Oral health in Jordan

D.S.M. Quteish Taani
Irbid, Jordan

This paper reviews the overall picture for oral hygiene, gingival/periodontal disease, dental caries and oral lesions/conditions in Jordanian subjects and its relationship to socioeconomic status. Furthermore, the trends of certain conditions are described. Only approximately one-third of children brushed their teeth regularly, so the amount of plaque was high and gingivitis was pronounced irrespective of socioeconomic status. Public school children had higher overall scores for decayed, missing, or filled teeth and surfaces than the children in the private schools. In general, boys had higher plaque and gingival scores than girls. The occurrences of shallow and deep pockets in these children were low (0.3–5.3%). Although an improvement in oral hygiene, gingival conditions and dental caries has been reported recently in children, the prevalence of these conditions is still high compared to that found in the developed countries. More than one half of the adults brushed their teeth regularly and high proportions of subjects with shallow and deep pockets were found in the 50–60-year-old age group with about 19% and 11% respectively. Fordyce’s granules and tori were the most common lesions among the thirty different oral lesions or conditions diagnosed. It may be concluded that motivation and proper oral hygiene should be emphasised. Secondly, implementation of school-based oral health promotion and prevention programmes is urgently needed.

Key words: Children, dental caries, gingival status, oral lesions, oral hygiene, trends

Jordan is a small developing country with an estimated population of around 5 million people. As with most developing countries, Jordan has experienced a significant increase of its population, with children and adolescents forming a large fraction of its total population. This change in demographics has also put a strain on the dental services due to increased demands.

Epidemiological data available in Jordan have attempted to describe the oral health status of mainly younger populations. These surveys were carried out in schools where children and adolescents were examined, and the available data regarding the oral health status of Jordanian adults are very scarce.

National epidemiological studies in 1984 and in the 1990s showed that dental caries experience, as measured by DMFT, was found to be between 4 and 5 for the 12–16-year-old age groups. Similarly, the prevalence of dental caries and periodontal disease has been increasing in the developing countries. These figures are relatively high as compared to the declining DMFT figures in the most industrialised developed countries.

This high prevalence of dental caries parallels the socioeconomic development and may be related to the western type of diet which is rich in refined carbohydrates, and more frequent consumption of sugar, especially sweets and fruit drinks. Furthermore, assessment of the prevalence and severity of periodontal disease in 15–16-year-old age group indicated that gingival rather than periodontal disease is common in Jordanian adolescents.
Further studies relating oral health to socioeconomic status revealed a weak relationship. Such findings for oral hygiene, gingival status, and dental caries were worse, but not significantly worse, among poor children than they were among wealthy children.

A recent study of dental caries experience in 12–13-year-old Jordanian children showed that the mean DMFT index was 2.5, while a study of oral health trends in Jordanian children concluded that oral hygiene, gingival conditions and dental caries have improved since 1993. Despite these studies, there is still no national comprehensive oral health survey from Jordan.

The aim of this review is to describe oral health in Jordan with reference to:

- The prevalence and severity of gingival/periodontal disease, dental caries and oral lesions, and oral hygiene status
- The relationship between socioeconomic status and oral hygiene, gingival condition and dental caries
- The trends in oral health.

**Oral health in children and adolescents**

**Oral hygiene practice, plaque and gingival conditions**

Tooth brushing is considered to be the most reliable mean of plaque control, providing thorough and regular cleaning. Nowadays, wide variations exist in toothbrush design, brushing technique, frequency and time of tooth brushing. The oral hygiene habits represented by the frequency of tooth brushing by children according to their sex and type of school is shown in Table 1.

