

## Prevalence of dental caries among children in Misurata, Libya: a cross-sectional study

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Article information	Abstract
<p><b>Key words</b></p> <p>Dental caries, Prevalence, dmft, DMFT, children, Libya..</p> <p>Received 01 06 2024, Accepted 13 06 2024, Available online 23 06 2024</p>	<p><i>This study was carried out to determine the prevalence rate of dental caries among Libyan children in Misurata City aged 3 to 13 years by determining the number of decayed, missing, and filled teeth (DMFT). A random sample was taken from 12 private primary schools in Misurata City attending summer camps from June to July 2023. The study included 332 children, who were examined by trained dentists. The number of male children was 209 (63.0%), and females were 123 (37.0%). In this study, children aged 3 to 6 years (75%) had decayed primary teeth, with a mean (d) component score of 3.409, compared to the decayed teeth (D) component in children aged 7 to 13 years, which recorded only 16.5% with a mean D score of 0.394. Missed and filled teeth were higher in preschool children compared to school children, showing (m) at 14%, (M) at 1%, (f) at 19%, and (F) at 3%. The prevalence of dental caries in children aged 7 to 13 years showed a high significant statistical association with age (<math>P &lt; 0.001</math>). Additionally, a significant statistical relation was observed between the (D) component of DMFT and gender (<math>P=0.007</math>). The dmft index was recorded higher than the DMFT index (4.060; 0.457), respectively, showing that young children are affected more by dental caries. In Conclusion, Primary and secondary teeth have shown high rates of caries, indicating that dental caries remains a public health issue. Therefore, awareness should be provided to children, particularly at a young age.</i></p>

### 1. Introduction

Dental caries is one of the most common health problems in the world, affecting all age groups, including children, adolescents, and older adults. Approximately 60% to 90%

of children are affected by dental caries (Jinghao et al., 2018). Additionally, the World Health Organization (WHO) reported that Early Childhood Caries (ECC) is a global oral health problem, with a prevalence rate between 60% and 90% (Kazemina et al., 2019). Children between the ages of 6 and 12 months are at increased risk of developing tooth decay, and for children between the ages of 12 and 18 months, tooth decay appears on the primary teeth and about twice per year for permanent teeth (Helfenstein et al., 1991). Dental caries is a highly prevalent chronic oral disease, particularly in childhood (Mulu et al., 2014).

Dental caries, also known as tooth decay (Kumari et al., 2023) or dental cavities, denotes a breakdown in the substance of teeth, which facilitates the attachment of bacteria to the teeth and the conversion of carbohydrates into acids (Silk, 2014). The interaction between the bacteria and carbohydrates can cause dental caries, leading to pain and inflammation, and if left untreated, may lead to tooth loss and oral dysfunction (Laudenbach & Simon, 2014). There are many indicators used to measure the prevalence of dental caries, of which the decayed, missing, and filled teeth (dmft/DMFT) index is the most widely used indicator to measure caries in primary and permanent teeth. The DMFT index is used to evaluate the oral health status in most research studies (Tohidast et al., 2006). The prevalence of dental caries for both deciduous and permanent dentition can be measured using the dmft/DMFT index. The DMFT index is used for permanent teeth, while the dmft index is used for primary teeth.

Several studies have assessed the prevalence of dental caries in various countries in the Eastern Mediterranean region, reporting that dental caries is still an oral health concern for children living in 9 countries of the Mediterranean region (Kale et al., 2020). Therefore, the present study aimed to show the trends of the dmft/DMFT index in children aged 3-13 years in Misurata, Libya, and evaluate the association between the factors of age and sex and the prevalence of dental caries.

## **2. Methods and materials**

This cross-sectional study included 332 children who were examined by well-trained general dentists under the supervision of consultants in Preventive Dentistry, Faculty of Dentistry, Misurata. It was conducted at some private primary schools during the summer of 2023, between June 1 and August 30. The number of males and females was 209 and 123, respectively, and their ages ranged from between 3 to 13 years old.

The ethical approval of the current study was obtained from the Faculty of Dentistry at Misurata University and the Oversight of Education in Misurata, as well as permission to conduct the study was gained from school administrations. All patient details were recorded in self-prepared patient files, including general patient information, soft and hard tissue findings, in addition to the dmft/DMFT score (dental caries index). The data was collected and exported to an Excel file, then analysed statistically by a statistician specializing in biostatistics to obtain the required results. In this study, descriptive methods were used to analyze the study data and obtain the results, including the Mann-Whitney test was used to study the significant differences between the sexes, and Kruskal-Wallis test was used to study the significant differences between ages.

