ORAL HEALTH STATUS AND TREATMENT NEEDS IN HEARING IMPAIRED AND VISUALLY IMPAIRED CHILDREN IN MANSOURA CITY, EGYPT

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ABSTRACT

Aims: this study was carried out to assess oral health status and treatment needs among a group of hearing impaired and visually impaired children in Mansoura city, Egypt.

Methodology: A cross sectional study design was conducted. Total of 130 hearing impaired and 120 of visually impaired children were included in addition to 130 of normal children. The diagnosis of dental caries was done according to the World Health Organization (WHO) criteria using dft and DMFT indices. Oral hygiene was assessed using Simplified Oral Hygiene Index (OHI-S). Gingivitis was evaluated by Papillary, Marginal and Attached (PMA) Index. Also, treatment need was specified using Unmet Treatment Need (UTN) index.

Results: It was found that the caries prevalence and experience was significantly higher among visually impaired children (73.3%, 5.33±4.32) and hearing impaired children (61.5%, 4.73±4.38) than normal children (46.2%, 1.07±1.80) (p value ≤0.05). In addition, there was a statistically significant difference in median scores of PMA index, median scores of OHI-S index and percentage of unmet treatment needs among the study groups (p value ≤ 0.05).

Conclusion: The caries prevalence and severity was higher among visually impaired and hearing impaired children than normal children. They also suffered from more gingivitis, poor oral hygiene and higher percentage of unmet treatment needs compared to normal children.

KEY WORDS: Visually impaired child, hearing impaired child, oral health status

INTRODUCTION

Oral health status of children has great impact on the general health, well-being and quality of life. Children with special needs are a special group of patients with different forms of systemic disorders such as developmental, mental, sensory, physical, cognitive, or behavioral, emotional impairment or a limiting condition that needs health care intervention, medical management, and specialized services or programs. There is limited
motor and sensory coordination among children with disabilities; most of them cannot take care for themselves and must depend on their caregivers or parents for general care.\(^1\)

Children with developmental impairment mainly have a complex unmet health care treatment needs. Disabled Children with worse conditions and from families with low socioeconomic status are suffering from high unmet dental needs and limited access to health care. It was found that dental treatment is the most prominent unmet health need of the children with any forms of impairment.\(^2\)

Hearing impairment and visual impairment create a high proportion among all disabled children. It was reported that, hearing impairment is the most prominent sensory disability during childhood.\(^3\) The prevalence of visual impairment among children is 1.4 million worldwide, most of them live in low income countries of Asia and Africa.\(^4-6\) These disabilities have a great effect on social, emotional, and psychomotor development of children.\(^5\)

Children with hearing or visually impairment are suffering from high level of oral diseases, due to their actual impairment or economic limitation or social factors, or even because their parents find difficulty in performing essential daily oral hygiene regimen.\(^7\) Daily oral hygiene practices are more difficult than oral care of children with normal abilities, who commonly have the ability to perform their oral health care by themselves. In contrary to that, disabled children may be dependent on others to achieve their routinely oral care activities.\(^8\)

Oral disease is a major health problem for children with disabilities.\(^3\) They suffered from an elevated prevalence and severity of oral disease when compared to the healthy children.\(^9\) They have high percentage of dental caries, missing teeth, prolonged retention of primary teeth, misaligned or supernumerary teeth, malocclusion, and periodontal disease. All these oral diseases are significant indicators of poor oral health which has negative impact on the ability of the child to chew and enjoy food, digestion, nutrition, facial shape and speech or in other words their quality of life.\(^10,11\)

There are many studies\(^12-16\) worldwide reported Poor oral hygiene, gingivitis and periodontitis among visually impaired children. These patients mainly have poor and insufficient knowledge about oral health. Attaining of acceptable oral hygiene is considered one of the most difficult tasks for visually impaired children.\(^17\)

Liu et al., 2019\(^18\) assessed the oral health status to the school children with vision impairment in China. They found that their participants had a high prevalence of dental caries, periodontal diseases, and sever malocclusion.

Rezaei et al., 2019\(^19\) evaluated the oral health status and treatment needs of children with hearing and vision impairment. The result revealed that, those children had high level of tooth decay, particularly in deciduous teeth, an elevated percentage of the children and needed treatment. In comparison to their peers, these group of children had lower level of oral health.

Various studies on the oral health status of the normal children have been carried out worldwide; however, limited information is available on the oral health of the hearing impaired and visually impaired children particularly in Egypt. However, the data about oral health status and treatment needs for children with special needs will help to obtain baseline data to understand oral health needs of those children and consequently the appropriate preventive measures will be recommended and undertaken. For that reason, this study was conducted to assess oral health status and treatment needs among a group of hearing impaired and visually impaired children in Mansoura city, Egypt.

