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Oral Hygiene Practices and Dietary Behaviours in a Group of Children in Benghazi, Libya

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Abstract: ***"Oral health is essential to overall wellness. Oral health is more significant than general health, which is crucial to our well-being and standard of living. It is also a major indicator of overall health. This study needed to evaluate Libyan children's dental hygiene practices concerning their dietary category. Participants and methods: Subjects and methods: One hundred thirty-eight schoolchildren, ages five to thirteen, who consent to participate were included in the study population. The children had their eating habits and dental healthcare practices evaluated in the children's dental clinic at the University of Benghazi with their parents or guardians. Results: When lunchbox food consumption was used to assess dietary habits at the school, the majority of students consumed 37.1% of pastries packed with chocolate, 27.5% of chocolate bars, 26.1% of milk juice, and 8.7% of chips. Analysis of food consumption trends at family get-togethers. Children's beverage preferences are dominated by carbonated, sweetened juice drinks (56.0%), followed by milk (10%) and water (34%). Tooth brushing frequency: 44% brush once, 39.3% brush twice, and only 53.5% did not brush their teeth regularly. In conclusion, our data show how children, in terms of age and gender, encounter a wide variety of food intake and oral hygiene behaviours. These statistics help focus on dietary policy, finding gaps in nutritional surveillance, and evaluating the impact of youngsters' eating and drinking behaviours during school and family outings.***

Keywords: Oral hygiene, Dietary habits, Libyan children, school and family diet

1. Introduction

Untreated dental decay, or cavities, is the most prevalent illness globally, despite being mostly avoidable. [1-3]. The serious implications of untreated oral disorders, such as discomfort, lower quality of life, and missed school days, make it imperative that their mouths remain healthy.[4]. Furthermore, it was discovered that adolescents' self-rated oral health was connected to the clinical outcomes of untreated dental caries. [5]. It was suggested that the emphasis on promotion and prevention programs should be directed at children younger than 6 years (3], The current WHO strategy for the prevention of dental caries in children focuses on schoolchildren and youth because moreover, Oral health means more than good teeth; it is integral to general health and essential for well-being. It implies being free of chronic oro-facial pain, oral and pharyngeal (throat) cancer, oral tissue lesions, birth defects such as cleft lip and palate, and other diseases and disorders that affect the oral, dental and craniofacial tissues, collectively known as the craniofacial complex. [6]. Our diets affect our teeth, and sugar is the main cause of dental caries in adults and children. [7-8]. Understanding the interplay between teeth, germs, and sugar is crucial for effectively preventing dental caries as it involves the pathophysiology of the disease's development. Fortunately, caries development can be virtually completely avoided with proper diet, good oral hygiene, and routine dental treatment. [9]. The main cause of periodontal disease, plaque, can grow in bulk when sugar is consumed. However, reducing sugar is not an effective approach for controlling plaque because gingivitis cannot be prevented by cutting back on sugar to the greatest extent possible. Similarly, eating fibrous foods cannot substitute for brushing your teeth. [10]. The condition of periodontal tissues is adversely affected by deficiencies in vitamins A, C, E, and folate. The findings demonstrated that increased intake of vitamins A, B complex, C, D, and E was linked to a lower incidence of periodontal disease. These findings significantly affect the development of primary preventive strategies and the creation of dietary recommendations for certain individuals. [11-12]. Predicting future caries in permanent teeth can be aided by the prevalence of caries in primary teeth.[13]. Understanding a school children's food consumption gives vital information about their nutritional status, which is needed to create well-thought-out inter-intervention programs according to needs and look into the connections between the population's health and nutritional status. [14]. Duggal et al. (2001) investigated the association between carbohydrate intake frequency, fluoride paste use, and the relationship with enamel demineralisation. According to these authors, patients who use fluoride toothpaste experience demineralisation after consuming seven or more carbohydrates daily, whereas patients who use non-fluoride toothpaste experience demineralisation with three intakes. [15].

2. Subjects and methods

A cross-sectional survey with 138 children between the ages of 4 and 13 were participated in the study. The University of Benghazi's Faculty of Dentistry granted ethics approval and

permission to conduct the study "Oral health inquiry regarding hygiene practices concerning their dietary category in a group of Libyan children's eating habits throughout family vacations and school hours."

