Evaluation of the Relationship Between BMI and DMFT/dmft in Children with Down Syndrome

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Abstract:

Introduction: Despite the decrease in the prevalence of dental decay in recent years in developed countries, decay is currently one of the diseases that involve our community's children, including children with Down syndrome. The aim of this study was to evaluate the relationship between Body Mass Index and DMFT/dmft in children with Down syndrome who referred to Dental hospital in Tabriz.

Material And Methods: This cross-sectional study included 22 children with Down syndrome who were admitted to Dental hospital in Tabriz in 2015 (No: tbzmed.rec.1394.224). DMFT/dmft data was collected by direct observation using a torch light and participants' height and weight were measured using a digital scale and wallmeter and were recorded in the designed checklists. Patients' BMI was then calculated. After data entry to SPSS 18, descriptive statistics were used in the first stage and Pearson or Spearman correlation coefficient test was then used to assess the association of BMI with mean DMFT/dmft according to conditions and regression model to examine the role of gender and correlation between variables. In this study, P-values less than 0.05 was considered statistically significant.

Results: In this study, 7 patients (31.8%) were male and 15 (68.2%) were female. Mean total DMFT was 9.8±8.1 and the mean dmft score was 5±1.2. There was no significant relationship between BMI and dmft (P-value=0.073), while there was a positive correlation between BMI and DMFT (correlation coefficient>0 and P-value=0.016). There was also no difference between BMI and DMFT/dmft with gender. (P-value>0.05).

Conclusion: The results of this study showed that BMI increases with increasing DMFT in patients with Down syndrome. The reason of increased decay can be considered high-carbohydrate diet, low physical activity, lack of attention to oral hygiene due to not regularly brushing tooth after each meal, not using dental floss and mouthwash containing fluoride.

Keywords: BMI, Down syndrome, DMFT/dmft

Introduction:

Tooth decay is the most common nutritional microbial (dietobacterial) and multifactorial disease in people with a several-thousand-years' history and is said to be rooted in human life’s history. According to the WHO reports, oral diseases such as decay is still one of the main problems in the field of health (1,2). Decay is an infectious transmissible disease. It is, in fact, a preventable disease and can be stopped at early stages and people are prone to it during the whole life span. Prevention and treatment of this problem depends on the understanding and assessing the amount of dental decay and its relationship with the dietary habits, the health, and dental care (2,3). Low and high weight and decay are multifactorial problems that affect children's physical and mental health. Diet and lifestyle are considered as decisive factors that can be assessed in studying the
relationship between obesity and tooth decay (4). The relationship between childhood developmental status and dental decay is complex and influenced by many factors such as age, sex, race, and other social factors (5). Diet and lifestyle changes caused weight gain and emergence of advanced tooth decay since the mid-1990s, due to increased welfare and access to high-calorie foods and drinks rich in carbohydrates; finding a positive relationship between these two variables is the basis of the formation of many of the studies in multiple countries (6).

The World Health Organization uses different indicators to determine the status of oral health in countries and compare them with each other, the most important of which is DMFT (Decayed-missing-filled teeth) or mean of decayed, filled, and pulled-out teeth (6,7).

The results of the researches showed decay as an infectious multifactorial disease, strongly influenced by various factors such as individual’s education, family income, and poor oral hygiene (2).

Body Mass Index (BMI) is widely used as a measure to alternatively evaluate the body’s physical condition and is considered a common indicator of patients’ nutritional status. Many studies have assessed the effect of BMI on the incidence of cavities, but not able controversy exists regarding this association. (8,9).

Since sexual and mental impotence prevents achieving an ideal level of health, mouth diseases are a major problem for people with disabilities (10,11). Down syndrome includes a relatively large group of people with disabilities. Oral findings in this syndrome include mouth breathing, open bite, missing tooth, conical teeth, small teeth, grooved lips and tongue, delayed growth, and high decay rate with an incidence of nearly 1 in every 700 live births. This is an underdeveloped syndrome and causes prognathic occlusal relationship (11).

Al-Maweri and colleagues conducted a study on children with Down syndrome and reported high prevalence of decay and dental care (12). Vellappally’s research has also shown high levels of malocclusion and dental decay in children with Down syndrome (13).

Alm and colleagues reported the relationship between BMI and dental decay in a study in 2008 (14), while Sheller and colleagues showed no significant relationship between childhood decay and BMI in a study in 2009 (15).

Also Vania and colleagues showed that obese and overweight children have less dental decay than normal and below-normal children (16), while other studies have shown that obese children are more sensitive to dental decay because of a carbohydrate-rich diet (17).

Since studies regarding BMI and DMFT are limited with different and contradictory results and such a research has also not yet been carried out in children with Down syndrome and since children with Down syndrome have physical and mental problems and cannot perform their personal tasks such as oral hygiene particularly due to mental retardation, thus, the rate of dental
decay and periodontal problems of these patients is high. Also, as far as routine dental procedures is difficult in these patients due to their low cooperation, their dental care is provided in hospital conditions and under anesthesia, which requires great time and costs and anesthesia for these patients is accompanied by various problem, due to heart disease and etc., thereby reducing risk factors and use of preventive methods is essential in these patients. This study aimed to evaluate the association of BMI with DMFT in children with Down syndrome to be able to take a step forward in reducing their dental decay, hospitalization for dental treatment, and health care costs by identification and screening patients with abnormal BMI.

