



Dental Caries Status and Oral Impact on Daily Performances Using Child-OIDP in School Children from Matara District, Sri Lanka

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Abstract

A good understanding about the physical, social and psychological effects of dental caries is important since it provides an insight into the impact of dental caries on children's lives. The impact on the quality of life is generally assessed using specifically designed condition-specific instruments. The child version of the Oral Impacts on Daily Performance (Child-OIDP) is one such specific instrument to identify the oral problems having an impact on the quality of life, thereby linking the impacts to the oral condition needing attention. The objectives of this study were to determine the prevalence, intensity, and extent of the impact of the dental caries on the quality of among Sri Lankan teenaged schoolchildren in Matara District. A total of 286 children aged between 13 - 18 years, attending the annual screening at the regional dental mobile service, were recruited to the study. According to the WHO guidelines, oral examination was performed and a pretested Sinhala version of the Child OIDP was used. In the study population the prevalence of dental caries was 42.7% the mean DMFT was 0.97 (\pm 0.1) and the mean DMFS was 1.8 (\pm 0.2) for permanent teeth. There was no statistically significant difference between male and female children for DMFT and DMFS levels. Simply 61.5% of the children reported at least a single affected daily performance due to dental caries during the last six months. Out of them, 26.6% reported impacts of high frequency while 34.6% reported the least impact on the daily performances. Twenty nine percent reported the impact on one out of eight daily activities. Functional activities like eating (37.8%), and cleaning mouth (23.1%), were the most frequently and severely affected daily activities followed by sleeping (14.3%), smiling (14.7%) and emotion (13.3%). Our results showed that dental caries primarily affects all three domains: functional, physical and psychological, while highlighting the importance of this knowledge in future improvement of the quality of life in children.

Keywords: Dental Caries Prevalence; DMFT; DMFS; Child-OIDP; School Children in Sri Lanka

Abbreviations

Child- OIDP: Child Oral Impact on Daily Performances; DC: Dental Caries; DMFS: Decay, Missing, Filled Tooth Surfaces; DMFT: Decay, Missing, Filled Teeth; ECOHIS: Early Childhood Oral Health Impact Scale; NOHS: National Oral Health Survey of Sri Lanka; OHIP-14: Oral Health Impact Profile-14; SE: Standard Error; WHO: World Health Organization

Introduction

Dental caries is a significant health problem among children worldwide. The incidence and the prevalence of dental caries have declined in industrialized countries over the past two decades while the low-income countries experienced an increasing trend in dental caries among children [1]. According to the National Oral

Health Survey of Sri Lanka (NOHS) [2] which traditionally assessed the oral health status and treatment needs of the population, the mean DMFT among 12 and 15 year-old-children is at a very low level as 0.6 (\pm 1.1) and 1.0 (\pm 1.6) respectively. It consisted of mean numbers of decayed teeth (D = 0.4), missing teeth (M = 0.1) and filled teeth (F = 0.1). However, according to the surveyed districts, these values showed regional variations. For example, the mean DMFT for ages 12 and 15 in Matara district were 0.8 and 1.4 while for those in Batticaloa were almost 1.0 and 2.1. The reported value for prevalence of dental caries in these age groups were 30.4% and 41.5% [2].

Numerous studies have revealed that dental caries and its complications have a great impact on the bearer's quality of daily life

Hence, there is an increasing concern to measure the extent to which the oral conditions disrupt normal social functioning including major changes in behaviors such as inability to work or attend school and household duties. As a result, the Child Oral Health on Daily Performance (Child-OIDP) index has been developed as the latest socio-dental indicator [3,4]. It is well designed to measure the oral health impact on 8 daily activities of the bearer, such as eating, speaking, cleaning the mouth, sleeping, smiling, school work, emotion and social contact [4,5].

Several other instruments such as the Oral Health Impact Profile -14 (OHIP-14) [6], Early Childhood Oral Health Impact Scale (ECOHIS) [7] and OIDP Sinhala version [8] have been used for Sri Lankan population to assess the quality of life due to oral health conditions or diseases.

Objectives of the Study

The objectives of the present study were to evaluate the dental caries status and its impact on the daily performance of teenaged School children in Matara District using instrument child-OIDP and thereby to have an insight into their oral health needs and status which will be useful in planning future preventive measures.

