

Assessment Performance of Primary School Students Regarding Oral Hygiene and Dental Caries

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Abstract

Background: Oral health is integral to general health and essential for well-being and oral diseases qualify as major public health problems owing to their high prevalence and incidence. The public health problems associated with oral diseases are a serious burden on countries around the world. Performance refer to any learning activity that, students perform to demonstrate their knowledge, attitude and practice. **Aim of the Study:** The current study aimed to assess performance of primary school pupils regarding oral hygiene and dental caries. **Design:** A descriptive cross sectional research design was utilized to fulfill the aim of this study. **Setting:** The study was conducted in Alshimy School and Towa (2) Primary Schools affiliated to Minia City of Minia Governorate, Egypt. **Sample:** Cluster random sample of 400 children were committed to the study. The children were distributed for the six schools class as following (30% from each class). **Data collection Tools:** Four tools were used as follows: **Tool I;** Structured interviewing questionnaire (socio demographic data, Dietary Habits and practice), **Tool II;** Knowledge Assessment Tool, **Tool III;** Self-Reported practices Assessment tool & **Tool IV ;** (Dental Caries Attitude Scale) among the primary school pupils. **Results:** The current study revealed that there is no statistical significant differences between total knowledge scores and age, residence and total practices at (p value<0.05), there is statistical significant differences between all knowledge score, attitudes scores and sex at (p value=03) and highly statistically significant difference between attitudes and residence at (p value=.001) . **Conclusion:** According to the results of this study, more than three quarter of school children had an unsatisfactory level of knowledge about dental caries, and more than three quarters of them had poor practices scores toward dental caries, around three quarter had negative attitudes scores. **Recommendations:** Regular dental check-up and identification of high caries risk among school children should be conducted by training school nurses and other primary care workers who have regular contact with school children & providing health education for teachers and pupils about oral hygiene and prevention of dental caries.

Key Words: Attitude, Dental Caries, Knowledge, Oral Hygiene, Practice.

Introduction

Oral health is essential to human health. Conditions associated with poor oral health involve all organ systems and many major disease categories including infectious disease, cardiovascular disease, chronic pain, cancer, and mental health. Outcomes are also associated with health equity. Medical education organizations including the Association of American Medical Colleges and National Academy of Medicine recommend that oral health be part of medical education. However, oral health is not traditionally included in many medical school, physician assistant, or nurse practitioner curriculum (Gill et al., 2022).

Oral hygiene measures in childhood lead to healthy teeth and oral mucosa, providing optimal general health conditions. Oral diseases are depicted as a major public health challenge, especially in school children (Gill et al., 2022). A total of 90% of them are suffering from dental caries, with increasing incidences in Asian and Latin American countries. It had been reported by the United Nations Educational, Scientific and Cultural Schools continue to be an essential environment, offering an ideal and effective method to manage over 1 billion children worldwide. Preschools and primary schools have great potential to influence child's health behavior (Yilmaz et al., 2021).

More than 530 million children worldwide suffer from dental caries in primary teeth. In the United Kingdom, in 2019, tooth extraction was the main reason for hospital admission among children aged between six and ten years. Even though the prevalence of decayed teeth in children in the UK has significantly decreased in recent years, and oral health

inequalities between socio-economic groups persist (Uerlich et al., 2021).

Dental caries may cause toothache, tooth loss, and systemic infection. In addition, it may influence children's school performance and missing school days and may result in difficulties in eating and sleeping due to school performance and missing school days and may result in difficulties in eating and sleeping due to pain. The microbial community of caries is diverse and contains many facultative and obligatory anaerobic bacteria. Streptococcus mutants are considered to be the principal etiological agent of dental caries (Doley et al., 2022).

Dental caries ranks among the most common oral diseases of childhood. Due to its prevalence, economic aspect, and effect on the quality of life, it presents a significant public health issue. Numerous factors are increasing the risk of dental caries. Besides inherent and metabolic predispositions, behavioral factors are of great importance. Among them, oral hygiene and diet play significant roles. Tooth-brushing applied at least once a day has been considered a principal tool to maintain oral health and prevent caries (Štefanová et al., 2020).

School-age children (those aged 6–18 years) experience a range of largely preventable health problems, including unintentional injury, interpersonal violence, sexual and reproductive health issues, communicable diseases, non-communicable diseases, and mental health issues (WHO, 2021). Good oral health knowledge is important for achieving good oral health habits, and a link has been shown to exist between improved knowledge and better oral health

(Blaggana et al., 2016). School-based health education is successful in encouraging awareness, modifying, and changing attitudes and behaviors related to health (Alshloul, 2021).

Performance assessment defined as assessment measures how well students apply their knowledge, skills, and abilities to authentic problems. The key feature is that it requires the student to produce something, such as a report, experiment, or performance, which is scored against specific criteria. Also Performance refers to a piece of work students are asked to do to show how well they apply their knowledge, attitude, or practice (McTighen, 2021).