**MATERIALS AND METHODS**

This study was conducted after approval of Ethical Committee of Faculty of Dentistry, Mansoura University under code number (A21030821). A detailed information on the study was provided
to all the participated children. Verbal assent was obtained from the children prior to the clinical examination. Additionally, an informed consent was sent to the parents prior to clinical examination. Children who unwell to participates were excluded from the study. After the examination, children in need of dental treatment were referred to the outpatient clinic of Pediatric Dentistry and Dental Public Health department, Faculty of Dentistry, Mansoura University. All the collected data was coded and safeguarded with high privacy.

A descriptive cross sectional study design among hearing impaired and visually impaired children was conducted. All hearing impaired students at Al-Amal school for deaf and dumb in addition to all the visually impaired students at Al-Nour school for blind at primary and preparatory stages were attended to be included in the study. Total number of hearing impaired children who returned signed consent forms and considered valid for the study was 130 children while the total number of visually impaired children was 120 children. The age of children ranged from 7 to 15 years old. A number of 130 Children who were free from any systemic disease were included as a control group. Healthy children had the same age range, and matched in gender and socioeconomic status to the study group. Control group was selected from governmental schools, Mansoura city using convenience sampling technique.

Clinical examination of all school children was done by single trained and calibrated examiner. The consistency of examination was ensured by twice examination of 20 children by the same examiner using the same indices used in this study. The results of the two examinations were compared and the agreement Kappa value was high. Intra-examiner reliability was calculated and Cohen Kappa score was 0.95.

Clinical examination was performed at school in an ordinary chair facing natural light and a source of artificial white light was also used for all children. Clinical examination was done with disposable mirrors and probes.

Diagnosis of dental caries was performed according to the (WHO) criteria using dft index for deciduous teeth and DMFT index for permanent teeth. Tooth was scored decayed if there is undermining, softening, cavitation, temporary filling, recurrent caries and/or remaining root.

Gingivitis was assessed using Papillary, Marginal and Attached (PMA) Index. gingival inflammation for each child was assessed using; score (0) in case of normal gingiva with no change in color or appearance while, score (1) was recorded in presence of any sign of inflammation.

Oral hygiene was assessed using Simplified Oral Hygiene Index(OHI-S). It consists of two components: the simplified debris index (DI-S) and the simplified calculus index (CI-S) that based on extension of debris or calculus on six pre-selected teeth surfaces. The index teeth are (16, 11, 26, 36, 31, 46) All teeth were examined from the facial surface except the mandibular molars were examined from the lingual surface.

The examined teeth surfaces take scores according to the following scores (table 1) OHI-S for each child was calculated by adding the total DI-S scores and total CI-S index of the selected teeth. Oral hygiene level was assessed as good or fair or poor according to the interpretation of total S-OHI scores (table 2)

The unmet treatment need among participated children was also specified using Unmet Treatment Need (UTN) index.

The data were statistically analyzed using SPSS version 21(SPSS, Inc., Chicago, IL, USA). The normal distribution of data was assessed by Kolmogorov-Smirnov test. Chi-square test was the test of significance for qualitative data. While for quantitative data, One-Way ANOVA test was used for parametric data and Kruskal-Wallis test for nonparametric data. The statistically significance was considered at P-value ≤0.05.
TABLE (1): Simplified Oral Hygiene Index Scores (OHI-S)

<table>
<thead>
<tr>
<th>Scores</th>
<th>Debris index (D I)</th>
<th>Calculus index (C I)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No debris or stain present.</td>
<td>No calculus present.</td>
</tr>
<tr>
<td>1</td>
<td>Soft debris covering not more than one third of tooth surface, or presence of extrinsic stains</td>
<td>Supra gingival calculus covering not more than one third of tooth surface</td>
</tr>
<tr>
<td>2</td>
<td>Soft debris covering more than one third, but not more than two thirds of the exposed tooth surface.</td>
<td>Supra gingival calculus covering more than one third but not more than two thirds, or the presence of individual flecks of sub gingival calculus</td>
</tr>
<tr>
<td>3</td>
<td>Soft debris covering more than two thirds of exposed tooth surface</td>
<td>Supra gingival calculus covering more than two thirds of tooth surface or continuous band of sub gingival calculus or both</td>
</tr>
</tbody>
</table>

TABLE (2): OHI-S Values and Interpretations.