3. Results

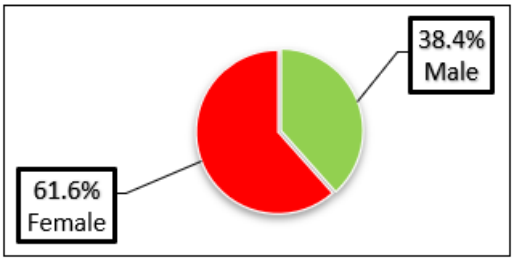

Figure 1: Displays the study sample distribution based on participant numbers and gender. There were 85 (61.6%) females and 53 (38.5%) boys.

As shown in Table 1, the largest proportion of research participants were respondents aged over 10 (n = 60, % 43.5), followed by respondents aged 7–10 (n = 53, % 27.2), and the lowest number were respondents aged under 7 (n = 25, % 18.1).

Table 1: Age-based distribution of the respondents

Age Group	Frequency (n)	Percentage (%)
< 7 years	25	18.1
7-10 years	53	38.4
>10 years	60	43.5
Total	138	100

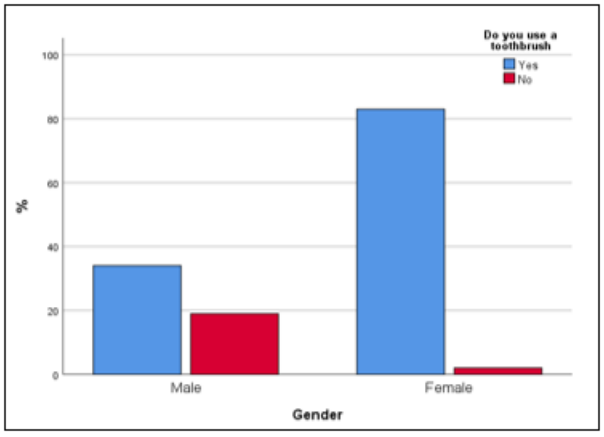

Figure 2: The association between the use of a toothbrush and gender

Relationship between the usage of toothbrushing and gender: Statistical analysis reveals a significant connection ($\chi2(2) = 9.885$, $p < 0.05$) between the frequency of use and gender. There is a statistically significant link between gender and toothbrush use in which a high proportion of females use toothbrushing ($\chi2(1) = 28.389$, $p \leq 0.05$).

Table 2 demonstrates the relationship between the frequency of usage of toothbrushing and gender: Statistical analysis reveals a significant connection ($\chi2(2) = 9.885$, $p < 0.05$) between the frequency of use and gender. Less than half of the participants use it once per day.

Table 2: Relationship between gender and the frequency of daily teeth brushing

Gender	How many times per day				Total
	Once	Twice	Three	I don't know	
Male	18 (51.4%)	16 (47.1%)	0 (0.0%)	19 (37.0%)	53 (100.0%)
Female	33 (39.8%)	30 (36.1%)	20 (24.1%)	2	85 (100.0%)
Total	51 (43.6%)	46 (39.3%)	20 (17.1%)	21	138 (100.0%)
$\chi^2 = 9.885$	df=2	CC=-0.279	p-value=0.007		

Statistically significant at 5%

Table 3: shows the relationship between age and the frequency of Toothbrush Usage

Therefore, it can be inferred from χ^2-test results that the correlation between the age group and the frequency of toothbrush use is statistically significant. ($\chi^2_{(4)} = 11.866$, $p < 0.05$).

Table 3: Relationship between age and the frequency of toothbrush use each day

Age group	Toothbrush use				Total
	Once	Twice	Three	I don't know	
< 7 years	11 (55.0%)	7 (35.0%)	2 (10.0%)	5	25 (100.0%)
7-10 years	26 (56.5%)	16 (34.8%)	4 (8.7%)	7	53 (100.0%)
> 10 years	14 (27.5%)	23 (45.1%)	14 (27.5%)	9	60 (100.0%)
Total	51 (43.6%)	46 (39.3%)	20 (17.1%)	21	138 (100.0%)
$\chi^2 = 11.866$	df=4	CC=-0.231	p-value ≤ 0.02		

Table 4 shows that 53.5% of the sample did not brush regularly, whereas 46.4% of the sample did brush frequently.

Table 4: Association between regular toothbrush use and age

Age group	Regular use of toothbrushing			Total
	Yes	No	I don't know	
< 7 years	13 (52.0%)	7 (28.0%)	5 (20%)	25 (100.0%)
7-10 years	20 (37.7%)	23 (34.4%)	10 (2.0%)	53 (100.0%)
> 10 years	31 (52.6%)	22 (36.6%)	7 (12.6%)	60 (100.0%)
Total	64 (46.4%)	52 (37.6%)	22 (15.9%)	138 (100.0%)
$\chi^2 = 9.296$	df=4	CC=-0.271	p-value=0.05	

'Statistically significant at 5%

Relationship between age and toothbrush type: The correlation between the age group and the type of toothbrush is statistically insignificant. In table 4. ($\chi^2_{(4)} = 8.695$, $p = 0.10$).