World Health Organization promotes oral health promotion through schools to improve understanding, behaviors, and practices related to oral health for the prevention and control of dental disease among schoolchildren. Several studies have established numerous sources of information on oral health, such as parents, schoolteachers, dentists, and mass media, which have a direct impact on schoolchildren's oral health awareness (Al-Darwish, 2016).

School nurses play an important role within the school health program by addressing the major health problems experienced by children (Holmes et al., 2016). The National Association of School Nurses (NASN) recently established the Framework for 21st Century School Nursing Practice, which characterizes five principles of school nursing, including care coordination (e.g., student health and education care plans, direct care, case management), leadership (e.g., advocacy for policy development and implementation, funding and reimbursement, health care and education reform), quality improvement (e.g., to identify, prioritize, and monitor actions that show the greatest impact on education and health outcomes), community and public health (e.g., to improve both individual and population health and education outcomes, to address social determinants such as student housing and environments), and standards of practice (e.g., clinical guidelines, code of ethics, evidence-based practice, Nurse Practice Acts) (Kolbe, 2019).

School nurses are well positioned to take the lead for the school system in partnering with school physicians, community physicians, and community organizations. They facilitate access to Medicaid and the State Children's. The school nurse promotes health. The school nurse provides health education by providing health information to individual students and groups of students through health education, science, and other classes (Selekman et al., 2019).

Significance of the Study

Dental caries and periodontal diseases are among the most prevalent preventable health problems in the world and are the main causes of tooth loss. Despite the reduction in dental caries levels due to preventive interventions, the incidence of periodontal diseases remains high and these conditions are highly associated with poor oral health status. It is well established also that adequate oral hygiene is essential in order to prevent the occurrence and progression of both diseases. Therefore, even with professional care, the patient's ability to maintain adequate tooth brushing and interdental cleaning is fundamental for achieving and maintaining oral infection control (Oliveira et al., 2021).

World Health Organization (WHO) has represented the early childhood caries as a worldwide problem with a prevalence of between 60 and 90%. According to the statistics

provided by the European countries, 61% of children aged 6 to 12 years have at least decayed tooth, and due widespread dental caries in all social classes, this disease can impose a great financial burden on the society (Kazeminia et al., 2020). In Egypt A nationally representative study published in 2019 reported high prevalence (69.2%) with a mean decayed, missing and filled teeth score of 3.5 among the 3-to 6-year-old children (Chen et al., 2021).

In developing countries, dental caries remains untreated due to inappropriate, unaffordable, and unavailable dental services and to the scarcity of professionals. Moreover, dental caries costs United State \$298 billion in direct treatment costs to the global economy, 4.6% of the global health budget, and 144 billion losses due to loss of productivity (Teshome et al., 2021).

Aim of the Study

The aim of this study was to:

The current study aimed to assess performance of primary school students regarding oral hygiene and dental caries.

Research questions

The study was answering the following questions:

- 1- What is the level of knowledge, attitude and practices regarding oral hygiene and dental caries among primary school students?
- 2- What are the relation between socio demographic data and knowledge, attitude and practice among primary school students?

Subjects & methods

Study design:-

A descriptive cross sectional research design was achieved to fulfill the aim of this study.

Setting

The setting was chosen by multistage random sample. The study was conducted in Alshimy School and Towa (2) Primary Schools at Touk El Khail and Towa Villages Primary Schools affiliated to Minia City of Minia Governorate, Egypt. The two selected schools had chosen by randomization through multistage random sample as Minia governorate divided into districts then the investigator by simple randomization made a list of them and selected Minia district primary schools(138 school), and selected Touk El Khail and Towa primary schools then making another list containing 22 primary governmental schools at the assigned district. The last stage was choosing two schools. The demographic, cultural, and geographical features of the selected schools were very similar.

Sample:

Sample size:

A random sampling technique formula to estimate sampling size It is computed as $n = N / (1+Ne^2)$. Slovin's formula (David & Maligalig, 2006).

Description:

n = required sample size. N = population. e = margin of error at 5% (standard value of 0.05).

1st school n = $442 / (1 + (442 \times 0.05^2))$ n = ~210

2nd school n = $362 / (1 + (362 \times 0.05^2))$ n = ~190

According to needed Total sample (400) pupils

Sample Calculation:

Samples were taken from each class .A cluster random sample of 400 children was committed to the study. The children were distributed for the six school classes as follows (30% from each class): a total number of each grade of two schools:1st years (77), 2nd year (70), 3rd year (68),4th year (66),5th year (64), 6th year (60).

The sample composed of (400) primary school pupils according to following criteria

Inclusion Criteria:

- Age group ranged from (6-12) years.

