Oral health status of teenagers and young adults with intellectual impairment in Athens, Greece

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Abstract

Aim and objectives: To assess the oral health status in Greek teenagers and young adults with intellectual impairment. The objectives were to: evaluate their oral hygiene level, caries experience, restorative care, need for periodontal treatment and frequency of orthodontic anomalies; collect, through questionnaires, information regarding their family characteristics, medical profile, oral hygiene and dietary habits; and evaluate the influence of these factors on their oral health status.

Design: 87 students (53 males, 34 females) with intellectual impairment and mean age of 21.08 years (±4.17) attending a special school in Athens participated in the study. Periodontal condition, caries incidence, dental treatment needs and malocclusion were evaluated by clinical examination in the special school’s dental office.

Results: The periodontal treatment need index revealed that 60.56% of the students were in need of periodontal treatment. The mean DMFT index was 8.9 (±7.2) and caries represented the largest part of the score (mean DT: 5.4, ±5.1). Results for the restorative index showed that only 24% (±30.3) of the carious teeth surfaces were treated. Orthodontic anomalies were found in 58% of the students with a greater prevalence of crossbites and open bite. Furthermore, from regression analysis, there was an association between intellectual impairment, dental status and paternal educational level.

Conclusions: Teenagers and young adults with intellectual impairment attending a special school in Athens, Greece had poor oral hygiene and increased needs for dental and periodontal treatment. Students with more severe intellectual impairment had lower caries prevalence but worse periodontal condition.

Key words: Mental impairment, oral health

Introduction

The oral health of individuals with intellectual impairments has been reported to be poorer than individuals with normal development. Most studies have shown that these individuals have poorer oral hygiene and a higher prevalence of gingivitis and periodontitis as compared to healthy individuals of the same age (Mann et al., 1984; Murray and Mcleod, 1973; Nunn, 1987; Nunn and Murray, 1987; Palin-Palokas, 1987; Storhaug and Holst, 1987; Shaw et al., 1986; Tesini, 1981). However, data on dental caries prevalence are equivocal (Cutress, 1971; Shaw et al., 1986). Some researchers report high disease prevalence while others have shown decay rates similar or even lower than those found in healthy persons of the same age (Cutress, 1971; Shaw et al., 1986).

Oral hygiene can be influenced by the type of disability. Persons with intellectual impairment have been found to have worse oral hygiene compared to people with visual impairments or persons with cerebral palsy (Mitsea et al., 2001). Oral hygiene can be also influenced by the degree of intellectual functioning. Children with moderate and/or severe intellectual impairment have been found to have better oral hygiene and fewer carious teeth as compared to those with mild intellectual impairment (Gizani et al., 1997). This was attributed to the fact that children with more severe intellectual impairment spent more hours within the school or institution where there was an organised health programme. Malocclusion has been found to occur in intellectually impaired teenagers and young adults more frequently than in people with other disabilities (Dinesh Rao et al.,
2003) or without other disabilities (Mitsea et al., 2001; Vigild, 1985).

In Greece, data concerning the oral health of people with special needs are limited (Gizani et al., 2003; Mitsea et al., 2001; Tsami et al., 2004). Decay rates have been reported to be higher in intellectually impaired teenagers (Gizani et al., 2003; Mitsea et al., 2001) compared with healthy adolescents (Hellenic Dental Association, 2005) and their periodontal health was found to be poor (Gizani et al., 2003). However there are no reports regarding the oral health of young adults with intellectual impairment.

The aim of the present study in Greek teenagers and young adults with intellectual impairment was to assess their oral health and associated influences. The objectives were to: evaluate their oral hygiene level, caries experience, restorative care, need for periodontal treatment and frequency of orthodontic disorders; collect, through questionnaires, information regarding their family characteristics, medical profile, oral hygiene and dietary habits; and evaluate the influence of these factors on their oral health status.

Materials and methods

Sample

Eighty seven students with intellectual impairment attending a publicly funded special day school, from all areas in Athens, were selected to participate in this study. However, due to lack of cooperation, only 81 were examined (50 males and 31 females) with a mean age of 21±4 years. According to the Intelligence Quotient (IQ) score (Daily et al., 2000), 24.1% of the persons examined had severe intellectual impairment (IQ: <35), 55.1% moderate (IQ: 36-51), and 20.6% mild (IQ: 52-67).

Study design

After written, informed consent, given from the students’ parents or guardians, information from questionnaires and medical records was collected and an oral clinical examination was undertaken.

Questionnaires

Two questionnaires, A and B, were used in the present study (Gizani et al., 2003). Questionnaire A regarding the medical history and the family characteristics of the persons examined, was completed by the dentists-examiners with the assistance of the nurse of the school. Questionnaire B was sent to the parents or guardians in order to report information about their child’s oral health behaviour such as oral hygiene, dietary habits and dental attendance patterns.