Methods

This cross-sectional study collected data using a designed checklist. The target population included all children with Down syndrome (children diagnosed with Down syndrome who have been referred to dental hospital to receive appropriate treatment). After filling out the consent form by parents, children’s height was measured by a wall meter without shoes and with the heels paired and weighted by digital scale (Seca made in Germany) without shoes and with light clothes by the educated examiners and were recorded in checklists. For a greater precision, the scale was adjusted at the beginning of each working day. Then, BMI of each individual was calculated by dividing weight in Kg to height in m². To evaluate DMFT/dmft, all participants were examined by the mirror and dentists’ catheter by flashlight and the required information of DMFT and dmft were recorded in the checklists.

Inclusion criteria:

1. Children with Down syndrome who were referred to Dental hospital in Tabriz
2. Tendency of parents

Exclusion criteria:

1. Lack of child’s cooperation
2. Any systemic, genetic, or congenital diseases that influence dmft, DMFT, such as: amelogenesis imperfecta, dentinogenesis imperfecta, ectodermal dysplasia, Lefever-papilon

After entering data into SPSS 18 software, descriptive statistics were used to describe data. To evaluate the association of BMI with mean DMFT/dmft, Pearson or Spearman correlation coefficient test was used to examine the role of gender and correlation between variables. In this study, P-values less than 0.05 was considered statistically significant.

Results

22 patients with the inclusion criteria were recruited into the study. Among the participants, 7 patients (31.8%) were male and 15 (68.2%) were female. The mean total DMFT was 9.8±8.1 and the mean dmft score was 5±1.2.
In the studied cases, the mean studied variables were not different between male and female patients.

To verify the statistically significant differences between the studied variables according to gender, two independent sample t-test was used. Significance level was considered 0.05. The results showed that the mean of the variables had no statistically significant difference based on patients’ gender; in other words, there was no statistically significant relationship between studied variables and patients’ gender. (P-value>0.05)

1. There was no significant relationship between BMI and dmft. (P-value>0.05)  
2. There was a positive correlation between DMFT and BMI; in other words DMFT increased with increasing BMI. (Correlation coefficient> 0 and P-value<0.05) (table 1).

<table>
<thead>
<tr>
<th>P-value</th>
<th>correlation coefficient</th>
<th>The studied variable pair</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/073</td>
<td>-0/389</td>
<td>BMI, dmft</td>
</tr>
<tr>
<td>0/016</td>
<td>0/505</td>
<td>BMI, DMFT</td>
</tr>
</tbody>
</table>

Table 1: Results of Pearson correlation test

Discussion:

This cross-sectional study was conducted on children with Down syndrome who were admitted to Dental hospital in Tabriz in 2015. The results showed no statistically significant relationship between BMI and dmft, while DMFT had a positive correlation with BMI; in other words DMFT increased with increasing BMI. There was also no difference between BMI and DMFT/dmft regarding gender.

In 2007 Oredugba compared 43 patients with Down syndrome with 43 healthy controls in terms of dmft and DMFT. Their results showed that patients with Down syndrome had higher rates of tooth decay that is in line with the results of the current study (18).

Vaziri evaluated DMFT and CPITN indices in patients with Down syndrome in 2007, including 18 females and 19 males with this syndrome. According to his study, children with Down syndrome had higher DMFT because of periodontal problems that is similar to the present study (19).
Al-Maweri et al. (2014) conducted a study on 96 children with Down syndrome aged between 6-15, evaluated by questionnaire and clinical assessment and showed that 93% of patients had dental decay, fillings, and pull-outs due to decay and needed dental care. The results of their study is similar to the results of our study (13).

Giuseppina Laganà et al showed in a study in 2012 that dmft and DMFT is higher in females, whereas in our study no statistically significant difference was observed between dmft/DMFT and gender (20).

Vellappally and colleagues reported high rate of DAI malocclusion (Dental Aesthetic Index) and dental decay (DMFT) in children with Down syndrome in an investigation in 2014 and concluded high DMFT in patients with Down syndrome that is in line with the results of the present study (14).

Cheng KH conducted a study in China in 2007 on 65 patients with Down syndrome. The results showed that patients with Down syndrome had less dental fillings (2.4 versus 2.7) and fewer decayed teeth (1.1 to 1.7) compared to healthy controls (21). But in the current study, dmft was 5±1.2 and the mean dmft score was 9.8±8.1. Their mean age was about 17-42 years. It seems that the contradictory results of the studies is because of different age ranges.

A study by Chakravathy K. and Thippeswamy H in 2013 on association of DMFT with BMI on 456 students from 13 to 15 years concluded that the prevalence of dental decay is higher among students with higher BMIs. The higher DMFT in this study was mentioned to be because of higher frequency of high-carbohydrated diet. From this standpoint, the results of the study is similar to the present study (22).

In 2004, Lee and colleagues compared dental decay in 28 children with Down syndrome with 41 healthy children using the dmfsDMFS index. Their participants’ mean age was 11.4 with a range of 8-17 years and the authors concluded that the Down syndrome group had lower decay compared to the control group, which was reported to be because of low range of the patients, higher age of the controls, and unequal number of the two groups (23).

Mojarad and colleagues assessed the correlation between BMI and decay (DMFT) in a study in 2011 in Hamadan on middle school students. In this study, DMFT was calculated 6.28% in male and 6.85% in female students. The results of this study showed no significant difference between high BMI and DMFT that is different from the results of current study (24).
Conclusions

Tooth decay is a multifactorial disease. Various factors play a role in it, including bacteria, sugary materials, time of exposure to carbohydrates, the amount of salivary immunoglobulin, and etc.

The results of the current study showed that DMFT increases with increasing BMI in patients with Down syndrome. The reason of increased decay can be considered high-carbohydrate diet, low physical activity, lack of attention to oral hygiene due to not regularly brushing tooth after each meal, not using dental floss and mouthwash containing fluoride.

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References