Materials and Methods

The approval for the research protocol and ethical clearance were obtained from the Ethical Review Committee of the Faculty of Dental Sciences, University of Peradeniya (Ethical Clearance Certificate No: FDS-FRC/2013/04). Permission to implement the research work was obtained from the zonal education and health authorities in Matara district. Teenaged school children who were attending the annual screening at the regional dental mobile service were recruited into the research from schools in Matara educational zone.

The study design was a school-based, cross-sectional study. After statistical analysis for the power calculation of the sample size, the randomized sampling method was used to recruit schoolchildren. It consisted of minimally 270 school children. Thirty schools (clusters) were selected utilizing systematic sampling and selection of every 12th school was carried out from a total of 372 schools in Matara district. Maximally 10 schoolchildren were randomly selected from those 30 schools (clusters) to maintain the calculated sample size after dropouts. The written and verbal consents were taken from each school child. A questionnaire including basic socio-demographics of schoolchildren (name, age, gender, and date of birth) and Sinhala translated pretested interviewer-administered Child Oral Impact on Daily Performance Instrument (Child-OIDP)

[4] was given to them. The subjects were asked to recall dental caries experience that they perceived in the last six months and to note any oral impact on any daily performance mentioned in the Child-OIDP. Then they were asked to recall its frequency as once or twice a month (mild) or once or twice a week (moderate), or daily (severe).

Oral examination was performed by a dental surgeon with training and experience in observing and recording dental caries status according to the WHO guidelines [9]. The examiner was calibrated prior to data collection and intra-examiner variability was assessed using the kappa statistics (Cohen' kappa coefficient) which was 0.849 (95% CI 0.760, 0.937 with SE \pm 0.045).

The criteria of the WHO [9] were used to record dental caries (DC). The participants were assessed while seated in a mobile dental chair during a dental examination. A standardized oral examination using a fiber-optic light was performed. All participants were provided with necessary oral hygienic instructions and the necessary dental treatments were delivered at the time of examination. Those with advanced treatment needs were guided to the consultant units in the General Hospital, Matara.

Data analysis was conducted using the standard statistical software package of SPSS-13 (Chicago, IL, USA). Descriptive statistics included computational percentages, means, and standard errors.

Results

A total of 286 students including 127 males (44.4%) and 159 (55.6%) females at a mean age of 14.7 ± 0.05 years participated in the study (Table 1).

| Characteristic | | N | % | Total N |
|----------------|--------|--------------|------|-----------------|
| Sex | Male | 127 | 44.4 | 286 |
| | Female | 159 | 55.6 | |
| Age (Yrs) | Male | 14.60 (0.05) | | 14.66 (0.05) |
| | Female | 14.71 (0.04) | | |

Table 1: Demographic characteristics of the study population.

As shown in table 2, the prevalence of dental caries in this study population was 42.7%. Further, the prevalence of dental caries among males and females were 41.7% and 43.4%, respectively.

Comparison of DC levels in male and female populations and the total population of the study based on DMFT and DMFS indices are indicated in table 3. The mean number of DMFT and DMFS for an-

| | Male | Female | Total |
|---------------------------|------------|------------|-------------|
| Caries present (n, %) | 53 (41.7%) | 69 (43.4%) | 122 (42.7%) |
| Caries not present (n, %) | 74 (58.3%) | 90 (56.6%) | 164 (57.3%) |

Table 2: Prevalence of dental caries in the study population.

| Variable | Female | Male | Total |
|----------------|-------------|-------------|-------------|
| | Mean (SE) | Mean (SE) | Mean (SE) |
| Anterior DMFT | 0.01 (0.01) | 0.05 (0.02) | 0.03 (0.01) |
| Posterior DMFT | 1.00 (0.11) | 0.91 (0.13) | 0.94 (0.08) |
| Total DMFT | 1.01 (0.11) | 0.95 (0.14) | 0.97 (0.09) |
| Anterior DMFS | 0.01 (0.01) | 0.09 (0.05) | 0.05 (0.02) |
| Posterior DMFS | 1.90 (0.26) | 1.61(0.30) | 1.75 (0.18) |
| Total DMFS | 1.91 (0.26) | 1.7 (0.28) | 1.80 (0.19) |

Table 3: Mean DMFT and DMFS scores in the study population.

terior teeth dental caries were considerably lower in female (0.01 ± 0.006) than in male (0.05 ± 0.02) students. In addition, the mean DMFS score was double the value of DMFT in both male and female students.

