PLAQUE MATURITY AND PROBLEMS ENCOUNTERED BY MOTHERS DURING TOOTH BRUSHING AMONG DOWN SYNDROME CHILDREN IN THE NORTHEAST OF PENINSULAR MALAYSIA

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ABSTRACT

Background: Oral health, being an element of general health could be in a compromised state for Down syndrome (DS) individuals due to their limited capability to control dental plaque. Mothers are the important person in ensuring the oral health care of their DS children. The study aimed to determine the presence of matured plaque and problems encountered by the mothers during tooth brushing session.

Materials and Methods: Comparative cross-sectional study was conducted on 85 DS children attending DS centre and 86 normal children from schools in Kota Bharu. Validated questionnaires were given to their mothers. The dental plaque was collected from the children at interproximal site of the molar teeth and examined using GC plaque and pH check kit. Data were analysed using SPSS version 20.0.

Result: The mean age for both groups was 9 years old. Most of the DS (91.8%) and non-DS (95.3%) children used ordinary children toothbrush. The matured plaque was not significantly different between DS (81%) and non-DS (87%) children; (p=0.279). Most of the DS mothers (71%) encountered problems while brushing their children’s teeth which related to ‘children turning their head away’ (73.3%) and ‘closing the mouth’ (50%).

Conclusion: Matured plaque was high in both DS and non-DS children regardless the type of toothbrush used. DS mothers encountered most problems especially children turning their head away while practicing routine oral hygiene care to their children. Therefore, mothers must be educated on the proper way of handling their DS children in fulfilling their oral hygiene routine.

Keywords: Down syndrome, matured plaque, toothbrush, disability
1.0 Introduction

Down syndrome (DS) or Trisomy 21 is a genetic abnormality found by Sir John Langdon Down, a British physician in 1866 who associated this syndrome with reduced intellectual ability and similar Mongolian facial characteristic (Desai, 1997). DS is frequently seen with mental retardation in conjunction with other medical condition (Desai, Messer, & Calache, 2001). Oral health, being an element of general health could be in a compromised state for DS individuals. Comprehensive oral health care is necessary due to the problems encountered by them and the caregivers in order to achieve optimal oral health care.

In Malaysia, minimal study was done on the incidence of DS. Hoe, Boo and Clyde (1989) reported that the incidence of DS in Kuala Lumpur Hospital in 1989 was 1:959. Its occurrence was 1:981, 1:940 and 1:860 among Malays, Chinese and Indians respectively (Hoe et al., 1989).

According to Oredugba (2007), dental caries, gingivitis, and periodontal disease were common and significant oral health problems in Down syndrome population. Dental plaque can be defined as the diverse community of microorganisms found on the tooth surface as a biofilm, embedded in an extracellular matrix of polymers of host and microbial origin (Marsh, 2006). More than 500 bacterial strains can be found in dental plaque (Nield-Gehrig, 2005). The bacteria in the biofilm are always metabolically active. The bacteria of dental plaque can ferment carbohydrate substrate and produce organic acid (Walsh & Tsang, 2008). The plaque pH would fall below 5 within 1-3 minutes that leads to dental diseases (Kidd, 2005). However, with the presence of saliva, the pH can be neutralized and minerals may be regained (Kidd, 2005). Study has shown that the plaque pH at the interproximal sites was lower than in plaque at the buccal surfaces (Walsh, 2006a). Immature plaque was generally composed of Gram-positive facultative anaerobes and located at supragingiva (Aas, Paster, Stokes, Olsen, & Dewhirst, 2005). Dental plaque can be matured if it is not disturbed for two days (Seminario, Broukal, & Ivancková, 2005) and produces a substantial level of acid production when compared with immature plaque (Walsh, 2006a).

Providing effective oral health care to individuals with DS requires adaptation of skills for everyday use. Mechanical removal has been shown to be the most effective treatment currently available for the control of dental plaque biofilm (Nield-Gehrig, 2005). Hence, oral hygiene is effective only if the individuals with DS are regularly helped by the caregivers especially for those with poor manual dexterity (Oredugba & Akindayomi, 2008). However, parents who help with the brushing of their DS children’s teeth, encounter many other problems such as child turning their head away, refusing to open the mouth and chewing on the toothbrush (De Jongh, Van Houtem, Van Der Schoof, Resida, & Broers, 2008).

