

# Oral health status, attitudes and gender variations among governmental school children at Al-Mafraq governate – Jordan

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## Abstract

**Objectives:** Calculate the prevalence and severity of dental caries and periodontal health among school students aged 12-18 years old and their attitudes toward dental health and oral hygiene at Al-Mafraq governate- Jordan.

**Materials and methods:** Demographic and oral behavioral information were collected; students aged 12-18 years old from six public schools distributed over three districts in Al-Mafraq governate over a six-month period had a full oral and dental examination. DMFT index (Decay, Missing, Filling, Teeth) was used to measure caries experience. Plaque index (PI) and gingival index (GI) of Löe and Silness were used to evaluate the oral health status. T - test was used for statistical evaluation. A P-value < 0.05 was considered statistically significant.

**Results:** 1165 students were examined, 51% never had been to a dentist or had any previous dental treatment, 39.6% of the students examined never brushed their teeth and 61.85 % had dental caries. The (SiC) was 4.72 with a decay representing 93.53%. Females brush their teeth more frequent than males with a statistically significant difference;  $p < 0.001$ . Females showed lower DMFT index (1.81) and compared to males (2.25) with a statistically significant difference. Females showed lower SiC (4.164) compared to males (5.186) with a statistically significant difference. There was no statistically significant difference between males and females in PI  $p = 0.590$ , and GI;  $p = 0.852$ .

**Conclusions:** The prevalence of dental caries among students in Al-Mafraq governate and the significant caries index were substantially higher than the target goals of WHO/ FDA of year 2015 with more than

90 % of unmet treatment needs. Girls showed better oral hygiene habits compared to boys and exhibited less dental caries experience. However, periodontal status did not differ significantly between both genders.

**Keywords:** Dental health; oral health; adolescents; dental caries.

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## Introduction

Oral health is part of the general wellbeing of an individual. [1]

Caries and periodontal disease are the two most important dental diseases, although common yet, preventable.[2] It is estimated that

oral diseases affect nearly 3.5 billion people. More than 530 million children suffer from dental caries of primary teeth. Severe

periodontal disease, which may result in tooth loss, is also very common, with almost 10% of the global population affected. [3] Oral health affects people physically and psychologically and influences how they grow, enjoy life, look, speak, chew, taste food and socialize, as well as their feelings of social well-being. [1]

Microorganisms found in dental plaque can cause dental caries and periodontal disease.[4]

Strategies that focus on increasing the awareness and motivation of the population to improve their oral hygiene, implementing prevention methods, regular check-ups and making dental care more accessible to those people in underprivileged societies can significantly decrease the prevalence of dental caries and periodontal disease.[5]

Several dental surveys have been conducted in Hashemite kingdom of Jordan but unfortunately most of them were focused in Amman capital of Jordan and examined students in private schools. [6,7] The purpose of this survey and a previous survey [8-11] executed by Jordanian National Women's Health Care Center (NWHCC) and a team of researchers from the University Of Jordan, Ministry of

Health and Royal Medical Services is to identify people who are at a higher risk of developing dental caries and periodontal disease in the most needed societies in governmental schools and peripheral areas. Al-Mafraq is one of these areas located north-east of Jordan with also increasing number of Syrian refugees after Syrian political crisis in the last few years.

Our aim from this cross-sectional study was to calculate the prevalence and severity of dental caries and periodontal health among school students aged 12-18 years old and their attitudes toward dental health and oral hygiene at Al-Mafraq governate-Jordan.

### **Material and Methods**

Over 6 month's period from October 2018 until March 2019, the NWHCC pre-trained teams conducted an oral health survey for students aged 12-18 years old, students were recruited from six large public schools distributed over the three main districts of Al-Mafraq governorate.

Ethical approval for the study was granted from the ethical committee of the Jordanian Ministry of Health (Code: MOH REC

160019). All students were examined after signing an informed consent by them and their parents. Demographic and oral behavioral data including age, gender, school, district, oral hygiene methods and previous dental treatment were recorded by using a questionnaire followed by a full oral and dental examination. The data sheet was pre-validated by experts committee of dentists and dental care nurses. A mobile dental clinic was used to examine all students at the schools; disposable examination sets (pre-packed mirror and explorer) and disposable latex gloves were used during the examination.

We adopted the same methods used in our previous surveys, [8-11] to standardize the examination procedures and to decrease differences in examination outcome, three general practitioner dentists who conducted the clinical examination attended a training course before starting the survey. Pre-survey assessment of agreement was performed between examiners, with Kappa inter-examiner of 0.93 and intra-examiner of 0.98.