Table 4 and 5 show descriptive data on DMFT and DMFS level distribution of the study populations. Although it showed DC at a level of 42.7% in the total population, a majority of the students (98.3%) did not have any caries on anterior teeth in the permanent dentition. It shows that out of 286 students, only 5 had anterior teeth caries.

| DMFT value | Males (n) | Females (n) | Total Subjects | | |
|------------|------------|-------------|----------------|---------------|------------|
| | | | Anterior (n) | Posterior (n) | Total (n) |
| 0 | 74 (58.27) | 90 (56.60) | 281 (98.25) | 167(58.39) | 164(57.34) |
| 1 | 23 (18.11) | 20 (12.58) | 3 (1.05) | 40 (14.34) | 43(15.03) |
| 2 | 14 (11.02) | 29 (18.24) | 2 (0.70) | 41 (14.69) | 43(15.03) |
| 3 | 6 (4.72) | 11 (6.92) | | 17 (5.94) | 17 (5.94) |
| 4 | 4 (3.15) | 4 (2.52) | | 8 (2.80) | 8 (2.80) |
| 5 | 1 (0.79) | 3 (1.89) | | 4 (2.10) | 4 (1.40) |
| 6 | 4 (3.15) | 2 (1.26) | | 6 (1.75) | 6 (2.10) |
| 7 | 1 (0.79) | | | 1 (0.35) | 1 (0.35) |

Table 4: Distribution of DMFT levels of the study population.

| DMFS value | Males (n, %) | Fe-males (n, %) | Total student number | | |
|------------|--------------|-----------------|-----------------------|------------------------|--------------------|
| | | | Anterior teeth (n, %) | Posterior teeth (n, %) | Total teeth (n, %) |
| 0 | 74 (58.27) | 90 (56.60) | 281 (98.25) | 167 (58.39) | 164 (57.34) |
| 1 | 16 (12.60) | 15 (9.43) | 2 (0.70) | 29 (10.74) | 31 (10.14) |
| 2 | 12 (9.45) | 13 (8.18) | 1 (0.35) | 24 (8.04) | 25 (8.74) |
| 3 | 5 (3.94) | 8 (5.03) | 2 (0.70) | 11 (4.55) | 13 (4.55) |
| 4 | 2 (1.57) | 7 (4.40) | | 9 (3.15) | 9 (3.15) |
| 5 | 4 (3.15) | 4 (2.52) | | 8 (2.80) | 8 (2.80) |
| 6 | 2 (1.57) | 9 (5.66) | | 11 (3.85) | 11 (3.85) |
| 7 | 3 (2.36) | 5 (3.14) | | 8 (2.80) | 8 (2.80) |
| 8 | 1 (0.79) | - | | 1 (0.35) | 1 (0.35) |
| 9 | 2 (1.57) | - | | 2 (0.7) | 2 (0.7) |
| 10 | 1 (0.79) | 2 (1.26) | | 3 (1.05) | 3 (1.05) |
| 11 | 1 (0.79) | 2 (1.26) | | 3 (1.05) | 3 (1.05) |
| 12 | 2 (1.57) | 2 (0.63) | | 4 (1.40) | 4 (1.40) |
| 13 | 1 (0.79) | 1 (0.63) | | 2 (0.70) | 2 (0.70) |
| 15 | 1 (0.79) | - | | 1 (0.35) | 1 (0.35) |
| 16 | - | 1 (0.63) | | 1 (0.35) | 1 (0.35) |
| 18 | - | 1 (0.63) | | 1 (0.35) | 1 (0.35) |

Table 5: Distribution of DMFS levels of the study population.

According to dental caries risk assessment classification, a very few subjects; 3.8% (11 subjects) belong to the severe caries risk group (DMFT > 4). Out of 42% DC population, 30.1% had mild caries risk (DMFT < 3).

Table 5 shows the involvement of the tooth surfaces of permanent dentition in DC lesion. Only a single surface of the teeth was affected in 10.1% of the students. The maximum number of tooth surfaces involved in female students was 18 while that of male students was 15.

According to the results of the OIDP scale, dental caries has no impact on their daily activities in 113 (39.5%) of schoolchildren. However, out of 173 children with impact on their daily activities, 99 children reported that dental caries had a mild impact, while 54 children reporting a moderate impact on their daily activities. Further, it shows that dental caries had a more frequent, intense, and severe impact on daily activities in 76 children with impact.