<table>
<thead>
<tr>
<th>OHI-S values</th>
<th>Interpretations</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 1.2</td>
<td>Good oral hygiene</td>
</tr>
<tr>
<td>1.3 - 3</td>
<td>Fair oral hygiene</td>
</tr>
<tr>
<td>3.1-6</td>
<td>Poor oral hygiene</td>
</tr>
</tbody>
</table>

RESULTS

Table (3) shows caries prevalence and experience among the study groups. It was found that caries prevalence and experience was higher among visually impaired children (73.3%, 5.33±4.32) and hearing impaired children (61.5%, 4.73±4.38) than normal children (46.2%, 1.07±1.80) and these difference were statistically significant (p value ≤0.05)

Table (4) shows the gingival condition and oral hygiene status among study groups. It was found that the median of PMA scores among hearing impaired and visually impaired children were (26) and (31) respectively while in control group was (24), a significant statistical difference was found (p value is 0.002).

Regarding oral hygiene, it was found that there was statistically significant difference between median scores of OHIS index among study groups (p value <0.001). The scores were higher among visually impaired children (2.41) than hearing impaired children (2.33) with no statistical significance.
Table (5) shows oral hygiene level among the study groups. It was found that the oral hygiene status was better among the control group than the hearing impaired and visually impaired children. Poor oral hygiene was reported among 75.7% of hearing impaired and 63.2% of visually impaired children while in control group it was reported among only 14.6% (p value <0.001).

Table (6) shows the different unmet treatment needs among study groups. It was found that 15.4% of hearing impaired children and 13.3% of visually impaired children don’t need treatment. While, 29.2% children in control group don’t need treatment, in addition to that; there was a statistically significant difference between study groups in treatment needs for prophylaxis and restoration (p≤0.05). There was no significant difference between treatment needs for extraction (p=0.265).

### TABLE (4) : Gingival condition using PMA index and oral hygiene status using OHIS index among the study groups:

<table>
<thead>
<tr>
<th>Groups</th>
<th>PMA median (min-max)</th>
<th>DI Median (min-max)</th>
<th>CI Median (min-max)</th>
<th>OHIS Median(min-max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hearing impaired children N= 130</td>
<td>26 (3-56) ▼</td>
<td>1.66 (0.66-3) ▼</td>
<td>0.41 (0-2) ▼</td>
<td>2.33 (0.66-5) ▼</td>
</tr>
<tr>
<td>Visually impaired children N= 120</td>
<td>31 (6 - 66) ⚫</td>
<td>1.73 (0.83-3) ⚫</td>
<td>0.66 (0-2) ⚫</td>
<td>2.41 (0.83-5) ⚫</td>
</tr>
<tr>
<td>Control group N= 130</td>
<td>24 (0 - 42) ⚫</td>
<td>1.33 (1-2.17) ⚫ &amp;</td>
<td>0.33 (0-1.17) ⚫</td>
<td>1.66 (1-3) ⚫</td>
</tr>
<tr>
<td>P value of Kruskal Wallis test</td>
<td>0.002*</td>
<td>&lt;0.001*</td>
<td>&lt;0.001*</td>
<td>&lt;0.001*</td>
</tr>
</tbody>
</table>

N↔ number of the examined children  *↔Significant difference (p≤0.05)
▼,◆↔ similar symbols mean Significant difference between groups (p<0.05)

### TABLE (5): Oral hygiene level among the study groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Good oral hygiene n (%)</th>
<th>Fair oral hygiene n (%)</th>
<th>Boor oral hygiene n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hearing impaired children N= 130</td>
<td>12 (9.2%) ▼</td>
<td>43 (33.1%) ▼</td>
<td>75 (57.7%) ▼</td>
</tr>
<tr>
<td>Visually impaired children N= 120</td>
<td>19 (15.8%) ⚫</td>
<td>25 (20.8%)</td>
<td>76 (63.2%) ⚫</td>
</tr>
<tr>
<td>Control group N= 130</td>
<td>88 (67.7%) ▼ &amp;</td>
<td>23 (17.7%) ▼</td>
<td>19 (14.6%) ▼</td>
</tr>
<tr>
<td>P value of Χ² test</td>
<td>&lt;0.001*</td>
<td>0.03*</td>
<td>&lt;0.001*</td>
</tr>
</tbody>
</table>

N↔ number of the examined children  *↔Significant difference (p≤0.05)
▼,◆↔ similar symbols mean Significant difference between groups (p<0.05)
Vision and hearing are the most important ways for communication, and any impairment in early childhood can have negative effects on physical, neurological, cognitive and emotional development which consequently affect on both oral and general health of the child. (17) Those children have a higher prevalence and severity of oral disease when compared to the general population. (9)

Concerning dental caries; this study revealed high prevalence of dental caries among visually impaired and hearing-impaired children comparing to control group. Those children are partially or completely dependent on others in their daily care activities. Frequent teeth brushing cannot be performed alone, maintaining acceptable oral hygiene may be unattained which leads to high prevalence of dental caries. Additionally, the lack of knowledge about caries prevention practices may worsen the condition.