Exclusion criteria:

- Students who have age less than (6) yrs. And age above (12yrs).
- Private school student.

Tools for Data Collection:

Tools for data collection will be consisted of four tools: the investigator to collect data

Tool I: Structured interview questionnaire and consist of two parts; **Part (1):** Socio Demographic Data, it consists of (9) items including: Data related to pupils such as age, gender, grade, school name, residence...etc. with response multiple choices developed by (El-Nasr, 2017), and modified by investigator.

Part (2): Student's Dietary Habits and practice Habits assessment regarding dental caries:- Student Dietary Habits: It includes (5) questions to assess the pupils previous history such as: How many times do you have meals per day, Do you like sweets & If yes How often do you consume sweets per weeketc. with response multiple choice developed by (Al-Darwish ,2016),and modified by investigator to be suitable for use .

Student Practice Habits: It includes (10) questions to assess the pupils previous history such as: Do you usually rinse your mouth after meals, How many times do you brush your teeth daily & What you use to clean your teethetc. with response multiple choice developed by (Yavagal & Singla, 2017) and modified by investigator.

Tool II: Knowledge Assessment Tools: consist of two parts;

Part (1): knowledge about dental hygiene: It consists of (4) items including: keeping my teeth healthy it is necessary to, example of foods causing dental caries, complications from poor dental care & how often for prevention from poor dental care developed by (Ahmed et al., 2015),and modified by investigator to be suitable for use.

Part (2): knowledge about dental caries: It consists of (8) questions such as: means of healthy teeth ,oral and dental health means health of the body, causes of dental caries and means of dental cariesetc.) Developed by (Alhazmi et al., 2014)),and modified by investigator to be suitable for use.

For knowledge outcomes, a correct response was scored as (One), while incorrect and "don't know" responses will be scored as (Zero). The total knowledge scores was 12. Scores ≤ 6 (50%) will classified as unsatisfactory level of knowledge, scores > 6 (50%) was classified as satisfactory level of knowledge.

Tool III: Self-Reported Practice regarding oral care:-It consists of (9) items to assess the pupils practices about dental caries such as: oral health behavior including brushing activity (such as wet the brush with water, put toothpaste on the brush, brush front surface of all teeth starting from the top row and brush inner surface of all teeth) with response (done correctly, done incorrectly& not done, added after jury committee modification developed by (Abou Zeid Hassan, 2019).

For Self-Reported Practice, correct responses (done correctly) were scored as (One), while incorrect responses (done incorrectly& not done), was scored as (Zero). The total knowledge scores were 9. Scores ≤ 5 (60%) was classified as unsatisfactory level of Practice. scores > 5 (60%) was classified as satisfactory level of knowledge.

Tool IV: (Dental Caries Attitude Scale):- Attitude/behavior scale (HU-DBI) items among the studied student. This scale adopted by (Kawamura,1992) the scale includes statements to assess pupils' attitude regarding dental caries that modified by investigator. It consisted of (17) questions by using (Three) Likert scale (agree, Indifferent & disagree).

For attitude outcomes, responses agree was taken score (two) and responses (disagree take zero scores and Indifferent were taken scores (1). The total attitude scores will 34. Scores ≤ 21 was classified as negative attitude, scores > 20 were classified as positive attitude response. Maximum possible score is 21, and the minimum score is (17). The higher the score is the better the oral health attitude and behavior (Kawabata, 1990 & Kawamura, 1992).

Validity:

The questionnaire was piloted on panel of 5 experts (jury) of community health nursing staff who reviewed the instruments for clarity, relevance, comprehensiveness, understanding, applicability and easiness.

Reliability:

To ensure the tool consistency, it was checked for its reliability .Internal accuracy was calculated to see how well the tools objects measured what they were supposed to measure . A Cronbach's alpha coefficient of 0.00 means there is no reliability, while 1.00 means there is perfect reliability. Reliability testing for interviewing questionnaire about knowledge of primary school students about dental caries and oral hygiene 0.87 and interviewing questionnaire about self-reported practice about student's oral hygiene was 0.88.

Pilot study:

After designed the tools, a pilot study was conducted on (10 %) of sample to assess clarity, completeness, and to determine the time involvement. According to the results of pilot study, the needed omissions, and/or additions were done., some questionnaire items Modified as in tool I(Socio demographic characteristic&Diatry habits), in tool II (Knowledge assessment tool about oral hygiene and dental caries) changed all items to multiple choice questions. Also added tool III (self-reported practices) of pupils to assess the level of oral care .In tool IV modified and consisted of (17

item) added choice from three items using (Three) Likert scale (agree, Indifferent& disagree).The results of the pilot study were included in the study .

Ethical considerations:

A written initial approval was obtained from the research ethical committee of the faculty of Nursing, Minia University. Verbal consent was taken from all the pupils who participate in the study. The purpose and nature of the study was explained by the investigator through direct personal communication prior to starting their participation in the study. This data was confidential between the pupils and the investigator and it was used for the purpose of the study only. The questionnaire filled by the investigator.