Table 4 shows the relationship between age and toothbrush type

Age group	Type of toothbrush				Total
	Soft	Medium	Hard	I don't know	
< 7 years	14 (70.0%)	4 (20.0%)	2 (10.0%)	5	25 (100.0%)
7-10 years	21 (45.7%)	22 (47.8%)	3 (6.5%)	7	53 (100.0%)
> 10 years	32 (62.7%)	12 (23.5%)	7 (13.7%)	9	60 (100.0%)
Total	67 (57.3%)	38 (32.5%)	12 (10.3%)	21	138 (100.0%)
p-value = 0.06 df=4 CC=-0.263 8.695 =2 χ					

'*' Statistically insignificant at 10%

Table 5 demonstrates the association between using dental floss among the participants and age. Therefore, Table 5 illustrates that the χ2-test results suggest that there is no statistically significant correlation between the age group and dental floss use.

1) ($\chi^2_{(4)} = 9.296, p = 0.10$).

Table 5: Association between dental floss and age

Age group	*The study group's use of dental floss*			Total
	Once	Sometimes	No	
< 7 years	6 (30.0%)	5 (25.0%)	14 (45.0%)	25 (100.0%)
7-10 years	10 (34.8%)	4 (8.7%)	39 (56.5%)	53 (100.0%)
> 10 years	24 (47.1%)	11 (21.6%)	25 (31.4%)	60 (100.0%)
Total	40 (39.3%)	20 (17.1%)	78 (43.6%)	138 (100.0%)
χ^2 = 8.207 df=4 CC=-0.256 p-value=0.084				

' Statistically insignificant at 10% p >0.05.

Association between interdental brush and gender: There is a statistically significant correlation between gender and interdental brush use. In Table 6. ($\chi^2_{(2)} = 6.714$, $p < 0.05$).

Table 6: Association between interdental brush and gender among the study group

Gender	*Use of interdental brushes in this study group*				Total
	Once	Sometimes	No	I don't/know	
Male	8 (23.5%)	5 (14.7%)	21 (61.8%)	19	53 (100.0%)
Female	41 (49.4%)	7 (8.4%)	35 (42.2%)	0	85 (100.0%)
Total	49 (41.9%)	12 (10.3%)	56 (47.9%)	21	138 (100.0%)
χ^2 = 6.714 df=2 CC=-0.233 p-value=0.01					

Statistically significant at 5%

Table 7 shows the relationship between gender and school lunch box intake. There is a statistically significant correlation between the observed intake in the school lunch box and gender. ($\chi^2_{(3)} = 13.702$, $p < 0.05$).

Table 7: Relationship between gender and School Lunchbox Take-in during school times.

Gender	Lunch box taken in at school				Total
	chocolate-filled sweet bakery	*Chocolate bar*	*Juice milk or both*	*Chips*	
Male	18 (34.0%)	23 (43.4%)	11 (20.8%)	1 (1.9%)	53 (100.0%)
Female	34 (40.0%)	15 (17.6%)	25 (29.4%)	11 (12.9%)	85 (100.0%)
Total	52 (37.1%)	38 (27.5%)	36 (26.1%)	12 (8.7%)	138 (100.0%)
χ^2 = 13.702 df=3 CC=-0.301 p-value ≤ 0.003					

'*' Statistically significant at 5%

Table 8: displays gender and drinking patterns during family picnics. Hence, it can be inferred from χ^2-test results that the statistical significance of the drink consumption correlation with gender at a family picnic is evident. $\chi^2_{(3)} = 15.640$, $p \leq 0.05$).

Table 8: Gender and drink preferences at a picnic with family

Gender	*Children's preferences during a family outing*				Total
	Fizzy drinks	Juice	Water	Milk	
Male	11 (20.8%)	27 (50.9%)	15 (28.3%	0 (0.0%)	53 (100.0%)
Female	6 (7.1%)	33 (38.8%)	32 (37.6%	14 (16.5%)	85 (100.0%)
Total	17 (12.3%)	60 (43.5%)	47 (34.1%	14 (10.1%)	138 (100.0%)
χ^2 = 15.640 df=3 CC=-0.319 p-value≤0.001					

'*' Statistically significant at 5%.