### 3. Results

The number of children involved in the current study was 332, ranging in age from 3 to 13 years old, as shown in Figure 1. There were 209 males (63%) and 123 females (37%), as indicated in Table 1.

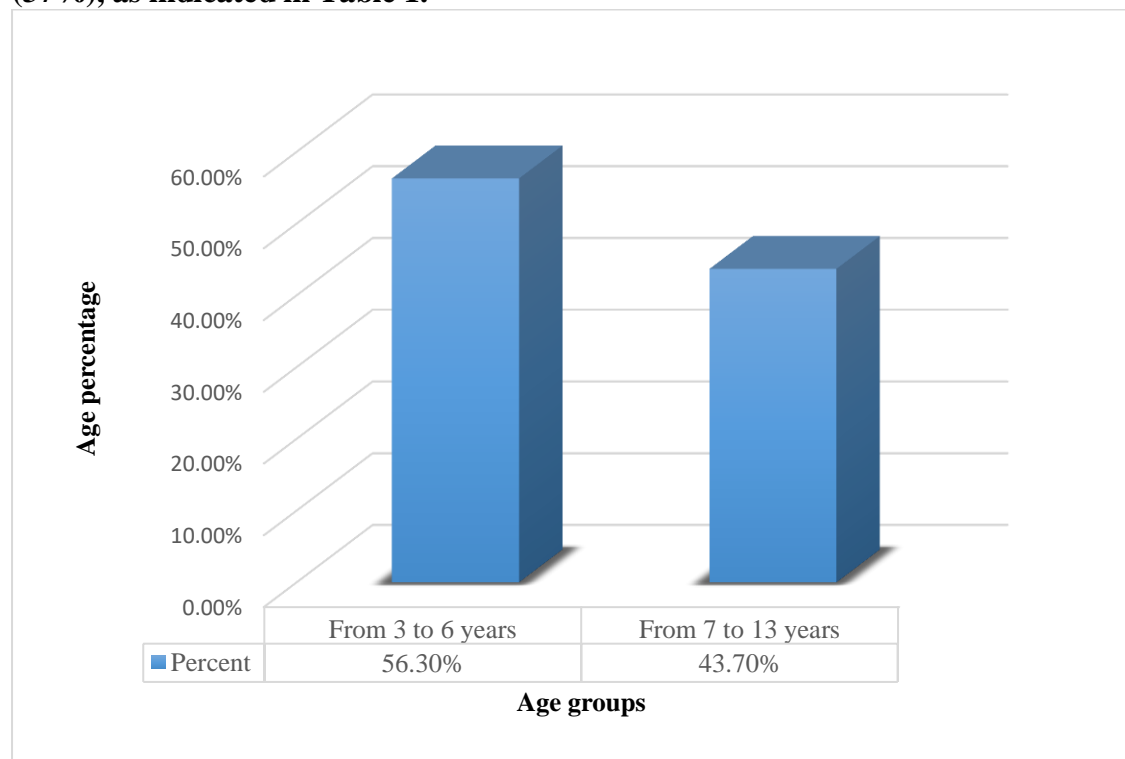


Figure No. (1) Shows the distribution of the study sample by age

Table No. (1) Shows the proportion of male and female children.

Gender	Frequency	Percentage
Male	209	60%
Female	123	37%
Total	332	100%

In this study, a high significant statistical association was recorded between caries rate DMFT and age factor ( $P < 0.001$ ), as well as a statistically significant differences were observed between DMFT and gender ( $P = 0.007$ ). On the other hand, no statistical

differences were found between the age and gender of children and caries prevalence at young children (dmft).

The results of this study showed that the dmft score was 4.06 (75%), whereas the DMFT score was 0.457 (16.5%). The rate of dmft and DMFT among females was higher compared to males, with scores of 4.31 and 0.715 for females, and 3.90 and 0.306 for males (see Table 2). In other words, 75% of preschool children (3-6 years old) had caries in their teeth. However, only 16.5% of children over 6 years were affected by dental caries, as shown in Figure 2.

Table No. (2) Shows the dmft & DMFT score in male and female.