Data Collection Procedures:

Dean Faculty of Nursing Minia University granted permission to conduct this study. Following ethical committee approval at Minia University's Faculty of Nursing, an official letter from the directors of two primary schools at Towa village (Alshimy School and Towa (2) Primary Schools) was obtained for data collection; it included a concise description of goals, as well as a request for permission.

In 2021, the investigator created data collection methods after conducting an exhaustive analysis of applicable national and international literature. The study tool was translated into Arabic. Investigator visited the director of each primary school and welcomed him then recognized him the classes were free that able to collect data from pupils and

filled out questionnaires in class after introducing himself and explaining the aim and purpose of study also the importance of oral hygiene and provided health education about guidelines to promote oral health status and how to prevent dental caries disease.

The investigator visited the primary school from 8.30 AM to 1.00 PM on three days each week, (Saturday, Sunday, and Monday) for one school. The investigator was collect data from each grade primary pupils in each primary school through (10 weeks). All data collection duration was taken about three months, from October 2021 to December 2021. and the average time spent on each was about 15-20 minutes.

After obtaining oral consent from each participant of pupils and explaining research goals to gain their cooperation, pupils were interviewed. The investigator filled out the questionnaire at Queries, which was read to respondents, and their exact answers were registered.

Statistical Analysis:

Version 20 of statistical package for social science (SPSS, IBM) was used to collect, tabulates, and analyze the data. Numbers and percentages were used to represent descriptive variable. The mean and standard deviation were utilized to present quantitative data. Chi square test used see if there were connection between two qualitative variables or if there was a difference between two or more proportions. Correlation was calculated between knowledge, using Pearson correlation test. Significant at (p-value <0.05)

Results

This study aims to assessment performance of primary school students regarding oral hygiene and dental caries.

Table (1): Distribution of the Study Primary School Pupils According to their Socio-Demographic Characteristics at Alshimy School and Towa (2) Primary School, 2021 (n=400):

Socio-Demographic Characteristics		No.	%
Age			
-	<10 yrs.	245	61.2
-	>10yrs.	155	38.8
Gender			
-	Male	184	46.0
-	Female	216	54.0
Residence			
-	Urban	29	7.6
-	Rural	371	92.4
Father Education			
-	Illiterate	25	6.3
-	Basic Education	59	14.8
-	Secondary Education	156	39.0
-	High Education	60	40.0
Father Occupation			
-	Employee	347	86.8
-	Not work	53	13.3
Mother Education			
-	Illiterate	73	18.3
-	Basic Education	57	14.3
-	Secondary Education	111	27.8
-	High Education	159	39.8
Mother Occupation			
-	Work	163	40.8
-	Not work	237	59.3
Number of Family Members:			
-	Two Persons	9	2.3
-	Three persons	37	9.3
-	(4 to 5)Person	229	57.3
-	More than 5 Persons	125	31.3
Economic Status:			
-	Sufficient	218	54.5
-	Not Sufficient	182	45.5

Table (1): Illustrates that 61.2% of subjects their age less than 10yrs, 38.8% their age more than 10 yrs., 54.0% of pupils are female, 46.0 % of pupils are male. Regarding their residence 92.4% of pupils are from rural area, 7.6% of pupils are from urban. The educational level of father reveals that, 40 % have high education, 39.0% of fathers have secondary education, 3.6% of fathers are illiterate, 86.8% of fathers are employee, and 13.3% of fathers are not work. Regarding mother education 39.8% of mothers have high education, 27.8% of mothers have secondary school, 18.3% of mothers are illiteracy, 59.3% of mothers are not work, and 40.8% of mother are work. Regarding number of family members 57.3% of pupils their family consists of 4 to 5 person, 31.3% of subjects their family consisted of more than 5 person, 54.5% of subjects have sufficient income but 45.5% have not sufficient.

Table (2): Distribution of the Primary School Pupils According to Their Dietary Habits at Alshimy School and Towa (2) Primary School, 2021 (n=400)

Dietary Habits	No.	%
Times about having meals per day:		
- Once	8	2.0
- Twice	37	9.3
- Three Times	251	62.8
- More than three	104	26.0
You like sweets:		
- Yes	359	89.8
- No	41	10.2
Times about consuming sweets per week :		
- Once	52	13.0
- Twice	59	14.8
- Three Times	57	14.3
- More than three	232	58.0
Preferred time for eating sweets:		
- At mealtimes	20	5.0
- After meals	105	26.3
- Between mealtimes	73	18.3
- At all times	202	50.4
Times about consuming snacks per day:		
- Once	134	33.5
- Twice	176	44.0
- Three Times	28	7.0
- More than three times	62	15.5

Table (2): Shows that, 62.8% of pupils have three meals per day, 26.0% of pupils have more than three meals and 89.8% of pupils likes sweets, 58.0% of pupils consume more than three of sweets per week, per day, 13.0% of subjects consume one time of sweet per week. Also 50.4% of children prefer to eat sweets all the day, and 5% of children prefer to eat sweet at meal time. In addition 44% of subjects consume twice snack per day and 15.5% consume more than three snacks per day.

