pre, immediate and three months after program implementation

Total knowledge score	Studied students				t. test	P value
	Satisfactory scores		Unsatisfactory scores			
	No	%	No	%		
• Pre program	0	0	179	100.0	17.550	< 001*
• Immediate post program	179	100.0	0	0	110.374	< 001*
• Three months post program	163	91.1	16	8.9	101.838	< 001*

*Significant at 0.05

Table (6) shows the relationship between socio-demographic characteristics of the studied students and their mean knowledge scores pre, immediate and three months after program implementation. The table revealed that, there was a significant relationship between pupils' total mean score of knowledge and their sex, grade, and birth order throughout the study (p value < 005).

Table (6): Relationship between socio-demographic characteristics of the studied students and their mean knowledge scores pre, immediate and three months after program implementation

Total knowledge score		Students' mean scores		
		Pre- program (N=179)	Immediate post program (N=179)	After three month post-program (N=179)
Sex	**Boys**	**10.8812±3.421**	**26.1980±2.249**	**24.3465±2.566**
	Girls	**11.2179±2.831**	**27.2051±1.956**	**25.2308±2.335**
X^2		**35.498**	**37.894**	**39.059**
P		**.001***	**< 001***	**< 001***
Grade	**Five**	**11.9890 ± 2.505**	**26.1758±1.964**	**24.5714±2.700**
	Six	**10.0341±3.485**	**27.1136±2.296**	**24.8977±2.279**
X^2		**34.251**	**31.725**	**31.117**
P		**.002***	**< 001***	**.002***
Birth order	**First**	**10.7558± 3.367**	**26.4419±2.078**	**24.5698±2.339**
	Middle	**11.0536±2.733**	**26.8393±2.402**	**24.8036±2.547**
	Youngest	**11.6216± 3.327**	**26.7838±2.070**	**25.0000±2.818**
X^2		**72.249**	**51.530**	**65.689**
P		**< 001***	**< 001***	**< 001***
Total mean score		**11.0279±. 3.173**	**26.6369±. 2.179**	**24.7318 ±2.500**

***Significant at 0.05**

Table (7) shows the relationship between socio-demographic characteristics of the studied pupils and their mean practice scores pre, immediate and three months after program implementation. The table revealed that, there was a significant relationship between pupils' total mean score of practice and their sex & grade pre, immediate and three months after program implementation. The finding revealed that fifth grade boys had better practice than six grade girls p value (< 005). Meanwhile, significant relationship between pupils' total mean score of practice and their birth order throughout the study which indicated that, the first child had better practice score either immediately or after three month after program implementation (p value < 005).

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Table (7): Relationship between socio-demographic characteristics of the studied students and their mean practice scores pre, immediate and three months after program implementation

Total Practice score		Students' mean scores		
		Pre- program	Immediate post program	After three month post -program
Sex	Boys	2.2178± 1.792	13.9010±1.808	13.0495±1.818
	Girls	2.9103 ± 2.020	13.9487 ± 1.528	12.8333±1.540
X^2		7.988	7.657	19.487
P		.435	.364	.012*
Grade	Fifth	2.3516 ± 1.858	14.1099 ±1.689	13.1978±1.641
	Sixth	2.693± 1.978	13.727± 1.672	12.7045±1.736
X^2		9.246	13.759	15.872
P		.322	.056	.044*
Birth order	First	2.4767±1.9080	14.0465±1.651	13.0349±1.690
	Middle	2.6607±1.880	13.9107±1.851	12.8750±1.917
	Youngest	2.4054±2.047	13.6486±1.513	12.8919±1.390
X^2		45.535	38.428	35.891
P		< 001*	< 001*	.003*
Total mean score		2.5196 ± 1.920	13.9218±1.687	12.9553± 1.702

*Significant at 0.05

4. DISCUSSION

Oral health care is a mirror for general health and well-being and significantly impacts children`s quality of life. By maintaining good oral hygiene and dental care, many diseases in school age children can be prevented. Those children should be educated about oral health, so that a sense of responsibility would develop among them [(10)]. Oral health education is believed to be a cost-effective method for promoting oral health if done through schools, where all school children irrespective of their socioeconomic status or ethnicity can be reached[(18)]. Therefore, the present study aimed to studying effect of educational intervention program on oral health knowledge and practice among primary school pupils in Tanta .