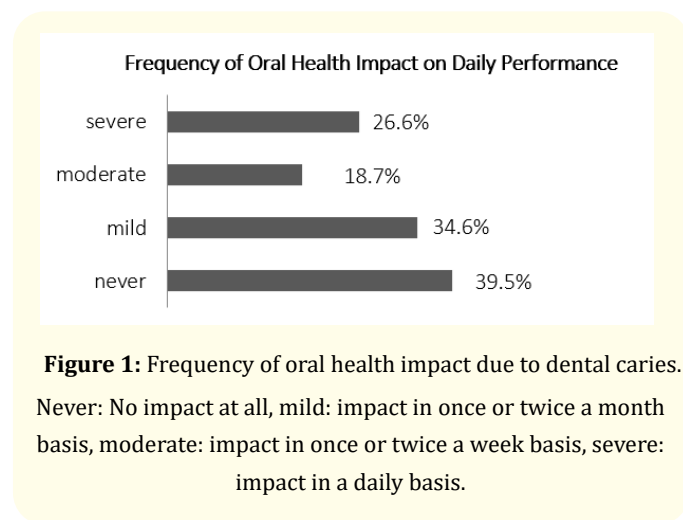


Figure 1: Frequency of oral health impact due to dental caries. Never: No impact at all, mild: impact in once or twice a month basis, moderate: impact in once or twice a week basis, severe: impact in a daily basis.

Table 6 shows the impact of caries on these students' daily activities such as eating, speaking, cleaning teeth, sleeping and relaxing, smiling, school work, emotional stability and social contact in the last six months. Eating was the most commonly affected daily activity (37.7%), followed by cleaning teeth (23.08%), smiling (14.69%), and sleeping and relaxing (14.34%). However, dental caries was found to have a considerable impact on other activities also. Among them, speaking was the least affected daily activity that shows percentage value of 5.94% (n = 17).

As shown in figure 2, the results of the frequency of the oral health impact on daily performances indicated that dental caries did not have any impact on the daily activities of 39.5% (113) school children. However, 29% (n = 83) of school children showed an impact of dental caries on at least a single activity while 0.7% (n = 2) showed the impact on all eight activities in the daily performances.

Discussion

Dental caries is a major oral disease that significantly affects individuals' daily activities. Since it is a largely preventable disease; the impact on the quality of life caused by dental caries is unnecessary [10]. However, the prevalence of caries among children has increased in developing countries due to their poor preventive care

| OIDP questions | Yes | | Once a month | | Once a week | | Daily | |
|-----------------------|-----|-------|--------------|-------|-------------|------|-------|-------|
| | N | % | N | % | N | % | N | % |
| Eating | 108 | 37.76 | 47 | 16.43 | 18 | 6.29 | 43 | 15.03 |
| Speaking | 17 | 5.94 | 9 | 3.15 | 5 | 1.75 | 8 | 2.80 |
| Cleaning teeth | 66 | 23.08 | 23 | 8.04 | 20 | 6.99 | 17 | 5.94 |
| Sleeping and relaxing | 41 | 14.34 | 26 | 9.09 | 7 | 2.45 | 6 | 2.10 |
| Smiling | 42 | 14.69 | 15 | 5.24 | 5 | 1.75 | 21 | 7.34 |
| Schoolwork | 22 | 7.69 | 11 | 3.85 | 6 | 2.10 | 5 | 1.75 |
| Emotional stability | 38 | 13.29 | 15 | 5.24 | 6 | 2.10 | 17 | 5.94 |
| Social contact | 28 | 9.79 | 11 | 3.85 | 10 | 3.50 | 7 | 2.45 |

Table 6: Prevalence of OIDP and frequency of the dental caries impact on daily activities of the study population (n = 286).

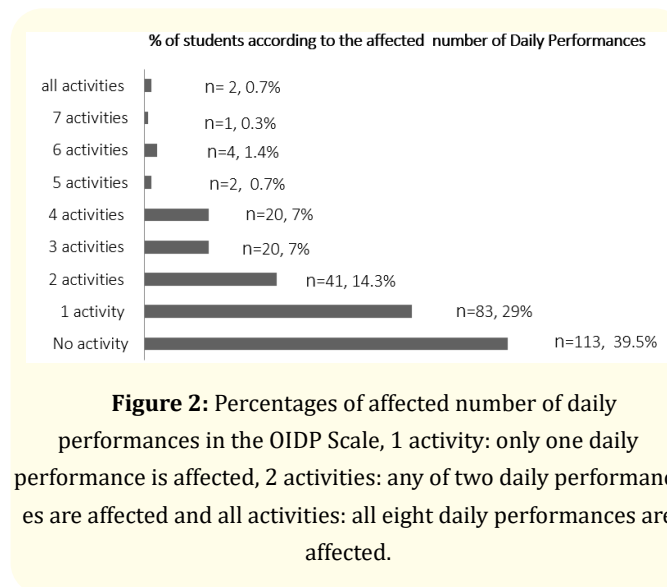


Figure 2: Percentages of affected number of daily performances in the OIDP Scale, 1 activity: only one daily performance is affected, 2 activities: any of two daily performances are affected and all activities: all eight daily performances are affected.