Clinical examination

Periodontal condition, caries incidence, dental treatment needs and malocclusion were evaluated. Clinical examination was carried out in the dental office of the special school by five postgraduate students of the Pediatric Dentistry Department of the University of Athens. The inter-examiner agreement for caries experience scores was in excess of 80%.

Periodontal condition: Dental plaque, gingival hypertrophy and need for periodontal treatment were estimated in order to assess each young person’s periodontal condition. Dental plaque was recorded as present or absent on all tooth surfaces using a disclosing agent (O’Leary et al., 1972). Gingival hypertrophy was estimated using a 4 grade scale: 0: healthy gingivae, 1: hypertrophy restricted to interdental papillae, 2: gingival overgrowth covering less than ½ of the tooth crown, 3: gingival overgrowth covering more than ½ of the tooth crown (Gizani, 1994).

Need for periodontal treatment was assessed using the CPTN index. Periodontal health was assessed by a Merit-B periodontal probe using the Community Periodontal Index of Treatment Need (Ainamo et al., 1982), with a 5 point scale: 0: healthy periodontium, 1: bleeding after mild probing of at least one site (oral hygiene instructions required), 2: presence of calculus and/or overhanging restorations supra- and/or sub-gingivally without the presence of pockets deeper than 3mm (scaling and instructions in oral hygiene are necessary), 3: presence of pockets deeper than 4-5 mm (scaling and root planing as well as oral hygiene instructions are necessary), 4: presence of pockets deeper than 5mm (root planning and more specialised periodontal treatment is necessary). A grade was given for each sextant of the mouth. The CPTN index was represented by the highest grade, indicating the severity of the periodontal treatment need for each person.

Dental condition: Caries experience was recorded using the DMFT/DMFS, representing the number of decayed, missing and filled permanent teeth/surfaces. The examination was carried out according to the World Health Organisation criteria, with a dental light using a plain mouth mirror and a blunt dental probe, without the use of radiographs (Palmer et al., 1984). The restorative index for the permanent dentition – RIS, was used to estimate the restorative treatment provided to carious tooth surfaces using the equation: RIS = (Filled/Decayed+Filled) x100 (Jackson, 1973).

Malocclusion: Orthodontic anomalies and anatomical structural anomalies of the tongue were also recorded. Orthodontic anomalies were recorded as disorders in the coronal plane (anterior open bite or/and posterior crossbite) and sagittal planes (overbite, anterior or/and lateral open bite, overjet of more than 4mm, anterior crossbite) (Spyropoulou, 2000).
Statistical analysis
Data from the medical records, questionnaires and findings of the clinical examination were analysed using the statistical package of SPSS 13.0. Regression analysis was then used to study the influence of the data collected from the questionnaires on the students’ oral health status.

Results

Questionnaires
Descriptive data from questionnaires are presented on parental educational level and the oral health behaviour of both students and parents. The response rate was 93.1%.

Parental educational level: Most of the parents were primary school graduates (Figure 1).

Figure 1: Parental educational level

<table>
<thead>
<tr>
<th>Parental educational level</th>
<th>% Parents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>53.2</td>
</tr>
<tr>
<td>Secondary</td>
<td>15.2</td>
</tr>
<tr>
<td>High school</td>
<td>8.9</td>
</tr>
<tr>
<td>University</td>
<td>7.6</td>
</tr>
<tr>
<td>Other</td>
<td>13.2</td>
</tr>
</tbody>
</table>

Students’ profile: According to their medical records, students had no motor difficulties except for two people who had minor difficulties with the mobility of their hands. Their medical history revealed that 35.6% had speech and/or learning impairment, 14.9% epilepsy, 9.2% visual impairment, 8% cerebral palsy, 5.7% autism, 3.4% cardiovascular anomalies, 16% Down’s syndrome and 16% received anti-seizure medication.

Oral health behaviour: With respect to the frequency of dental attendance, 13.6% of the students had never visited a dentist, while 63% were irregular dental attenders. According to the answers the parents gave, poor dental attendance was mainly attributed to lack of cooperation with the dentist as well as for financial reasons. The mean age of the first dental visit was 11.4 years (±5.2) mostly for a dental checkup, while the most common complaints were decayed teeth and toothache. Regarding sugar consumption in food and drinks, 71.6% of the parents reported that their children consumed sugar once per day or less. Parents also reported that 33.3% of their children rarely brushed their teeth while the remaining brushed at least once per day. Of those brushing, 50.6% received no help from others with tooth brushing. More than 70% of the students did not use any fluoride (mouthrinses, tablets), nor did they receive topical fluoride application at the dental office. Regarding their child’s oral health condition 50.6% of the parents reported it as moderate, while 23.5% felt it was good.