The current study revealed that there were statistically significant improvements in the pupils' scores of knowledge and practice of oral and dental care throughout the study (tables 3 and 5). These results were supported by the findings of Egyptian researches as Seif El-Nasr E M (2017)[(19)] and Abu-Elenen et al. (2015) [(20)], who reported that the application of oral health programs for children is effective for improving dental health knowledge and practice. Similar findings have been reported too in other countries where school-based preventive programs were found effective in improving oral health knowledge and behavior (Ajith Krishnan et al. 2010, Subedi et al. 2011) [(10, 21 -22)]. The positive effects of health education offered in this study is also in accordance with that of other studies conducted in different parts of the world, where the oral health behaviors and attitudes of children were changed after conducting the oral health education programs[(23-24)] .

Results of the present study indicated that the health education program offered to studied pupils improved their knowledge regarding to the milky and permanent teeth, importance of teeth, importance of dental care, frequency and duration of brushing teeth and types of teeth paste. Furthermore, there was an improvement of the school children's knowledge of dental caries risk factors, plaque layer, important food for dental health and harmful habits for teeth in addition to other oral health problems and methods of its prevention (Table 2). This result was in accordance with the study of Shenoy and Sequeira (2013) [(23)], Ahn and Yi (2010) [(25)].

In this study, the oral health knowledge and practice levels were influenced by socio-demographic factors, as sex, grade and birth order. As regard to the grade this could be the result of the curriculum that they have in the school as they study the structure of mouth and importance of teeth and how to protect their teeth. Also, this may attributed to the national program of school dental health that carried out at schools for the fourth grade pupils, as regard the differences related to birth order it may be attributed to the experience of parents as the youngest child shows better knowledge and practice score. The results are in line with previous studies of Seif El-Nasr E M (2017)[(19)] and Abu-Elenen et al. (2015) [(20)] .

Health education program to the studied pupils encouraged them to adopt right oral health practice such as tooth-brushing at least twice a day and visiting dentists at least every six months. The present study revealed that less than half of students were brushing their teeth twice daily but after program the percentage improved to 88.3% & 69% immediately and after three months respectively. the results of the study is in agreement with the study of Abu-Elenen et al. (2015)[20] as they revealed that one fifth of students performed the recommended practice of brushing teeth twice daily, but after program the percentage improved to 27.6 and 32.5% immediately and at follow-up, respectively. The results of the study of Oliveira et. al. 2008[18] among Nigerian children and Haque et. al. 2014[26] were in agreement with the results of the present study. On the other hand, these findings of the present study were contrary to the study of Jennifer 2014[27] to the school children of Dagupan City in which they reported that the respondents were not brushing their teeth regularly.

In relation to causes of dentist visit the highest frequencies of children reported that they visit dental clinic only when they have teeth ache and only less than one third of them had reported dental checkup pre-program implementation. This percentage had improved both immediately and three months post program as the majority of them reported that they will visit dentist every 6 month and only few of them reported that they will go to dentist if they have teeth ache. This result may attributed to effect of the program as it raise the awareness of the pupils about the benefits of early seeking medical advice in case of teeth ache. This result was supported by the study of Abu-Elenen et al. (2015) [20].

As regard the teeth brushing and teeth flossing steps, the result of the current study revealed that the majority of pupils couldn't perform the steps of brushing teeth and teeth flossing in a correct manner but after program implementation, this percentage improved to about one half of them who could perform the steps correctly immediately after program implementation and three months follow up respectively. These findings could be attributed to the oral care practices seemed to be more frequent observed during program implementation using an attractive aiding material and because of increasing knowledge of the children about oral and dental care. This result is supported by the finding of Seif El-Nasr E M (2017)[19] who reported that before oral health intervention program more than a quarter of pupils performed all steps of brushing teeth but after program the percentage improved to more than half.

So, continuous efforts should be made to help pupils and young generation to compile with oral and dental care. This can be achieved through the organization and implantation of educational programs to school age children.

5. CONCLUSION

Based on the results of the present study it can be concluded that, the oral and dental care educational program improve the knowledge and practice of the participant pupils.

6. RECOMMENDATIONS

- School health nurse should conduct dental and health education programs to students regularly.

- School health nurse have to develop simple attractive booklets about oral and dental care and disseminate it for pupils at schools.

- Periodic screening for school pupils for early detection of dental problems and referring them to health insurance medical services.

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