<table>
<thead>
<tr>
<th>Sex</th>
<th>Tooth brushing frequency</th>
<th>Total</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>None</td>
<td>Irregular</td>
<td>Regular</td>
</tr>
<tr>
<td>Male</td>
<td>50.7</td>
<td>28.5</td>
<td>20.8</td>
</tr>
<tr>
<td>Female</td>
<td>11.0</td>
<td>38.0</td>
<td>51.0</td>
</tr>
<tr>
<td>Total</td>
<td>33.6</td>
<td>32.6</td>
<td>33.8</td>
</tr>
<tr>
<td>Public</td>
<td>31.5</td>
<td>33.0</td>
<td>35.5</td>
</tr>
<tr>
<td>Private</td>
<td>17.9</td>
<td>35.5</td>
<td>57.1</td>
</tr>
</tbody>
</table>

Furthermore, about 35% of public and more than half (57%) of private school children claimed to brush their teeth on a regular basis, while about 31% and 18% of children in the respective types of school did not brush their teeth. In all these studies the oral hygiene of children was poor. Such findings could be either due to a short brushing time, the use of an ineffective technique, or both factors. Also, it is possible that some of the children did not brush as they claimed.

In a recent study, plaque and gingival scores were found to be higher among public school children than among private school children (Table 2), but with no significant difference between these groups. The plaque score was slightly lower than reported in a previous study. However, the mean plaque indices were found to be significantly higher in ‘very poor’ and ‘poor’ groups than in ‘moderate’ or ‘wealthy’ groups. The plaque scores among both sexes had marked differences, being significantly higher in males than in females. This may be due to the grooming behaviour in girls, especially at the adolescent age. Furthermore, clinical examination of children from private schools (high social class) showed slightly better results with no significant changes of oral hygiene than children from public school (moderate to low social classes).

Such results disagree with a previous finding which showed that the mean plaque scores were higher in the ‘very poor’ and ‘poor’ children than in the rich ones. About one third of the subjects had a completely healthy periodontium (code 0) while 40% had bleeding on probing (code 1). Calculus deposits (code 2) were found in only 17.4% of subjects. The presence of both shallow and deep pockets was minimal, being found in only 5.3% and 0.3% of the subjects respectively.

**Dental caries**

Dental caries data recorded recently from children attending public and private schools are presented in Table 3. Children in public schools had no significant difference in DT and DMFT scores compared to the children in private schools (p > 0.05). Similarly, the DS and DMFS scores of public school children were not significantly different (p > 0.05), from those of private school children. In an earlier study, the D-components dominated, accounting for about 89% of DMFT in public school children and 91% in private school children. Extracted teeth due to
caries (M) and filled teeth (F) were relatively few in the children attending both types of schools. Another earlier study revealed no significant differences in caries experience among schoolchildren in the four income groups (poor, very poor, moderate, wealthy), as measured by the decayed component for both teeth (D) and surfaces (S) (Table 4).

Earlier studies carried out in Jordan between 1993–1997 showed a marked level of dental caries (DMFT=4.5 to 5) in 13–14 and 15–16-year-old children in various socioeconomic groups. Similar observations have been reported in children from neighbouring countries. In our studies, caries experience varied between genders, being slightly higher among boys. Children attending public school had similar DMFT scores to those attending private schools. These findings agree with results reported in many developing countries, but disagree with a study comparing English children with Jordanian children, as in both countries there was a significant difference between caries experience of children in different social classes.

**Malocclusion**

The occlusal relationships and the presence of spacing or crowding in the primary dentition of Jordanians were recently assessed.

Mesial step molar relationship was found in about 48% of the subjects followed by flush terminal molar relationship in 37%. The majority of children examined had spaced primary dentition. In general, class I, II and III canine relationships were found in 57%, 29% and 3.7% of children respectively.

In a current study by Abu Alhajaj and Qudeimat, the prevalence of malocclusion in 2003 among 13–15-year-old North Jordanian school children was 92%. The most common antero-posterior relationship was class I incisors and molars (55.8% and 55.3% respectively), while class III incisors and molars were found in 10.5% and 1.4% respectively. Class II incisors and molars were found in 33.7% and 18.8% of the sample respectively. The most common malocclusion traits detected in this sample were crowding (50.4%) and midline shift (31.7%). Scissor bite (0.3%) was the least frequent malocclusion trait.