Clinical examination
Periodontal condition: Only 26% of tooth surfaces were free of dental plaque. Healthy gingivae were found in 40.7% of the students, while 59.3% had hypertrophy restricted to the interdental papillae. The periodontal treatment need index revealed that none of the students had a healthy periodontium (CPITN 0), while 60.6% of them were in need of periodontal treatment (CPITN 3, 4) due to periodontal pockets (Figure 2).

Dental condition: 14.8% of the students were caries free. The mean DMFT was 8.9 (±7.2), and caries represented the largest part of the score (mean DT: 5.4, ±5.1). The DMFS was 19.5 (±20.2) (Figure 3). The sum of the DMFT scores for the first and the second permanent molars represented 77% of the total DMFT score of the dentition. Results of the restorative index, RIS, showed that only 24.1% (±30.3) of the carious tooth surfaces were treated.

Malocclusion: 58% of those examined had orthodontic anomalies, mostly crossbites and increased overjet. The prevalence of different types of malocclusions can be seen in Table 1. Among the different syndromes, malocclusion was more frequently found in students with Down syndrome (69%). Furthermore, these students had a higher prevalence of open bite (11.7%) and anterior crossbite (23.5%), as compared to the rest of the students, 1.4% and 12.6% respectively. Macroglossia was found in 66% of the students with Down syndrome, as compared with 13.8% in the rest of the students. None of the students had received any orthodontic treatment.
Regression analysis

The influence of the age, gender and IQ score on the dental and periodontal condition was studied using a regression analysis model. Caries experience and filled tooth surfaces increased with age (p<0.05). People with lower IQ score (more severe intellectual impairment) had a better oral status (Table 2). Persons with a lower IQ score however, had worse periodontal conditions (Table 2).

Multiple regression analysis was used to study parental educational level on the child’s oral health. Paternal educational level negatively influenced DMFS and MS indices in that the higher the educational level of the father, the lower the number of decayed teeth and the number of extracted teeth (Table 3).

The age of the first dental visit had a positive influence on the plaque index since the earlier children started attending the dentist, the better their oral hygiene (Table 3).

Discussion

In the present study the oral health of teenagers and young adults with intellectual impairment attending a special school in Athens, Greece was found to be poor.

This investigation was based on a previous study carried out in Greece with children with mild intellectual impairment (Gizani et al., 2003). Dental caries were scored using the WHO criteria, as already used for people with intellectual impairment (Gizani et al., 1997; Nunn et al., 1993; Tsami et al., 2004). The oral hygiene of the students in the present study was found to be poor with less than one third of the tooth surfaces free of dental plaque.

Results from the questionnaire completed by the parents showed that two thirds of the adolescents brushed at least once per day and half of them without parental supervision. This may be attributed to their parents believing that they could perform tooth brushing well due to lack of motor disabilities, so the children were not assisted in this task. Furthermore, effective plaque removal may have been negatively influenced by the gingival en-
Table 1. Prevalence of orthodontic disorders

<table>
<thead>
<tr>
<th>Disorder Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posterior crossbite</td>
<td>29.6%</td>
</tr>
<tr>
<td>Anterior crossbite</td>
<td>16%</td>
</tr>
<tr>
<td>Anterior open bite</td>
<td>3.7%</td>
</tr>
<tr>
<td>Lateral open bite</td>
<td>3.7%</td>
</tr>
<tr>
<td>Deep Bite</td>
<td>4.9%</td>
</tr>
<tr>
<td>Overjet ≥ 4mm</td>
<td>17.3%</td>
</tr>
</tbody>
</table>

Table 2. Results of multiple regression analysis on the influence of gender, age and intellectual impairment on dental and periodontal condition

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>DMFS</th>
<th>DS</th>
<th>MS</th>
<th>FS</th>
<th>CPITN</th>
<th>Plaque</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>3.45 (0.45)</td>
<td>-0.11 (0.96)</td>
<td>2.35 (0.28)</td>
<td>1.21 (0.41)</td>
<td>0.01 (0.94)</td>
<td>-4.43 (0.37)</td>
</tr>
<tr>
<td>Age</td>
<td>1.14* (0.04)</td>
<td>0.17 (0.54)</td>
<td>0.46 (0.08)</td>
<td>0.50* (0.00)</td>
<td>0.00 (0.87)</td>
<td>-0.78 (0.18)</td>
</tr>
<tr>
<td>IQ Score</td>
<td>-7.21* (0.04)</td>
<td>-4.82* (0.01)</td>
<td>-0.10 (0.94)</td>
<td>-2.28* (0.05)</td>
<td>0.47* (0.01)</td>
<td>7.34 (0.06)</td>
</tr>
<tr>
<td>R2</td>
<td>0.10</td>
<td>0.10</td>
<td>0.05</td>
<td>0.12</td>
<td>0.10</td>
<td>0.05</td>
</tr>
<tr>
<td>Observations</td>
<td>81</td>
<td>81</td>
<td>81</td>
<td>81</td>
<td>71</td>
<td>75</td>
</tr>
</tbody>
</table>