Total Knowledge scores about Dental Caries

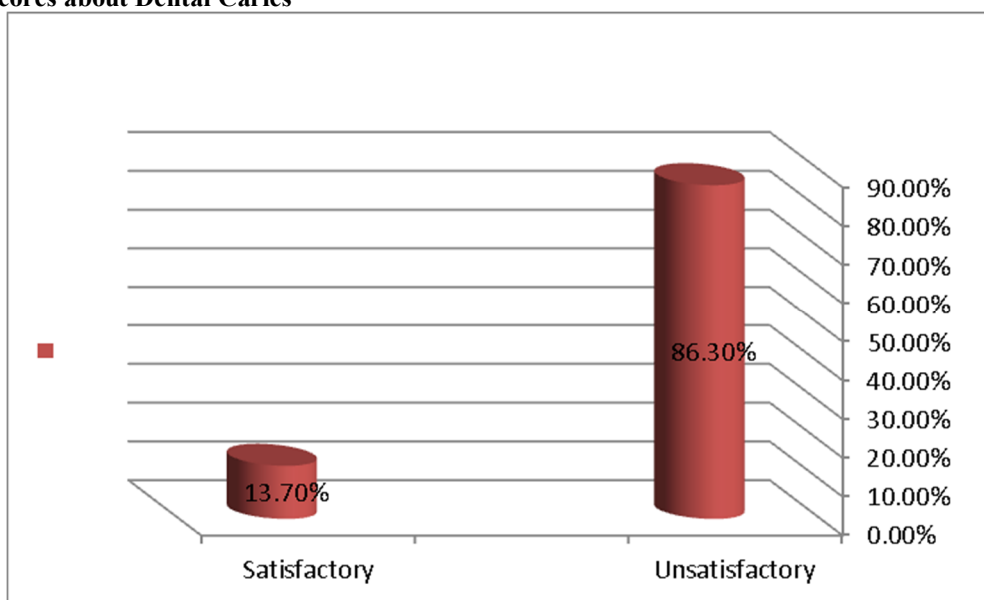


Figure (1): Distribution of primary school pupils regarding total knowledge scores about dental caries at Alshimy School and Towa (2) Primary Schools, 2021 (n=400):

Figure (1): Illustrates that 86.3% of pupils have unsatisfactory knowledge scores, but 13.7% of subjects have satisfactory knowledge scores.

Total Practices Scores about Dental Caries

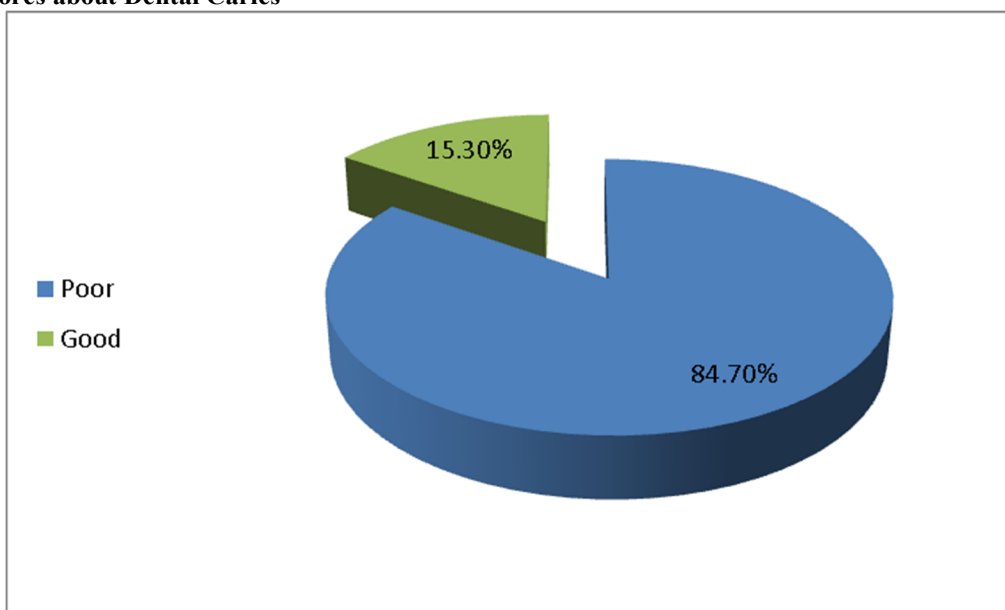


Figure (2): Distribution of Primary School Pupils Regarding total Practices Scores about Dental Caries at Alshimy School and Towa (2) Primary Schools, 2021 (n=400):

Figure (2): Illustrates 84.7% of pupils have poor practices scores, but 15.3 of subjects have good practices scores.

