


Original Article

Application of Dental Indices to Evaluate Oral Health Status for Schoolchildren in Central Tripoli, Libya

Sara Abusreweil^{1*}, Najeha Shetwi², Amel Berbash¹, Ebtahal Gabroun¹¹Department of Preventive Dentistry, Faculty of Dentistry, University of Tripoli, Tripoli, Libya.²Department of Orthodontics, Faculty of Dentistry, University of Tripoli, Tripoli, Libya.Corresponding Email. s.abusreweil@uot.edu.ly

ABSTRACT

Background and objective. The present study aims to determine the treatment needs index (TNI), care index (CI), restorative index (RI) and functional measure index (FMI) among Libyan schoolchildren. This study also aims to evaluate the impact of self-assessed brushing frequency and the role of parental observation during brushing on DMFT scores. **Methods.** a cross-sectional study was carried out on 185 schoolchildren (125 boys and 60 girls) between the ages of 12-14 years in Tripoli to collect the data for decayed, missing and filled teeth in the permanent teeth (DMFT). TNI, CI, RI and FMI were determined. The impact of brushing frequency and parental observation during brushing on the DMFT score were assessed within the stated age range. Data were analyzed using GraphPad Prism version 9. **Results.** high rates of treatment needs were observed amongst girls (66%) and boys (55%), with no statistically significant difference. CI was found to be 6.8 and 4.6 for boys and girls, respectively, whereas RI was shown to be 0.08 and 0.05, for boys and girls, respectively. FMI was found to be 0.9 amongst both genders. Brushing frequency was correlated with DMFT scores. In contrast, the role of parents in encouraging oral hygiene habits did not impact oral health status. **Conclusion.** The study indicated unmet treatment needs for dental caries and little experience of restorative treatment. Oral hygiene education for children and parents needs to be implemented to maximize opportunities for oral health improvement.

Keywords: Treatment Needs Index, Care Index, Restorative Index, Functional Measure Index, Caries.**Citation:** Misurati N, Berhaim N, Traina H. Application of Dental Indices to Evaluate Oral Health Status for Schoolchildren in Central Tripoli, Libya. Khalij-Libya J Dent Med Res. 2022;6(2):125-128. <https://doi.org/10.47705/kjdmr.226206>**Received:** 28/10/22; **accepted:** 11/11/22; **published:** 17/11/22Copyright © Khalij-Libya Journal (KJDMR) 2022. Open Access. Some rights reserved. This work is available under the CC BY-NC-SA 3.0 IGO license <https://creativecommons.org/licenses/by-nc-sa/3.0/igo>

INTRODUCTION

Dental caries has become an ever-increasing commonality within youth, affecting millions worldwide, impacting many different aspects of their lives; from the presence of pain to the ability to carry out daily tasks. The caries diagnostic criteria of the World Health Organization (WHO) for decayed, missing and filled teeth (DMFT) is the simplest and most commonly employed epidemiologic index in caries research (1). In fact, it is essential to use indices that could assess the severity of the disease and

treatment outcomes in different populations. For instance, care index was used to define the number of restored teeth as a fraction of the total number of decayed, missing and filled teeth (2). This index indicates the extent of treatment of caries lesions being delivered to a population and this can be used in dental health surveys for children (3). Treatment needs index was proposed as an epidemiological tool to determine the needs for treatment of large communities (4). This cross-sectional study aims to determine key indices including CI, TNI, RI and FMI,

amongst boys and girls and between different age groups. This study also aims to evaluate the impact of self-assessed brushing frequency and parental role on DMFT scores. These epidemiological data would be needed before implementing an effective preventive program.

METHOD

A cross-sectional study was performed on 185 schoolchildren (60 girls and 125 boys), targeting those aged between 12-14 years old, located in a highly populated area of Municipality of Tripoli Center. The study was approved by the Ministry of Education (Department of social services and school health). Parents' informed consent was obtained before recruiting the children into this study. The students' personal data was obtained from the school records for each individual pupil. A questionnaire, adapted from Al-Omiri, Al-Wahadni (5), was given to all students to complete. The questions were about brushing frequency and the role of parents in oral health care motivation from their perspectives. Each question was fully explained to the students. The questionnaires were then completed by the children at the schools under teacher supervision. The investigators were available onsite to provide clarification when required.