Effort must be made to encourage the parents to play an active role in promoting and improving the oral health of their DS children (Jain et al., 2009). According to Ajami, Shabzendedar, Rezar and Asgary (2007), little attention was paid to the oral health needs of
the disabled even though this group faced oral health problems due to their limited manual dexterity, less motivation and short attention span (Ajami et al., 2007). Dependency on others for personal hygiene care and feeding could not be avoided. The soft diet for DS children was mainly due to low masticatory efficiency (Adiwoso & Pilot, 1999). Bizarra and Robeiro (2009) have done a study among 135 DS children and found that DS children had poor levels of oral hygiene at the beginning of the study. After three consecutive months of supervised tooth brushing, the mean difference of plaque score from the initial and final simplified debris showed significant positive result (Bizarra & Ribeiro, 2009). It is good if the caregivers have oral health care skill in order to assist them delivering oral hygiene regime to their special need children. According to De Jongh et al. (2008), about 38% of caregivers have received the education and 88% of them found it useful.

Therefore, in the present study, the type of toothbrush used, prevalence of matured plaque and problems faced by mothers during tooth brushing would be determined whether they might lead to the development of oral diseases such as dental caries and periodontal disease among this disadvantaged group of population. The problems faced by the mothers would be identified in this study that might help in planning the strategy for a better control of their children’s oral hygiene and maintenance of good oral health status.

2.0 Materials and Methods

A comparative cross-sectional study was conducted from February 2013 to May 2013. Case group was comprised of DS children while the comparative group was comprised of non-DS children. The DS children were recruited from DS centres which includes schools with special needs classes, Community Based and Rehabilitative Centre (CBRCs) and private DS centre in Kota Bharu while the non-DS children were recruited from a primary school in Kota Bharu, Kelantan.

The sampling frame was determined based on the inclusion and exclusion criteria. The inclusion criteria for both groups included absence of any medical condition affecting periodontal status such as diabetes mellitus type 1 (Khocht, Janal, & Turner, 2010) and study subjects who aged between 7 and 12 years-old. Children with any hand impairment and hemiplegic cerebral palsy were excluded from this study (Krumlinde-Sundholm & Eliasson, 2002). Mothers of both DS and non-DS children who were chosen previously were included in the study and illiterate mothers were excluded.

Power and sample (PS) software was used to calculate the sample size based on comparing two proportions (Dupont & Plummer Jr, 1990). The sample size was calculated with 80% power and alpha 0.05, based on the prevalence of matured plaque among non-DS (sibling) group of 19% (Hennequin, Allison, & Veyrune, 2000). The precision at 0.20 (20%) with 95% confidence interval was used. The calculation indicated that minimal sample size of 96 subjects would be sufficient for each group and all eligible DS children were listed and all of
them who fulfilled the inclusion and exclusion criteria were included in the study. For comparative subjects, they were randomly selected using simple random sampling.

Prior to data collection, training and calibration exercise on the procedure and assessment of plaque pH of the examiner were conducted. The overall percentage of the examiners’ assessment on plaque pH against the calibrator’s assessment was 95% and 97% respectively.

The data collection of this phase was done in the early morning around 9 am before the children had their recess. The teacher was informed prior to the day of data collection to ensure that the DS children come to school for the examination on that particular day and did not eat one hour before dental examination. This was to avoid the mixture of pH from the saliva and contamination from the carbohydrate-contained food. The examination was done in the class using a portable dental chair under portable light.

GC plaque-check and pH kit was used to check the plaque pH. Plaque indicator kit was a simple and inexpensive tool. According to the manufacturer’s protocol, it can clearly visualize the plaque into green, yellow, orange or red within 5 minutes. The location of plaque harvested was made uniformed at interproximal area of the first mandibular molar or, if it was missing, second mandibular molar or third mandibular molar was used. The interproximal aspect of the first mandibular molar was the site chosen because it has the slowest clearance of substrates by saliva (Walsh, 2006a; Walsh, 2006b). A study done in Brazil among mentally challenged children also mentioned that the interproximal areas of the teeth have more plaque than the other sides of the teeth either buccal or lingual surfaces, or it is suitable for the efficacy testing of toothbrushes (Pannuti et al., 2003). Prior to collecting the plaque sample, gauze was used to lightly dab dry the site to be sampled to reduce contamination with saliva and if the contamination did happen, it can cause inaccurate result. The plaque sample was then dipped for one second into an indicator solution and was taken out and observed for 5 minutes. The status of the plaque pH of the patient was identified. Green colour after 5 minutes indicated a normal pH around 6.6 to 7.2 and recorded as immature plaque. Yellow or orange to red colour indicated a pH of 6.0-6.5, while red colour indicated a pH of 5.0-5.8. Yellow or orange to red colour was recorded as low plaque pH and categorized as matured plaque. For samples with yellow or red region, preventive action was recommended.