Total Attitudes Scores about Dental Caries:

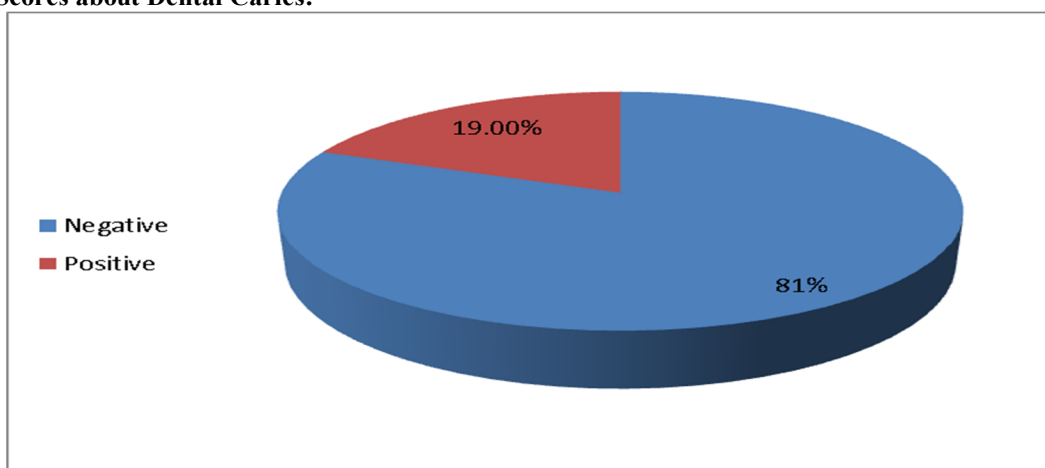


Figure (3): Distribution of Primary School Pupils Regarding total Attitudes Scores about Dental Caries at Alshimy School and Towa (2) Primary Schools, 2021 (n=400):

Figure (3): Illustrates 19% of pupils have positive attitudes scores, but 81% of subjects have negative attitudes scores.

Table (10): Relation between total Knowledge Scores and Socio Demographic Characteristics at Alshimy School and Towa (2) Primary Schools, 2021 (n=400):

Socio Demographic Characteristics	Total Knowledge N=400				X2	P. value
	Satisfactory		Un satisfactory			
	No.	%	No.	%		
Sex						
- Male	19	10.3	165	89.7	X2=18.3	P.04*
- Female	36	16.6	180	83.4		
Age						
- Less than 10 yrs.	33	13.4	212	86.6	X2=7.713	P0.9
- More than 10 yrs.	22	14.1	133	85.9		
Residence						
- Rural	54	14.5	317	85.5	X ² =18.55	P 0.3
- Urban	1	3.4	28	96.6		

N.B p-value (<0.05)

Table (10): Illustrates there are no a statistically significant difference between total knowledge scores and age, residence while there is a statistically significant difference between total knowledge scores and sex.

Table (11): Relation between total Practices Scores and Socio Demographic Characteristics of pupiles at Alshimy School and Towa (2) Primary Schools, 2021 (n=400):

Socio Demographic Characteristics	Total Practices N=400				X2	P. value
	Good		Poor			
	N	%	N	%		
Sex						
- Male	26	14.1	158	85.9	X2=34.38	P.03*
- Female	35	16.2	199	83.8		
Age						
- Less than 10 yrs.	40	16.3	205	83.7	X2=15.13	P0.8
- More than 10 yrs.	21	13.5	134	86.5		
Residence						
- Rural	54	14.5	317	85.5	X ² =34.23	P0.03*
- Urban	7	24.1	22	75.9		

N.B p-value (<0.05)

Table (11): Illustrates there are a statistically significant difference between total practices scores and sex, residence p value=0.03, but there is no statistically significant difference between practices and age P value =0.8.

Table (12): Relation between total Attitudes Scores and Socio Demographic Characteristics at Alshimy School and Towa (2) Primary Schools, 2021: (n=400)

Socio Demographic Characteristics	total Attitudes N=400				X2	P. value
	Positive		Negative			
	N	%	N	%		
Sex						
- Male	31	16.8	153	83.2	X2=36.15	P.2*
- Female	45	20.8	171	79.2		
Age						
- Less than 10 yrs.	45	18.3	200	81.7	X2=29.88	P0.4
- More than 10 yrs.	31	20.0	124	80.0		
Residence						
- Rural	64	17.2	307	82.8	X ² =76.5	P0.001**
- Urban	12	41.3	17	58.7		

N.B p-value <0.05).