		<i>dmft score</i>	<i>DMFT score</i>
Male	209	3.909	0.306
Female	123	4.317	0.715

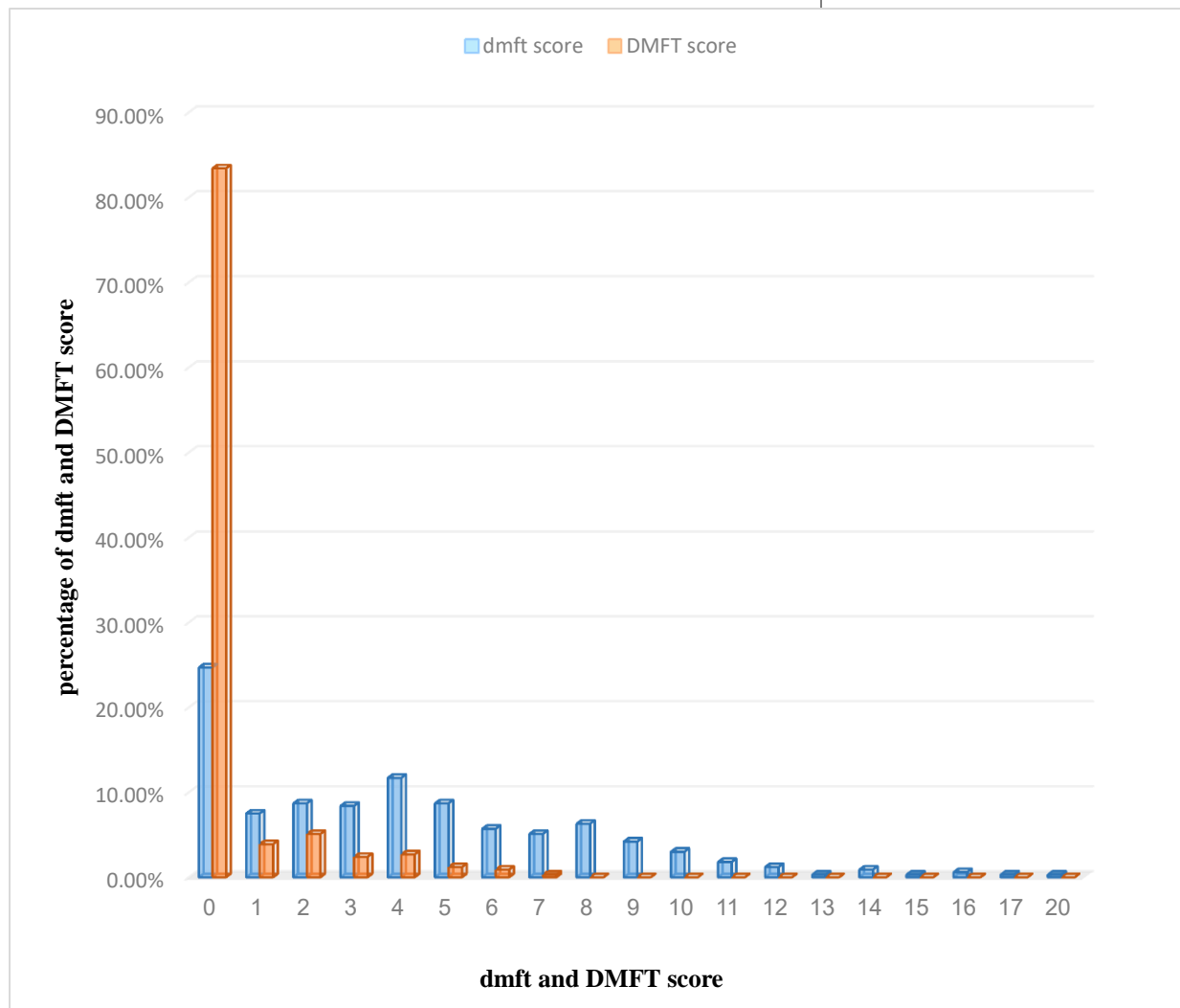


Figure No. (2) Shows the proportion of dmft and DMFT among the study samples (d) component was 3.409 (73%), while in the DMFT score, the average score of decayed teeth (D) component was recorded only 0.0394 (15%) (Table 3). Moreover, the score of

missing teeth (m) component was 0.25 (14%), and (M) 0.009 (1%). Additionally, the filled teeth (f) component was 0.42 (19%), and (F) component was 0.054 (3%), as shown in Figures 3 and 4. Furthermore, a significant statistical relation was found between the number of decayed teeth (D) component of DMFT with age and gender ( $P < 0.001$ ;  $P = 0.009$ ), respectively.