Teeth were examined in classrooms, by a single operator, using a mirror and a dental explorer. Data for decayed, missing and filled teeth in the permanent teeth were recorded and different indices were then calculated, including treatment needs index, care index, restorative index and functional measure index. The DMFT index is composed of the sum of three components: decayed, missing and filled teeth or surfaces in permanent teeth. The indices were calculated using the following equations:

$$\text{TNI (\%)} = \frac{\text{Decayed (D)}}{\text{DMFT}} \times 100$$

$$\text{CI (\%)} = \frac{\text{Filled (F)}}{\text{DMFT}} \times 100$$

$$\text{RI} = \frac{\text{Filled (F)}}{\text{Filled (F)} + \text{Decayed (D)}}$$

$$\text{FMI} = \frac{\text{Sound (S)} + \text{Filled (F)}}{28}$$

Data were analyzed using GraphPad Prism version 9 (GraphPad, San Diego, CA, USA). Data distributions, before analysis, were assessed using a D'Agostino and Pearson normality test. Kruskal-Wallis with Dunn's tests were used to determine the p values for multiple comparisons, while the Mann-Whitney test was used to determine the p values for two comparisons. Differences were considered statistically significant if $p < 0.05$.

RESULTS

The following bar graphs show the TNI (Figure 1), CI (Figure 2), RI (Figure 3) and FMI (Figure 4). Additionally, the impact of brushing frequency (Figure 5) and parental motivation (Figure 6) on DMFT were also assessed.

The treatment needs, including moderate and advanced conservative restorations, were recorded. As revealed from the results, there was a significant increase in treatment needs amongst boys; the highest TNI was found in older boys (14-year-old, 72.3%), while the lowest score was recorded for younger ones (12-year-old, 38.9%). In contrast, there was a gradual decrease in the treatment needs amongst girls as age increased.

Overall, higher TNI was recorded for girls (66%) than boys (55.1%), although no statistically significant difference was found between the two genders (Figure 1). No significant differences were also found in CI, RI and FMI between the boys and girls (Figure 2-4), although CI and RI, which measured previous management of dental caries, were slightly higher amongst boys than girls. More frequent tooth brushing correlated to lower DMFT scores for both genders. Parental observation did not enhance oral health status.

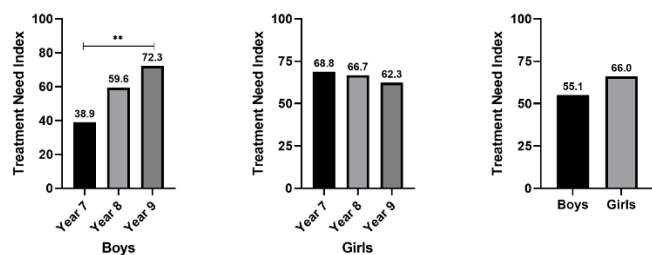


Figure 1. Treatment Needs Index. * Indicates statistically significant differences between year 9 and year 7 (** $p < 0.01$).

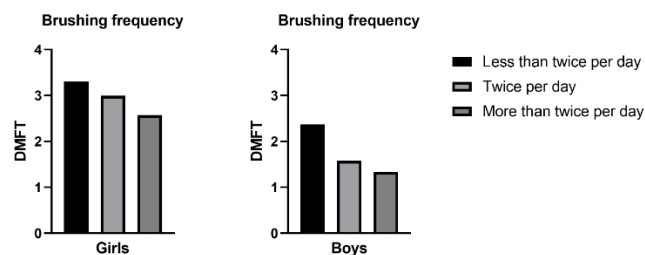


Figure 5. Impact of brushing frequency on DMFT amongst schoolchildren.