This result was in accordance with other studies which were performed to assess oral health status among deaf and blind schoolchildren worldwide and their results showed that the prevalence of dental caries were higher among hearing impaired and visually impaired schoolchildren as compared with children in the general population (7,18,26,27)

On the other hand, other studies revealed lower prevalence of dental caries than the present study. (4,28,29) This discordance may be due to difference in age groups, better socio-economic status, health insurance coverage of the included children in these studies.

As regards to gingival condition among study groups, it was found that visually impaired and hearing impaired children suffered from gingivitis more than children within control group. These findings were in agreement with El Deeb 2011 (28), Mariam et-al 2015 (27), Liu Lu et-al 2019 (18), Rezaei et-al 2019 (19) as their results concluded that more than half of the included blind and deaf children in their studies had gingivitis.

Referring to oral hygiene status; the results presented that 63.2% of visually impaired and 57.7% of hearing impaired children suffering from poor oral hygiene compared to only 14.6% in normal children, in addition; visually impaired and hearing impaired children had higher S.OHI scores with more calculus and debris scores than control group.

The high scores of PMA index and S.OHI index can be explained by lack of knowledge and motivation about the proper methods to maintain healthy mouth, the low priority given to oral health

### TABLE (6): Different treatment needs among the study groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>No ttt needs n (%)</th>
<th>Prophylaxis ttt needs n (%)</th>
<th>Restoration ttt needs n (%)</th>
<th>Extraction ttt needs n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hearing impaired children</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N= 130</td>
<td>20 (15.4%)</td>
<td>60 (46.1%)</td>
<td>80 (61.5%)</td>
<td>15 (11.5%)</td>
</tr>
<tr>
<td>Visually impaired children</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N= 120</td>
<td>16 (13.3%)</td>
<td>66 (55%)</td>
<td>88 (73.3%)</td>
<td>18 (15%)</td>
</tr>
<tr>
<td>Control group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N= 130</td>
<td>38 (29.2%)</td>
<td>40 (30.8%)</td>
<td>50 (38.5%)</td>
<td>10 (7.7%)</td>
</tr>
<tr>
<td>P value of χ² test</td>
<td>0.019*</td>
<td>0.045*</td>
<td>0.010*</td>
<td>0.265</td>
</tr>
</tbody>
</table>

N↔ number of the examined children  
*:↔ Significant difference (p≤0.05)  
*, &,☼↔ similar symbols mean Significant difference between groups (p≤0.05)  
ttt ↔ treatment
ORAL HEALTH STATUS AND TREATMENT NEEDS IN HEARING IMPAIRED AND VISUALLY

These results were in agreement with Mariam et-al 2015 (27) who reported high percentage of Preventive and restorative treatment needs are unmet in children with hearing impairment. It was attributed to the poor oral health attitude and knowledge of the parents of these children. Additionally, Mehta et al 2015 (32) concluded that 98.7% of children with different disability required some form of dental treatment.

Moreover, the result of the present study in accordance with Rezaei et-al 2019 (19) and Juma et-al 2019 (33). The results revealed that up to 41% of the subjects required oral prophylaxis, 89% restorations, 13% extractions, 20% orthodontic treatment, and 11% dental prosthesis (33).

All findings highlighted that oral health status of children with hearing and visual impairment are poor and more attention is required to plan and perform a comprehensive oral health care program for them.

CONCLUSION

Vision and hearing impairment can increase the level of oral diseases among school children in Egypt. It was found that caries prevalence and severity was higher among visually and hearing impaired children than normal children. Impaired children also suffered from more gingivitis, poor oral hygiene and higher percentage of unmet treatment needs compared to normal children.

RECOMMENDATION

Based on the results of the present study; it is necessary to establish oral health education programs for children with visual and hearing impairment and their parents to improve their oral health knowledge and practice. Furthermore; health authorities should give special attention to perform a comprehensive preventive school based oral health program jointly with general health program.
ACKNOWLEDGMENT

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REFERENCES