Table No. (3) Shows the proportion of decayed teeth (d/D) components.

Number of decayed teeth	<i>d</i>		<i>D</i>	
	Frequency	Percent	Frequency	Percent
0	89	26.8%	281	84.6%
1	35	10.5%	15	4.5%
2	35	10.5%	14	4.2%
3	33	9.9%	10	3.0%
4	34	10.2%	6	1.8%
5	32	9.6%	3	.9%
6	22	6.6%	2	.6%
7	11	3.3%	1	.3%
8	16	4.8%	0	0.0%
9	4	1.2%	0	0.0%
10	6	1.8%	0	0.0%
11	4	1.2%	0	0.0%
12	4	1.2%	0	0.0%
13	2	.6%	0	0.0%
14	1	.3%	0	0.0%
15	2	.6%	0	0.0%
17	1	.3%	0	0.0%
20	1	.3%	0	0.0%
<i>Total</i>	332	100.0%	332	100.0%

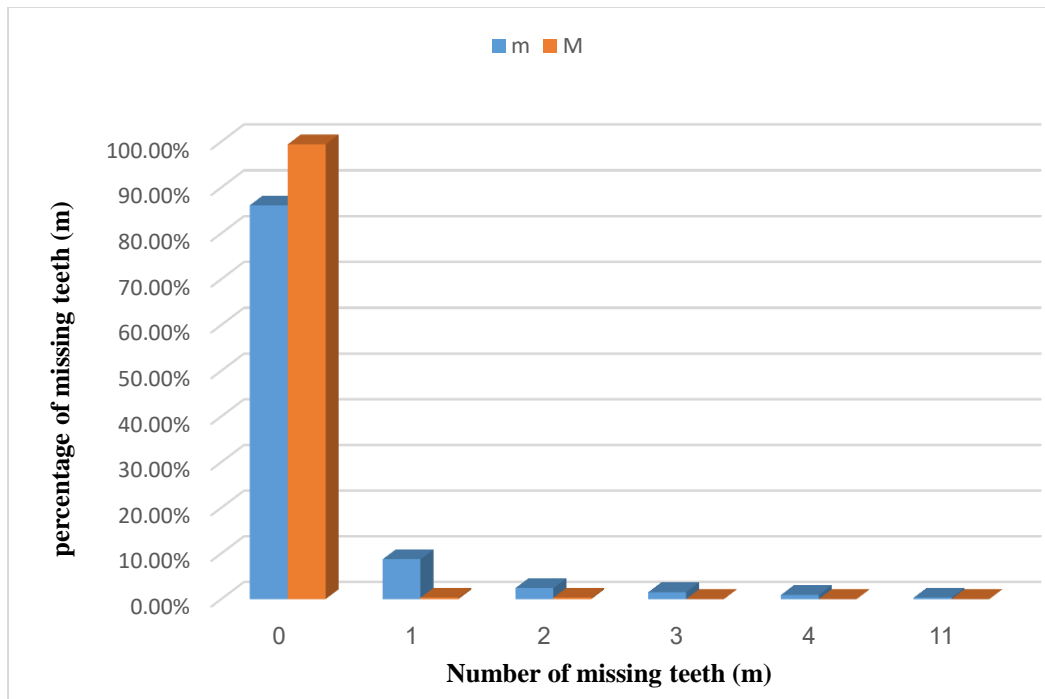


Figure No. (3) Shows the average score of missing teeth (m/M) components.