Tooth decay was defined according to WHO criteria as 'cavities with a softened dentine floor', we had

previously used this definition in a previous study. [8] The number of teeth with untreated decay (cavity) was defined as DT (decayed teeth), the number of teeth with decay in the past that had been repaired by operative procedures were defined as FT (filled teeth), and MT (missing teeth) was used to describe teeth removed or extracted because of decay. The sum of DT, MT and FT which represented the total number of teeth affected by tooth decay was referred to as the DMFT. The level of tooth decay in a population can be represented by the mean values of DT, MT, FT and DMFT as well as by the proportion of the population affected by each type of decay. The DMFT ratio represents the total number of teeth affected in the past and present, this value is a cohort that is more representative of the oral health status than the DT, which indicates those teeth requiring attention because of untreated decay; therefore we chose DMFT for evaluation and reporting in this study, although this index can be criticized for not counting either enamel caries, or caries activity, or even teeth or surfaces at special risk, in addition to not confirming the reason for decay extraction during examination, especially for deciduous teeth. However, it is good in providing descriptive

information for trends monitoring and policy makers' awareness of dental health. Significant caries index (SiC) was used in this survey to overcome the limitation in the distribution of DMFT. The (SiC) refers to the one-third of the population that are more severely affected by dental caries.[12]

Oral plaque was evaluated by running the side of a ball-tip probe along the inner and outer aspects of the six index teeth, using the criteria of the plaque index of Silness and Löe. [13] The six indexed teeth are the upper right first molar, upper right lateral incisor, upper left first premolar, lower right first premolar, lower left lateral incisor and first molar. Missing teeth are not substituted. The gingival condition was determined for the same teeth using the criteria of the gingival index of Löe and Silness. [13]

Objective research was performed to evaluate the state of oral hygiene during the examination as follows: good (plaque index 0.0 i.e., absence of plaque), fair (plaque index 0.1-1.9 i.e., presence of plaque) and bad (plaque index 2.0-3.0 i.e., plaque seen by the naked eye). The gingival index of Löe and Silness was used to record the severity of gingivitis. The gingival

index by Löe and Silness measures the severity of gingivitis on a scale ranging from 0.1–3.0 (0.1-1.0: mild gingivitis, 1.1-2.0: moderate gingivitis, and 2.1-3.0: severe gingivitis).

Statistical analysis was performed using SPSS for Windows (version 20, IBM Corporation, Armonk, NY). The T - test was used for statistical evaluation. A P-value < 0.05 was considered statistically significant.

## Results

1165 students were examined 48.4% were males 51.6% were females, age range from 11 to 18 approximately half were in age group from 13 to 15 years old. 94.1 % were Jordanian and the rest were Syrian refugees. Nearly half of the students examined (51%) never had been to a dentist or had any previous dental treatment.

### Oral hygiene habits:

More than third of the students examined never brushed their teeth (39.6%) with approximately the same percentage brushed their teeth once daily. Teeth brushing was the only oral hygiene method in 87.7 % of the students examined, only 0.4 % claimed to use dental floss, 0.7 % used toothpicks whereas 11.4 % used mouthwash.

### Caries prevalence and caries Index:

Out of 1165 students examined only 38.15 % were caries free (61.85 % have caries). DMFT index was found to be 2.037 with a decay representing 92.8 %, Missing 2.22% and fillings 5.58%. One third of the students examined were found to have DMFT index 4.723 (significant caries index SiC) with a decay representing 93.53%, Missing 1.62% and fillings 4.83%. (Table 1)

**Table 1:** DMFT index, Significant caries index and percentile of D, M, F.

DMFT index=2.037		SiC =4.723	
%D	92.18	%D	93.53
%M	2.22	%M	1.62
%F	5.58	%F	4.83

### Plaque index and gingival index:

Plaque index (PI) was found to be  $0.422 \pm SD 0.5991$  whereas gingival index was found to be  $0.361 \pm SD 0.585$ . According to PI approximately two thirds (63.2 %) were classified as having good oral hygiene (PI= 0.0), approximately one third (31.8%) were classified as having Fair oral hygiene (PI= 0.1-1.9) and only 5% were classified as having poor oral hygiene (PI= 2.0-3.0).

According to GI 69.1% were classified as having healthy gingiva (GI= 0.0), approximately a quarter (26%) were classified as having mild gingivitis (GI= 0.1-1.0) less than 5 % (4.5%) were classified as having moderate gingivitis (GI= 1.1-2.0) and less than 1% (0.30%) were classified as having severe gingivitis. (Table 2)

**Gender variations**

Table 3 shows gender variations according to the following

#### 1. Frequency of teeth brushing and gender

There was a statistically significant difference between males (M= 0.68, SD=0.76) and females (M= 1.03, SD= 0.89) in frequency of teeth brushing;  $t (1166) = -7.233, p= 0.000$

#### 2. Caries index and gender:

DMFT index was 2.254 for males whereas it was 1.814 for females, independent samples t-test showed that there was a statistically significant difference between males (M= 2.25, SD=2.51) and females (M= 1.83, SD= 2.17) in DMF scores;  $t (1168) = 3.068 p= 0.002$

Significant caries index was 5.186 for males whereas it was 4.164 for females independent samples t-test showed that there was a statistically significant difference between males (M= 3.46, SD=2.34) and females (M= 2.32, SD= 2.20) in significant Caries Index scores;  $t (845) = 7.278 p= 0.000$ .