Age and beverage consumption during a picnic with family, a statistically significant correlation has been found between the age group and the drink when having a picnic with family. ($\chi^2_{(6)} = 14.635$, $p \leq 0.05$).

Table 9: The age of the child and the beverages they had at the family picnic

Age group	Preferences for beverages consumed at family picnics				Total
	Fizzy drinks	*Juice*	*Water*	*Milk*	
< 7 years	7 (28.0%)	12 (48.0%)	3 (12.0%)	3 (12.0%)	25 (100.0%)
7-10 years	8 (15.1%)	22 (41.5%)	19 (35.8%)	4 (7.5%)	53 (100.0%)
>10 years	2 9 (3.3%)	26 (43.5%)	25 (41.7%)	7 (11.7%)	60 (100.0%)
Total	17 9 (12.3%)	60 (43.5%)	47 (3.41%)	14 (10.1%)	138 (100.0%)
χ^2 = 14.635 df=4 CC=-0.310 p-value=0.023					

'Statistically significant at 5%

4. Discussion

A cavity that develops inside the tooth is a pathological disease known as dental caries (DC). Bacteria attacking with acid causes the hard tissues of the tooth surfaces to demineralize, leading to the cavity. DC is a confined, progressive, chronic, non-self-limiting condition that gets worse over time if treatment is not received. It may also affect a child's overall health and capacity to carry out daily tasks at home and in school., children who experienced caries in their primary dentition experienced a significantly distinct caries trajectory in their permanent dentition. [16-17].

Dental caries is considered a dynamic disease process determined by a dynamic balance process of pathologic factors that lead to demineralisation and protective factors that cause remineralization. [16]. Nutrition and diet impact on oral health in many ways. Nutritional status affects tooth development and the host's resistance to numerous oral illnesses, such as periodontal diseases and oral cancer. Diet is a primary aetiological factor for dental caries and enamel erosion. [18]. The incidence of caries is higher in children and adolescents than in adults because secondary maturation and remineralisation of dental enamel steadily increase its resistance to acid attack. [19]. Research has shown that there is a correlation between the educational attainment of mothers and the frequency and intensity of Early Childhood Caries. [20-21].

Following our findings regarding irregular tooth brushing were found to be irregular, AlOmirir et al 2006 found similar results and parents' role in the oral hygiene habits of their children was limited. Although, showed higher awareness of caries than periodontal conditions. Irregular visits to the dentist were found to be common, and toothache was the major driving factor for dental visits. [22]. Any type of sugar found in food or drink might aggravate dental damage. Sugar-containing foods and beverages that are frequently consumed include yogurt, soft drinks, juices, candies, pastries, cookies, and cereal for breakfast. Certain foods, like cheese and peanuts, have been found to counteract the effects of acid attacks. Gum without sugar and certified by the American Dental Association (ADA) as Accepted. This indicates that these items meet ADA guidelines for safety and efficacy, and might be able to neutralize acidity as well. [23]. When on family vacations, youngsters might bring a variety of food options to share. As an illustration, consider salads, sandwiches, snacks, pasta, grains, lentils, and veggies. Food habits and other dietary patterns are factors that impact an individual's relative risk of preventable disease. These factors can be modified from childhood onwards. According to our research, the majority of youngsters would rather drink sweetened beverages like juice or fizzy drinks than milk or water. Water consumption, especially fluoridated water, strengthens teeth and reduces cavities in adults and children. Additionally, it thickens saliva, eliminates debris, lessens acidity, and promotes remineralization. It promotes good dental hygiene. [24]. The amount of drinking water required to maintain good health varies and depends on physical activity level, age, health-related issues, and environmental conditions. [25]. Individuals who routinely consume water, particularly when they gargle, have better dental hygiene than those who don't.. [26]. So, The best beverage for teeth is unquestionably water, especially fluoridated water. It fights dry mouth and keeps your mouth healthy. Throughout life, teeth need to be periodically treated with fluoride to prevent tooth decay. Drinking fluoridated water is one of the simplest and most effective ways to help prevent cavities. [27]. Duggal et al. (2001) investigated the relationship between frequent consumption of carbohydrates, the use of fluoride pastes, and enamel demineralization. The authors discovered that patients using fluoride toothpaste reach demineralization after consuming seven or more carbohydrates each day, whereas patients using non-fluoride toothpaste reach demineralization after three intakes. [15].

Ethical policy: and institutional review board statement: The Ethical Research Committee in the Faculty of Dentistry, University of Benghazi, Benghazi, Libya, has granted ethical certification for this research, with the registration number (0231).

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Conflicts of interest
There are no conflicts of interest.

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