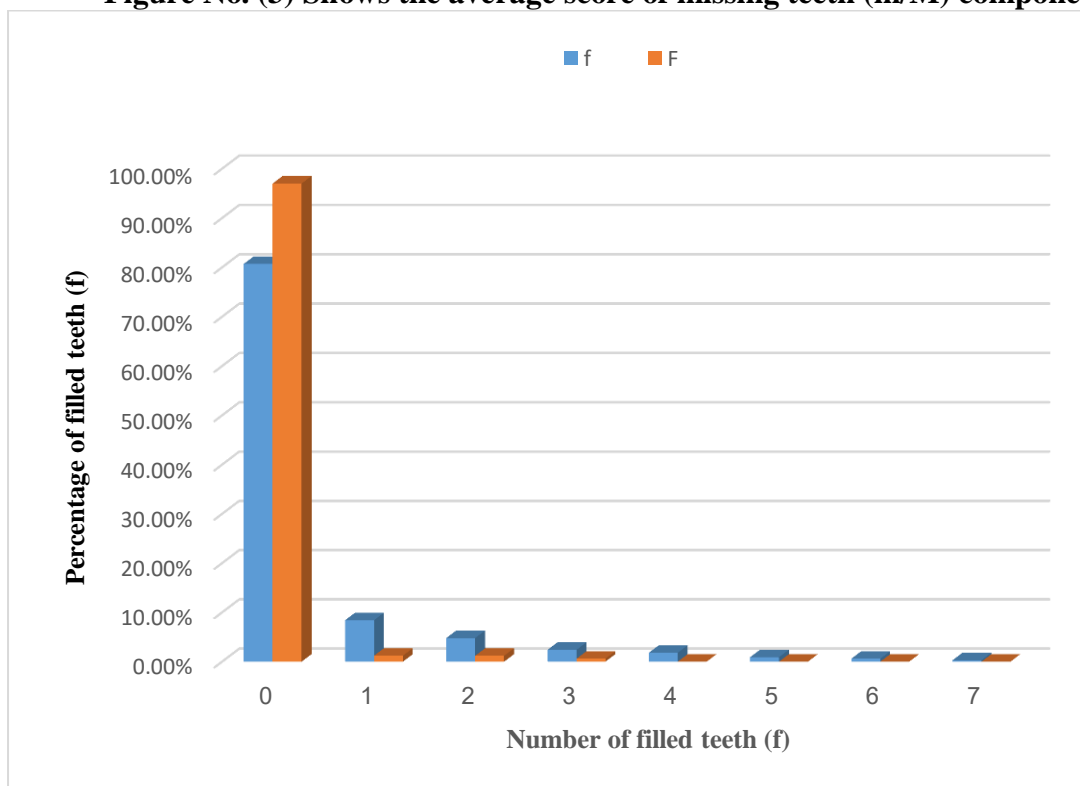


Figure No. (4) Shows the average score of filling teeth (f/F) components.

#### 4. Discussion

Through the results of the study conducted on 332 children aged 3 to 13 years in Misurata, Libya, several key findings were identified. The main finding indicated a significant association between the prevalence of dental caries in permanent teeth (DMFT) and the gender of the study population. On the other hand, no significant effect

of gender was found on dmft in children between 3 to 6 years old. Our results are consistent with a previous study in Tripoli, Libya (Alraqiq et al., 2021), showing that 78% of first-grade children had dental caries with a mean dmft of 3.7. However, in seventh-grade children, the study recorded a higher percentage of DMFT at 48.2%, which is substantially higher than the prevalence reported in our study, i.e., 17% in children aged 7-13 years, with a mean DMFT of 0.457. This difference could be explained by the difference in sample size between the two studies or may be due to the impact of other associated factors.

Similar results were reported in a study conducted to investigate the oral health status of a group of Libyan children in Benghazi city, showing high caries experience in children below 6 years old with a dmft score of 5.3, while it showed a high DMFT score of 2.6 for children over 12 years old (compared to our 0.47) (Ali et al., 2017). Furthermore, the current study revealed that the dt component of 3.40 (73%) and the DT component of 0.039 (15%) were significantly higher than the ft and FT components (0.42; 19% and 0.05; 3%, respectively) and the mt component of 0.25 (41%) and MT component of 0.009 (1%). Similar findings were reported in a study in Tripoli, Libya (Alraqiq et al., 2021), and in previous studies in other countries, including Egypt (Alsadat, 2018) and Saudi Arabia (Farooqi et al., 2015).

Regarding the dt/DT and ft/FT components, the higher figures indicate that a significant percentage of teeth originally infected with decay were treated with dental fillings, leading to the assumption that only a small number of children visit the dentist to treat decayed teeth. Additionally, the large percentage of children with decayed teeth might be due to parental carelessness in bringing their children to dentists for periodic checkup visits. Another factor contributing to the increased DMFT figures is the high consumption of foods containing sugars, which sometimes increases oral health consciousness among some individuals.