#### 3. PI, GI and gender

There was no statistically significant difference between males (M= 0.432, SD=0.57) and females (M=0. 423, SD= 0.63) in plaque Index scores;  $t (1166) = 0.539 p= 0.590$

There was no significant difference between males (M= 0.37, SD=0.53) and females (M= 0.36, SD= 0.63) in gingival Index scores;  $t (1166) = 0.187 p= 0.852$

**Table 2:** Percentile of school students according to gingival status:

GI	Gingival status	Percentage %
0.0	Healthy gingiva	69.1%
0.1-1.0	Mild gingivitis	26%
1.1-2.0	Moderate gingivitis	4.5%
2.1-3.0	Severe gingivitis	0.30%

**Table 3:** Gender variations (Independent samples t-test):

	Males	Females	P value
Number	565	603	
D+M+F	1274	1094	
DMFT index	2.254±2.51	1.814±2.17	P=002*
SIC	5.186±2.34	4.164±2.2	P<001*
PI	0.432±0.57	0.432±0.63	P=0.590
GI	0.37±0.53	0.36±0.63	P=0.852
Frequency of teeth brushing	0.68±0.76	1.03±0.89	P<001*

\* P value shows statistically significant difference

## Discussion

The results of this study showed that more than half of the students examined lack any dental care, more than one third of those students never brushed their teeth and almost all of them never used dental floss, this may be explained by poor income, unavailability of dental clinics and unavailability of dental health insurance on one side and lack of motivation,

knowledge and dental education on the other side.[14]

The prevalence of caries in those students was very high (61.85%), the significant caries index was also high (4.723) with 93.53 % have been left untreated and only 4.83% received dental fillings or have been extracted (1.62%). The high prevalence and severity of dental caries with the unmet treatment needs were consistent with other previous studies. [6-11]

the observed prevalence of dental caries among student in the present study was higher than the target established for the year 2000 (50%) by WHO/FDI [15], also the significant caries index was higher than a global oral health goal for significant caries index of less than 3 DMFT in the 12-year-olds in a given population by the year 2015.[12]

The results of this survey and previous surveys [8-11] indicate the need for dental education, and motivation for proper oral hygiene methods and to implement dental preventive and treatment methods which may include water fluoridation of drinking water for school children [16]and to provide governmental dental insurance for school children, needless to mention that poor oral status may put future extra burden on the government because of the need for more complicated and expensive dental treatment like for example root canal treatment , fixed or removable prostheses or implants for replacement of missing teeth in addition to the psychological impact of losing teeth on an individual .[17]

Although 63.2% were classified as having good oral hygiene according to PI, the remains of the students were classified as having poor to fair oral hygiene, similarly approximately one third of those students

were classified as having mild, moderate to severe gingivitis

which emphasizes the need for dental education for both parents, teachers and students and may be supervised teeth brushing and flossing session [18]

Obviously, this study shows that females had more positive behavior than males concerning teeth brushing their teeth than males, this is consistent with a previous meta-analysis of 1981, 2000, and 2010 data of Greek students by gender which showed that females brushed their teeth significantly more often than males [19]

The difference could be attributed to the fact that the society puts more pressure on girls to improve their image or girls tend to be more protective on themselves in a society which is still male driven particularly in areas of poor socioeconomic status. This positive oral hygiene behavior reflected on less caries index in girls than boys with a statistically significant difference, nevertheless it did not reflect on gingival status in this study where there was no statistically significant difference between boys and girls, this may be explained by be hormonal differences between boys and girls

at this age and its effect on periodontal status. [20]

Although the present study is not based on a representative sample of public-school children in Al-Mafraq governate because it uses convenience sampling, it does provide insight into the prevalence and severity of caries and gingivitis and lack of oral hygiene practice and dental care among public school children. The results of this survey indicate the need to start a local campaign to raise the public awareness of oral hygiene and the need to modify policies for early access to dental services among school children.

### Conclusions

The prevalence of dental caries among students in Al-Mafraq governate and the significant caries index were substantially higher than the target goals of WHO/ FDA of year 2015 with more than 90 % of unmet treatment needs. Girls showed better oral hygiene habits compared to boys and exhibited less dental caries experience. However, periodontal status did not differ significantly between both genders.

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### Competing interests

The authors declare that they have no competing interests.

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