approaches compared to those in developed countries [11]. Using child- OIDP in conjunction with clinical measurement is more appropriate in evaluating oral health care needs of children having dental caries since OIDP measures the impact and extent to which functional, psychological and social aspect of a child's life is affected due to caries [4,5,12-16].

This study attempted to use clinical assessment of dental caries in conjunction with the measurement of child-OIDP in a population of school children in Matara district, Sri Lanka. The study

population consisted of 286 teenaged school children at a mean age of 14.7 ± 0.05 years. According to the clinical assessment, the prevalence of dental caries in the study population was 42.7%. This value was slightly higher than the value reported for the age category in Matara district (41.5%) in the NOHS 2015-16 report. However, this value is comparable to the prevalence of dental caries for 15-year-old children in Sri Lanka [2]. Further, prevalence of dental caries in the study population is comparatively low when compared with some of the 10-12 years old Indian populations whose prevalence ranged from 44.8% - 63% [17-19]. However, the prevalence of caries in this study population is slightly higher than the that of children in between 10-13 years in Tanzanian, some other Indian, Italian, Malaysian, Ecuadorian, and Chile populations [12,20-24]. Similarly, the DMFT scores of some of these reported studies are comparatively high when compared with those of present study population [22,25] while some others are comparable (0.97 ± 0.09) [2]. In contrast, the DMFT score of this study population is not comparable with the value reported for the same age category in Matara district in the NAOH report since it was very high (1.4) [2].

According to the WHO recommendation for determining the risk status of dental the prevalence of dental caries in the age group of 12-years in Sri Lanka was considered 'very low' since the DMFT score for this age group was less than 1.2. For the age group of 15-years in Matara district, it was considered 'low' since the DMFT score for this category was above 1.2 [2]. According to the results of this study, prevalence of dental caries in our study population belongs to 'very low' category (Table 4). However, descriptive data on DMFT and DMFS levels for males and females in Table 4 and 5 show that there are pockets of several cases of severe dental caries status with the involvement of >4 teeth (Table 4) and involvement of >8 tooth surfaces (Table 5). This highlights the requirement of immediate health care attention for these severe caries risk groups.

Young children are more sensitive to various impacts of oral conditions on their quality of life. Their current quality of life and development may have their ultimate impact and cause a dramatic effect on their social skills and education. When considering the oral health-related impacts, the psychological component is greatly affected in children than in adults. The findings of this study revealed that the overall prevalence of oral impacts on daily performances of the school children at the age of 14.07 ± 0.05 years is 61.5% and they had affected one or more daily activities. When the prevalence of dental caries impact on daily activities of this study population is compared with other published data, it (60.5) was lower than findings from Indian, Italian and Ecuadorean populations [17,21,23] while it was higher than the findings from Tanza-

nian and Malaysian [12,22] population for the same age category.

In the present study, the most affected activity is eating and enjoying food (54.4%). This is consistent with the child-OIDP findings of other reported studies in the world [5,18,21-26]. In contrast, smiling and relaxing and speaking were reported as the most affected activities in Ecuadorian [23] and Indian [18] populations respectively. This may be due to the differences in the oral disease conditions and severity, culture, social background and educational level of the study populations. However, difficulty in eating followed by cleaning mouths due to oral problems were the most common activities affected and these findings are similar to other studies using child-OIDP on most of the comparable age groups [17,18,21,22,24]. Further consistent with the results reported in previous OIDP studies, difficulty with performing school work was most rarely affected daily activity due to dental caries [18,21-25].

Conclusion

Based on the results of this study, we conclude that dental caries prevalence of teenaged school children in Matara district is 42.7% which is a little higher compared that of the other world population, and dental caries has a significant impact on the quality of life, especially in relation to the physiology-related domain in the daily activities (i.e. problems when eating or cleaning mouth) as the major components. Further studies on the impact of dental caries on daily performances are warranted in order to introduce effective policies for management and prevention of dental caries in Sri Lanka.

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