A validated questionnaire by De Jongh et al. (2008) was self-administered to mothers in both groups. The questions were translated into Bahasa Malaysia and retranslated into English by the translator at the Language centres. The questionnaires contained questions related to the type of toothbrush used and problems encountered by the mothers during tooth brushing. The completed questionnaires were collected by the teachers the next working day. The questionnaires were rechecked for completeness and if there was any void, the respective mother was contacted again by the teacher to complete the questionnaire.

2.1 Statistical analysis

Data were analysed using SPSS version 20.0. The type of toothbrush used by the DS and non-DS children and problems encountered by the mothers were calculated for frequency and
percentage. Chi-square ($\chi^2$) test was used to determine the association between children category and type of the toothbrush used as well as comparing the proportion of problems faced between mothers of DS and non-DS. Chi-square test was also used to determine the association between the presence of matured plaque and DS. The prevalence of matured plaque was calculated at 95% confidence interval (CI). The comparison of mean plaque pH between DS and non-DS was done by using independent sampled t-test. The significant p-value was set at p<0.05.

Ethical approval was obtained from the Human Research and Ethics Committee of USM numbered USM KK/PPP/JEPM (260.3[11]). Approval from the Ministry of Education KP (BPPDP)603/5/JLD.12 (18), Kelantan Education Department JPN./SPSK/1902/07/7.9 Jld 2 (10) and Community Welfare Department JKMN.Kel/200/08/4/5 JLD were also obtained. Participation in this study was voluntary and based on informed consent.

### 3.0 Result

#### 3.1 Socio-demographic characteristics

Table 1: Socio-demographic characteristics and type of toothbrush used (n=171)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>DS (n=85)</th>
<th>Non-DS (n=86)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>Mean (SD)</td>
<td>n (%)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child age</td>
<td>9.2 (2.05)</td>
<td>9.8 (1.34)</td>
<td>0.022*</td>
</tr>
<tr>
<td>Maternal age</td>
<td>47.1 (8.39)</td>
<td>43.0 (6.85)</td>
<td>0.001*</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>41 (48.2)</td>
<td>41 (47.7)</td>
<td>0.941*</td>
</tr>
<tr>
<td>Female</td>
<td>44 (51.8)</td>
<td>45 (52.3)</td>
<td></td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malay</td>
<td>82 (96.5)</td>
<td>86 (100)</td>
<td>0.079*</td>
</tr>
<tr>
<td>Chinese</td>
<td>3 (3.5)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No formal education</td>
<td>6 (7.1)</td>
<td>5 (5.8)</td>
<td>0.001*</td>
</tr>
<tr>
<td>UPSR or equiv.</td>
<td>8 (9.4)</td>
<td>1 (1.2)</td>
<td></td>
</tr>
<tr>
<td>SRP/PMR/equiv.</td>
<td>10 (11.8)</td>
<td>3 (3.5)</td>
<td></td>
</tr>
<tr>
<td>SPM/equiv.</td>
<td>36 (42.4)</td>
<td>33 (38.4)</td>
<td></td>
</tr>
</tbody>
</table>
A total of 85 DS children and 86 non-DS children (comparative group) participated in the study. Table 1 shows the socio-demographic characteristics of the 171 subjects. The mean (SD) age for the DS and non-DS children were 9.2 (2.05) and 9.8 (1.34) years respectively. Female outnumbered male in the DS and non-DS children, 51.8% and 52.3% respectively. The mean (SD) age for the mothers of DS and non-DS were 47.1 (8.39) and 43.0 (6.85) years respectively. Malays were the majority in both groups that reflected the composition of Malay ethnic in Kelantan. Regarding the education level of the mothers, majority of them had secondary level of education or equivalent. The mothers of the non-DS children showed to have higher education level especially bachelor degree (30.2%) and master or PhD (8.1%). Most of the DS mothers were unemployed (48.2%) and about 22.4% were self-employed and working in the government sectors. As for the mothers of the non-DS children, about half of them working in the government sectors (50%), followed by unemployed (30.2%) and self-employed (12.8%). Equal numbers of mothers in both groups were working in private sector (7%). Household income of the non-DS group was higher when compared to the DS group. The median (IQR) household income for the DS was RM 1500.00 (IQR 2510) and the non-DS was RM 3750.00 (IQR 5530).
3.2 Type of toothbrush used

Most of the DS (95.3%) and non-DS (91.8%) children used ordinary children toothbrush. Only 8.2% of the DS children and about 4.7% of the non-DS children used modified toothbrush. Most of the modified part of the toothbrush was the handle. There was no significant association between children’s category (DS and non-DS) and the type of the toothbrush used (p = 0.339).