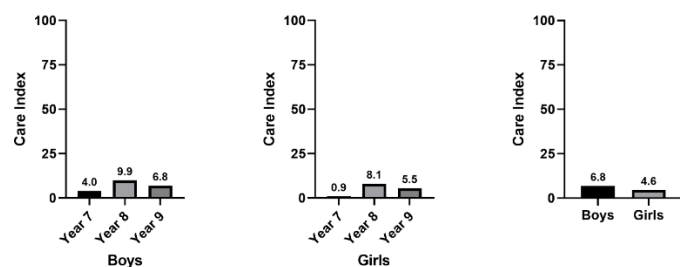


Figure 2. Care Index amongst schoolchildren.

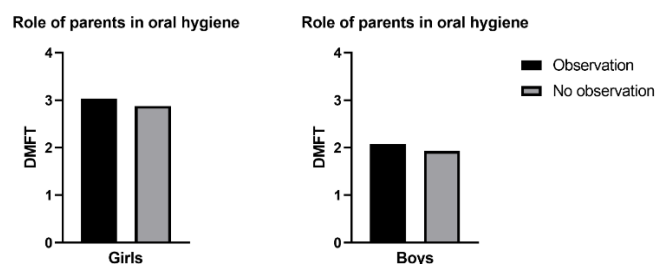


Figure 6. Impact of parents' observation during brushing on DMFT amongst schoolchildren.

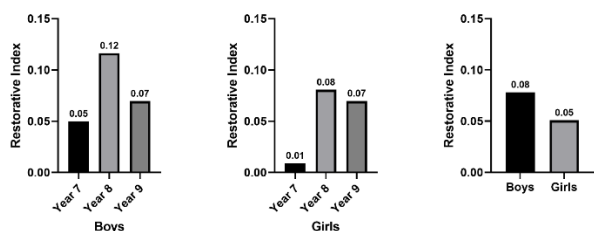


Figure 3. Restorative Index amongst schoolchildren.

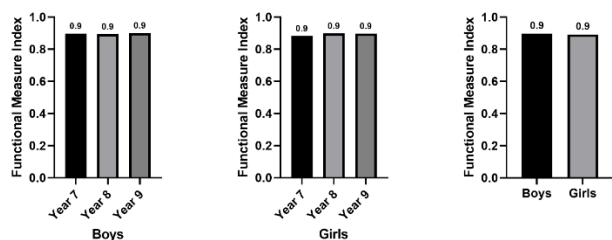


Figure 4. Functional Measure Index amongst schoolchildren.

DISCUSSION

Indices have been created to answer specific questions in caries research. The use of these indices allows us to detect trends in the effects and severity of the disease. The results of this study revealed that TNI was directly proportional to the age of the boys. The age group of 12 years recorded the lowest TNI score (38.9%), whereas the highest TNI score (72.3%) score was recorded in the age group of 14. In contrast, girls the age of 12 showed the highest TNI (68.8%) and this slightly declined as age increased. Notably, the age of 13 (year 8) demonstrated the highest CI and RI. Importantly, the Care index and restorative index have been used to describe the level of care delivered. However, these two indices are two different measures "as the higher the number of missing teeth, the larger the difference between the CI and RI may become" (2). The study demonstrated lower rates of care and restorative indices. Low rates of treated caries may suggest a low level of motivation among children and parents towards dental treatment. A low FMI (0.9) indicates a limited experience of extraction

amongst both genders. However, sociodemographic and socio-economic factors should be considered to address unmet oral health needs for children (6).

Of note, a correlation was found between brushing frequency and DMFT scores; the lowest DMFT scores were recorded when brushing frequency was more than twice a day. However, the difference was not statistically significant. The results also revealed that the role of parents in encouraging oral hygiene habits had no positive impact on DMFT scores. Regarding dental health behavior, it was shown that parents act as social models for their offspring and play a key role in the development of dental health behavior (7, 8). Therefore, the first step is to provide parents with knowledge on oral hygiene habits and keep them dentally aware. Thus, it is important that key behaviors with regards to oral health are developed and maintained in early childhood to become established skills (9).

In conclusion, treatment needs for dental caries were observed to be unmet. This study provides basic information on dental health status among schoolchildren that can be used to plan an effective caries preventive strategy.

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Conflicts of Interest

The authors declare no conflict of interest.

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