* Statistical significance at 5% level

Table 3. Results of multiple regression analysis on the influence of gender, intellectual impairment, educational level of the father and age of the first dental visit, on oral health

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>DMFS</th>
<th>MS</th>
<th>DS</th>
<th>CPITN</th>
<th>Plaque</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational level of father</td>
<td>-4.81* (0.01)</td>
<td>-2.23* (0.01)</td>
<td>-1.77 (0.10)</td>
<td>-0.13 (0.14)</td>
<td>-2.98 (0.12)</td>
</tr>
<tr>
<td>Age of first dental visit</td>
<td>0.36 (0.53)</td>
<td>0.17 (0.52)</td>
<td>0.32 (0.34)</td>
<td>0.026 (0.37)</td>
<td>1.60* (0.01)</td>
</tr>
<tr>
<td>R2</td>
<td>0.23</td>
<td>0.2</td>
<td>0.25</td>
<td>0.25</td>
<td>0.3</td>
</tr>
<tr>
<td>Observations</td>
<td>56</td>
<td>56</td>
<td>56</td>
<td>52</td>
<td>56</td>
</tr>
</tbody>
</table>

* Statistical significance at 5% level
largement found in about 60% of the persons examined. However, it has been shown that children with more severe intellectual impairment can achieve an improvement in their oral health status when participating in preventive dental programmes by sustaining the child’s motivation and utilising a carefully designed preventive programme (Holland and O’Mullane, 1986; Nicolaï and Tesini, 1982; Shaw et al., 1983; Shyama et al., 2003). The individuals in the present study were not in residential care but were attending the school as day students. Therefore, their oral hygiene status could be improved not only by the dental personnel but also by the school teachers as well as their parents/caregivers, who can all be valuable in teaching good and efficient oral hygiene and behaviour to persons with intellectual impairment.

None of the persons examined had a healthy periodontium and results of the CPITN showed that almost two thirds of the adolescents needed periodontal treatment. These findings are in agreement with previous studies that reported poor oral hygiene and gingival condition in intellectually impaired children as well as persons with special needs (Gizani et al., 1997; Vignehsa et al., 1991).

Other factors implicated in the severity of the periodontal condition, were found to be anti-seizure medication received by 16% of the students, immunological factors, hormonal changes, virulent microbial plaque common in persons with more severe intellectual impairment and certain syndromes such as in Down syndrome (Desai et al., 2001; Reuland-Bosma and van Dijk, 1986). Furthermore, results of the multiple regression analysis of the periodontal health data recorded by CPITN showed that there was a relationship between these high scores and lower IQ scores.

Caries experience was recorded using the DMFT index, the largest component of which was decayed teeth followed by teeth extracted due to caries. Dental caries of the first and second permanent molars represented 77% of the total DMFT score. First permanent molars are likely to become carious at an early age because of their early eruption time, their position in the posterior sextants and their occlusal morphology (Gizani et al., 1997). In the present study, poor oral hygiene, dental attendance at a late age, (mean age 11.4 years), and limited application of sealants may have been implicated in the poor oral status of the molars. Results of the multiple regression analysis regarding caries showed that the students with lower IQ scores had less decayed and filled tooth surfaces, and this may be attributed to the increased dental care received by severely intellectually impaired people as part of their medical care. The lack of self sufficiency in these children may lead their parents and caregivers to participate more actively in their oral hygiene and dietary habits.

The later the age at which the students visited the den-
comparing to the other students, probably attributed to the macroglossia that students with Down syndrome so often exhibited. Dysfunction of the tongue and oral habits may be important explanatory variables for the increased frequency of orthodontic anomalies found in intellectually impaired people (Oreland et al., 1987).

The regression analysis highlighted the importance of the influence of IQ score and parental educational level in the oral and dental conditions of teenagers and young adults with intellectual impairment, which should be taken into consideration when planning preventive programmes and strategies for oral health care provision for those individuals.

Conclusions

- Teenagers and young adults with intellectual impairment attending a special school had poor oral hygiene and increased need for dental and periodontal treatment.
- People with lower IQ scores had lower caries prevalence but worse periodontal conditions than people with higher IQ score.
- The earlier the child’s first dental visit the better their oral hygiene.
- The higher the paternal educational level, the lower the active caries prevalence and number of extracted teeth.

References


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