Other studies on the DMFT index for measuring caries prevalence, such as one conducted in Benghazi, Libya (Elfseyie et al., 2020), reported similar results for the DMFT components, with a DT component of 92.6%, followed by an FT component of 4.4%, and an MT component of 3.0%. Two other studies conducted in Tripoli, Libya (Baccush & Nayak, 1991) and Benghazi, Libya (Huew et al., 2011), reported higher DT and MT components than the FT component, which differs from our findings. Such differences may be explained by variations in the study samples or could be due to limited access to dental services and a lack of oral health awareness.

In the current study, the overall prevalence of dental caries in primary and permanent teeth was 91.50% (n=332). This result is consistent with a recent systematic review and meta-analysis of various prevalence of dental caries studies in different countries of East Africa (Teshome et al., 2021), which reported that the overall dmft and DMFT in East Africa were 95%. However, our results indicated a higher overall caries prevalence than the study conducted in two of Libya's western cities (Nasr et al., 2014), which showed an overall caries prevalence of 60.85%. This can be explained by differences in the size of the study sample, the study population, or other associated factors such as environmental factors, types of foods, and certain customs and traditions.

In the present study, the high prevalence of dental caries among Libyan preschool and school children could be attributed to poor oral hygiene, less exposure to

**fluoride, frequent consumption of high-sugar content foods, and the absence of dental health education and public caries prevention programs in Libya.**

#### **5. Conclusion.**

**To summarize, a high prevalence of dental caries in primary and permanent teeth was observed. However, a significant proportion of deciduous teeth was affected by dental caries in Misurata, Libya, indicating that dental caries is a common health concern. Accordingly, it is important to emphasize the significance of preventive measures, particularly at an early age in children in order to control the occurrence of dental caries. These measures include oral health education, water fluoridation, school fluoridation, and sealant programs to meet the oral health service needs of children. Further future studies are necessary to monitor the oral health status of children in Libya and to improve dental health services in schools and the community.**

#### **6. Acknowledgments.**

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## انتشار تسوس الأسنان بين الأطفال في مصراتة، ليبيا: دراسة مقطعية

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### المخلص

أجريت هذه الدراسة لتحديد معدل انتشار تسوس الأسنان بين الأطفال الليبيين في مدينة مصراتة الذين تتراوح أعمارهم بين 3 إلى 13 سنة من خلال تحديد عدد الأسنان المتأكلة والمفقودة والمحسوة (DMFT). تم أخذ عينة عشوائية من 12 مدرسة ابتدائية خاصة بمدينة مصراتة في الفترة من يونيو إلى يوليو 2023. وشملت الدراسة عدد 332 طفلاً، تم فحصهم من قبل أطباء أسنان مدرّبين. وبلغ عدد الذكور 209 (63.0%)، والإناث 123 (37.0%). في هذه الدراسة كان الأطفال الذين تتراوح أعمارهم بين 3 إلى 6 سنوات (75%) يعانون من تسوس الأسنان اللبينية (d) بمعدل 3.409، مقارنة بعنصر الأسنان المتأكلة (D) لدى الأطفال الذين تتراوح أعمارهم بين 7 إلى 13 عامًا، والذي سجل فقط 16.5% بمعدل 0.394. كانت الأسنان المفقودة والمحسوة أعلى عند أطفال ما قبل المدرسة مقارنة بأطفال المدارس، حيث أظهرت (m) بنسبة 14%، (M) بنسبة 1%، (f) بنسبة 19%، و (F) بنسبة 3%. أظهر انتشار تسوس الأسنان لدى أطفال المدارس وجود علاقة إحصائية قوية مع العمر بمستوى دلالة (P < 0.001). كما لوحظ وجود علاقة إحصائية كبيرة بين المكون (D) من DMFT والجنس بمستوى دلالة (P = 0.007). تم تسجيل مؤشر dmft أعلى من مؤشر DMFT (4.060)؛ (0.457)، على التوالي مما يدل على أن الأطفال الصغار يتأثرون أكثر بتسوس الأسنان. في الختام، أظهرت الأسنان اللبينية والدائمة معدلات عالية من التسوس المر الذي يجعل تسوس الأسنان لا يزال يمثل مشكلة صحية عامة. لذلك يجب توعية الأطفال وخاصة في السن المبكرة.

استلمت الورقة بتاريخ  
ي/ش/س، وقبلت بتاريخ  
ي/ش/س، ونشرت  
بتاريخ ي/ش/س  
الكلمات المفتاحية:  
تسوس الأسنان، انتشار،  
DMFT، dmft،  
الأطفال، ليبيا،