**Trauma**

The incidence and the pattern of dental emergencies resulting from traumatic injuries in 620 Jordanian children was studied by Al-Jundi. About 31% of these emergencies were a consequence of dental trauma to 287 teeth. The average time between trauma and dental emergency was 5 months. Pain and sensitivity was the most frequent symptom (31.3%), followed by swelling and sinus tract (17.4%). The main cause of dental trauma was “falling during play” (58.5%), while the least common cause was motor vehicle accidents (1.5%). The most frequently encountered type of trauma was crown fracture (76.7%) while soft tissue injuries were estimated to have occurred in 17% of the children.

The prevalence and the related factors with incisor trauma were assessed in a cross-sectional study involving 1,878 12-year-old Jordanian school children. Of the children examined about 14% had dental trauma, with maxillary central incisors being the most affected (79.2%) and enamel-dentine fracture (40.6%) being the most common type of crown fracture. It was concluded that the prevalence of traumatic injuries to the permanent incisors in this age group was close to that found in other countries. Also, male gender and having an overjet greater than 5.0mm were significant predisposing factors to dental injuries. The prevalence of injuries to the permanent incisors among 459 10–12-year-old Jordanian schoolchildren was investigated in urban Amman and rural South Shouma and found to be 19.2 and 15.5% respectively. The most common type of injury in both communities was enamel fracture and the most common causes of injury were falls and collisions with other children.

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**Table 3** Dental caries experience of children in public and private schools, decayed, missing, filled teeth and surfaces

<table>
<thead>
<tr>
<th>School</th>
<th>DT</th>
<th>MT</th>
<th>FT</th>
<th>DMFT</th>
<th>DS</th>
<th>MS</th>
<th>FS</th>
<th>DMFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>2.9</td>
<td>0.1</td>
<td>0.3</td>
<td>3.2±3.0</td>
<td>3.2</td>
<td>0.3</td>
<td>0.4</td>
<td>3.9±5.4</td>
</tr>
<tr>
<td>Private</td>
<td>2.1</td>
<td>0.1</td>
<td>0.7</td>
<td>2.9±4.3</td>
<td>2.3</td>
<td>0.4</td>
<td>0.9</td>
<td>3.6±4.6</td>
</tr>
<tr>
<td>P value</td>
<td>0.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.2</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
<td>0.1</td>
</tr>
</tbody>
</table>

**Table 4** Mean number of decayed, missing, filled teeth and surfaces in four socio-economic groups of children

<table>
<thead>
<tr>
<th>Socioeconomic group</th>
<th>DT</th>
<th>MT</th>
<th>FT</th>
<th>DMFT</th>
<th>DS</th>
<th>MS</th>
<th>FS</th>
<th>DMFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very poor</td>
<td>4.3</td>
<td>0.2</td>
<td>0.2</td>
<td>4.6±0.2</td>
<td>5.4</td>
<td>0.7</td>
<td>0.5</td>
<td>6.5±0.3</td>
</tr>
<tr>
<td>Poor</td>
<td>4.1</td>
<td>0.1</td>
<td>0.3</td>
<td>4.5±0.1</td>
<td>5.1</td>
<td>0.8</td>
<td>0.6</td>
<td>6.6±0.2</td>
</tr>
<tr>
<td>Moderate</td>
<td>4.2</td>
<td>0.3</td>
<td>0.4</td>
<td>4.9±0.2</td>
<td>5.4</td>
<td>1.0</td>
<td>0.9</td>
<td>7.3±0.4</td>
</tr>
<tr>
<td>Wealthy</td>
<td>4.2</td>
<td>0.3</td>
<td>0.6</td>
<td>5.0±0.2</td>
<td>5.5</td>
<td>0.9</td>
<td>1.0</td>
<td>7.3±0.3</td>
</tr>
</tbody>
</table>

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Taan: Oral health in Jordan
Oral health of adults

**Tooth loss**

In a study by Hamasha et al., with a random sample of 509 Jordanian adults (18–77 years), approximately 44% of the subjects reported brushing their teeth irregularly (on average less than once a day), while 54% brushed regularly (at least once a day). These subjects had an average of 21 teeth remaining, the mean number decreasing significantly with age. The number of retained teeth in Jordanian adults was found to be close to that of American and the Finnish adults. It was concluded that modifications in the non-disease independent factors (education, income, smoking, attitude, and beliefs) could reduce tooth loss and improve oral health status among Jordanians.