Table (12): Illustrates there are a highly statistically significant difference between total attitudes and residence p value=.001, but there are no statistically significant difference between attitudes with age and sex.

Table (13): Correlation between total Knowledge Score and total Practices Scores about Dental Caries at Alshimy School and Towa (2) Primary Schools, 2021 (n=400):

Overall Practices Scores about Dental Caries	Total Knowledge Score	
	Correlation Coefficient (r)	P-value
Total Practices Scores	.077	0.1

N.B (p-value <0.05).

Table (13): Shows there is no statistical significant differences in total knowledge score and total practices, P value=0.1.

Table (14): Correlation between total Knowledge Score and total Attitudes Scores about Dental Caries at Alshimy School and Towa (2) Primary Schools, 2021 (n=400)

Total Attitudes Scores about Dental Caries	Total Knowledge Score	
	Correlation Coefficient (r)	P-value
Overall attitudes scores	.101	0.04*

N.B (p-value <0.05).

Table (14): Shows there is statistical significant differences in total knowledge score and total attitudes scores, P value=0.04.

Discussion

School-aged children and school-based settings are more common and effective at providing preventive care than a community-based approach. School-based oral health education (OHE) has been applied successfully in some developing countries to achieve better oral health behavior and dental hygiene status of adolescents at a low cost (**Bhuiyan et al., 2020**).

The current study aimed to assess performance of primary school students regarding oral hygiene and dental caries. **Regarding age**, the current study revealed that more than half of the studied sample's age less than 10 yrs. This is consistent with (**Mohsen , 2019**) who his study about

assessing of Knowledge, Attitudes, and Practices of School children toward the importance of having healthy oral hygiene through practicing preventive dentistry; found that half of the studied sample's age located under 10 years .

Regarding gender, the current study found that more than half of the studied sample was female, this come in accordance with (**Mekhemar et al., 2021**), who examined oral health attitudes among preclinical and clinical dental students and found that approximately half of the students were females.

Regarding residence, the current study revealed that the majority of studied sample was lived in rural, in contrast with (**Shitie et al., 2021**), who study examined prevalence of

dental caries and its associated factors among primary school children in Ethiopia; demonstrated that the majority of studied sample was lived in urban. **In relation to parental education**, the current study revealed that the highest percentage among father and mothers of the studied children have a high education, this is agreed with (Mohsen , 2019), who found that the majority of the parents' education levels fell under having a college education. **In relation to parental occupation**, the current study revealed that majority of fathers were work and lowest percentage of mothers were not work, this is consistent with (Abd-Alsemia et al., 2018) in his study about "Health Promotion Intervention to Prevent Dental Caries among Primary School Children" who found that the majority of fathers were employees and the majority of mothers were housewives due to low work opportunities and most of parent cared with their houses and their children.

Regarding family size, the current study revealed that nearly half of the studied subjects' family contain 4 to 5 persons, these is consistent with (Naeim et al., 2019), who assessed children's oral health care practices and their dental problems and found that nearly half of the studied subjects' family contain 5 to 7 persons.

Regarding overall knowledge about dental caries, the current study revealed that the majority of the studied subjects possess unsatisfactory level of knowledge score, in the same line with (Abd-Alsemia, et al., 2018) ,who study that the majority of studied children had poor level of knowledge regarding to dental caries and care. In contrast, with (Mahmoud ,2013) who studied, oral health knowledge, attitude and behavior of nursing school students in Assiut city; illustrated that more than three-quarters of the studied students had satisfactory knowledge regarding oral health. This level of knowledge may be affected by the lecture that studied in the nursing school.

Regarding relation between demographic characteristics and overall knowledge score, the current study revealed the majority of the studied subjects who possessed unsatisfactory level of knowledge was male under age of 10 years and lived in urban, this finding come in accordance with(Al-Darwish ,2016) ,who examined oral health knowledge, behavior and practices among school children in Qatar; found that the highest percentage of the studied sample that have poor knowledge related to oral health was boys, under age of 12 years and lived in urban. Also, Abu-Elenen et al., (2015) who study evaluated the effect of an oral care educational program on the knowledge, practice and self-efficacy among school age children to evaluate the effect of an oral care educational program on the knowledge, practice, and self-efficacy among school-aged children; is on opposite side of the results of the present study, as about fifth (21.2%) of students performed the recommended practice of brushing teeth. From the investigator point of view, this difference is related to lack of knowledge about dental care and oral hygiene among our students which leads to lack of practice. Also, Abu-Elenen et al., (2015) who study evaluated the effect of an oral care educational program on the knowledge, practice and self-efficacy among school age children to evaluate the effect of an oral care educational program on the knowledge, practice, and self-efficacy among school-aged children; is on opposite side of the results of the present study, as about fifth (21.2%) of students performed the recommended practice of brushing teeth. From the investigator point of view, this difference is related to lack of

knowledge about dental care and oral hygiene among our students which leads to lack of practice.