A recent study showed that dental caries was responsible for the greatest tooth loss in patients below 40 years of age, while periodontal problems were the most common cause above 40 years. This study disagrees with the finding by Haddad et al., who reported that periodontal diseases were the main cause of tooth loss in Jordan. Such findings may be related to the fact that a high proportion of patients (59%) were over 40 years of age with a consequently greater chance of tooth loss by this cause.

**Periodontal disease**

The prevalence of the subjects affected by periodontal disease measured in terms of the highest CPITN is shown in Table 5. The proportion of subjects with healthy periodontium (score 0) ranged from 41.1% (among the 20–29-year-old group) to 11.1% (among the 50–60-year-old group). Bleeding on probing (score 1) was the highest in the 20–29-year-old group (19.5%) and the lowest in the 50–60-year-old group (11.1%). Calculus deposit (score 2) was the overwhelming problem over by 30 years of age, whilst shallow and deep pockets (score 3 and 4) were the least prevalent problems in all age groups less than 50 years. However, the highest percentage of subjects with shallow and deep pockets were found in the 50–60-years-old age group, being 18.6% and 11.1% respectively.

**Oral lesions**

In an investigation of oral lesions and conditions, 2,175 consecutive asymptomatic dental patients with an age range of 16–72 years were examined. Thirty different oral lesions and conditions were diagnosed. Fordyce’s granules and tori were the most common conditions diagnosed in 49% and 16% of the subjects respectively. About 24% of the lesions were diagnosed on the tongue (mainly coated tongue). Only 1.2% of the study population were confirmed as having potentially malignant lesions such as oral lichen planus, smoker’s keratosis or candidal leukoplakia.

**Trends in oral health**

In a recent study describing the trends in oral hygiene, gingival condition and dental caries prevalence in 13–14-year-old children showed that boys had higher plaque and gingival scores than girls (Table 6). The mean PII and GI scores of both males and females were significantly higher in a 1993 survey than in 1999 ($p<0.05$). Also, both male and female children in 1993 had significantly higher caries experience, as measured by DT-DS-DMFT and DMFS scores than in 1999 ($p<0.01$). No differences were found between M and F values of both the groups. Therefore, it was concluded that oral hygiene, gingival conditions and dental caries have improved since 1993.
Nonetheless, recent reports from Jordan reveal a tendency for lower caries experience with increasing social level,\textsuperscript{5,14} but that dental caries still remains high compared to that found in the developed countries.

Evidence from industrialised, developed counters showed obvious trends in the prevalence and severity of dental diseases, including a decline in the occurrence of dental caries, gingivitis and an improvement in oral hygiene\textsuperscript{12,52,35}. In the same way, gingival condition and oral hygiene scores were found to have been improved in Jordan. The possible reasons for improvement of children’s oral health may be related to several factors. These include improved living conditions, television advertisements and increased sales of fluoride toothpastes and other fluoride products. Furthermore, oral health information provided through schools may have modified or improved the health behaviour of children.

Dental caries and periodontal disease in general constitute public health problems, especially in the developing countries. Therefore, to control such oral diseases good oral health should be pursued at both public and personal levels.

Development of public health policies with comprehensive oral health promotion programmes at the national and community levels is essential. At the same time, the participation of individual subjects in developing personal skills in relation to oral hygiene practices and in improving diet and nutrition is crucial.

In conclusion, despite the fact that improvements in oral hygiene, gingival status and dental caries have been suggested in Jordanian children recently, more efforts are needed to achieve the level of dental health in developed countries.

References

29. Quteish Taani DSM. Periodontal rea-