Regarding overall practice about dental caries, the current study revealed that the majority of the studied subjects possess unsatisfactory level of practice score, in the same line with (Gualie & Tayachew , 2018), who assessed knowledge, attitude, and practice toward oral hygiene among governmental secondary school students; study findings showed that the highest percentage of students had poor practices of oral hygiene. Also, (Mehmood et al., 2018) who study entitled "Knowledge, Attitude and Practice Regarding Oral Health among Secondary School Students of Azad Kashmir Pakistan" concluded that the oral health practice among the students in Azad Kashmir is still below the satisfactory level.

Regarding relation between demographic characteristics and overall practice score, the current study revealed that there was no statistical significance difference between practice and age, this is agreed with (Abu-Elenen et al., 2015), who found that there were no significant differences between total knowledge and practice with age of children.

The current study revealed that there was a statistical significance difference between sex and residence of studied subjects and overall practice score, this is contradicted with (Imran et al., 2015), who examined knowledge and practice of oral health among higher secondary school students to determine the knowledge and practice of oral health among higher secondary school students and revealed no significant difference for knowledge and practice among male and female students ,and El-Nasr (2017), results revealed no statistically significant correlation between sex and place of residence with total knowledge and total practice before and after the oral health intervention program. **In relation to attitude of studied subjects** regarding behavior scale (HU-DBI) about dental care, The current study revealed that the majority of the studied sample's attitude regarding dental care was negative; this is in the same line with (Mekhemar et al., 2021), who reported that the general HU-DBI-based results exposed noticeably weak oral health attitudes and behavior among most students of the study population ,also, (Abd-Alsemia et al., 2018), his study showed that slightly less than three quarter of the studied children had a negative attitude regarding to dental care in pre intervention. And (Mehmood et al., 2018) concluded that the oral health attitude among the students in Azad Kashmir is still below the satisfactory level. In contrast with (Gualie & Tayachew , 2018), who found that more than half students had positive attitudes toward oral hygiene. The Possible reasons that can be attributed to this difference of response might be the demographic variations of the study population and study setting. Another possibility of discrepancy might be the sampling technique and accessibility of the services

Regarding relation between demographic characteristics and overall attitude score, the current study revealed that male students, living in rural areas represented the highest percentage of negative attitude of dental hygiene and care, in the same line with (Min Quan et al., 2018), who found that those living in urban areas had a higher awareness rate in terms of knowledge and attitude than those from rural areas.

The current study results regarding knowledge, practice and attitude are consistent with that of (Vishwanathiah , 2016), who studied "Knowledge, attitudes

and oral health practices of school children, and reported that dental care knowledge, attitudes and practices among the school students are still below the satisfactory level, and also stated that it is important to add oral health education in the curriculum at school level.

The current study approved no statistical significance correlation between overall knowledge score and overall practice score regarding dental care, on the opposite side with (Hazazi et al., 2018), who revealed that a significant positive linear correlation between knowledge-practice among studied students, the positive linear correlation confirms that better knowledge can lead to good practice. And, (Josca , 2014), who found that Oral health knowledge was significantly associated with oral health practices. Children's with higher knowledge showed better practices.

The current study approved statistical significant correlation between overall knowledge score and overall attitudes score, this result come in accordance with (Kamran et al., 2014), who study " Survey of oral hygiene behaviors, knowledge and attitude among school children: a cross-sectional study from Iran" who approved a positive significant correlation between knowledge and attitude, which suggested that increased knowledge led to increased positive attitude.

Conclusion

According to the results of this study, more than three quarter of school children had an unsatisfactory level of knowledge about dental caries, and more than three quarters of them had poor practices scores toward dental caries, around three quarter had negative attitudes scores. There were no statistical significant differences in overall knowledge score and over all practices while there were statistical significant differences in overall knowledge score and over all attitudes scores.

The current study revealed that there is no statistical significant differences between overall knowledge scores and age, residence and overall practices at (p value<0.05), there is statistical significant differences between overall knowledge score ,overall attitudes scores and sex at (p value=03) and a highly statistically significant difference between overall attitudes and residence at (p value=.001).

Recommendations

In light of the results of this study, the following recommendations were suggested:

- Posters can be displayed at school on the importance of the correct technique of brushing and flossing teeth to increase the knowledge and practices of the school children about dental care.
- Regular dental check-up and identification of high caries risk among school children should be conducted by training school nurses and other primary care workers who have regular contact with school children.
- Providing health education for teachers and students about oral hygiene and prevention of dental caries.
- Encourage researches about the importance of the continuous implementation of school based programs to be highlighted in order to promote dental health, trying to spread the practices on good dental health care to as many children as possible.

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