3.3 Problems encountered during tooth brushing practices among mothers of DS and non-DS children

Table 2: Type of self-reported problems faced by mothers

<table>
<thead>
<tr>
<th>Problems during tooth brushing</th>
<th>DS n= 60</th>
<th></th>
<th>Non-DS n= 18</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes Freq (%)</td>
<td>No Freq (%)</td>
<td>Yes Freq (%)</td>
<td>No Freq (%)</td>
</tr>
<tr>
<td>close mouth</td>
<td>30 (50)</td>
<td>30 (50)</td>
<td>11 (61.1)</td>
<td>7 (38.9)</td>
</tr>
<tr>
<td>turn head away</td>
<td>44 (73.3)</td>
<td>16 (26.7)</td>
<td>7 (38.9)</td>
<td>11 (61.1)</td>
</tr>
<tr>
<td>run away</td>
<td>11 (18.3)</td>
<td>49 (81.7)</td>
<td>16 (88.9)</td>
<td>2 (11.1)</td>
</tr>
<tr>
<td>cry loudly</td>
<td>20 (33.3)</td>
<td>46 (66.7)</td>
<td>0</td>
<td>18 (100)</td>
</tr>
<tr>
<td>tongue push toothbrush</td>
<td>14 (23.3)</td>
<td>46 (76.7)</td>
<td>2 (11.1)</td>
<td>16 (88.9)</td>
</tr>
<tr>
<td>bite toothbrush</td>
<td>16 (26.7)</td>
<td>44 (73.3)</td>
<td>0</td>
<td>18 (100)</td>
</tr>
<tr>
<td>chew toothbrush</td>
<td>7 (11.7)</td>
<td>53 (88.3)</td>
<td>0</td>
<td>18 (100)</td>
</tr>
<tr>
<td>difficulty to open mouth</td>
<td>25 (41.7)</td>
<td>35 (58.3)</td>
<td>6 (33.3)</td>
<td>12 (66.7)</td>
</tr>
<tr>
<td>gag</td>
<td>8 (13.3)</td>
<td>52 (86.7)</td>
<td>3 (16.7)</td>
<td>15 (83.3)</td>
</tr>
</tbody>
</table>

Out of 85 DS mothers, 63 (74%) of them brushed their children’s teeth compared to only 18 (21%) among non-DS mothers. Table 2 shows the type of self-reported problems faced by the mothers during tooth brushing. Of the 63 mothers of DS children who brushed their children’s teeth, 60 mothers reported to have problems during tooth brushing practices of their children. Only 18 mothers of the non-DS children encountered problems while having their children’s teeth cleaned. As for the mothers of DS children, the highest reported problems were children turning their head away (73.3%), subsequently followed by closing their mouth (50%),
difficulty to open mouth (41.7%), crying loudly (33.3%) when the mother attempted to brush their teeth and biting on the toothbrush (26.7%). For the non-DS mothers, the highest reported problem was the children running away (88.9%) when mothers were trying to brush their teeth, followed by children closing their mouth (61.1%).

**Table 3:** Association between perceived problems encountered by mothers during tooth brushing and DS (n=171)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Have problems</th>
<th>x² stat (df)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes (%)</td>
<td>No (%)</td>
<td></td>
</tr>
<tr>
<td>Mother’s category</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DS mother</td>
<td>60 (70.6)</td>
<td>25 (29.4)</td>
<td>42.49 (1)</td>
</tr>
<tr>
<td>Non-DS mother</td>
<td>18 (20.9)</td>
<td>68 (79.1)</td>
<td></td>
</tr>
</tbody>
</table>

Table 3 shows the association between perceived problems encountered by the mothers during tooth brushing of their children and DS. There was significantly more mothers (70.6%) of DS children perceived to have problems during tooth brushing practice of their children compared to non-DS mothers, p < 0.001.

**3.4 Prevalence of matured plaque among DS and non-DS children**

**Table 4:** Prevalence of matured plaque among DS and non-DS children (n=171)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Immature plaque</th>
<th>Matured plaque</th>
<th>p-value *</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% (95% CI)</td>
<td>% (95% CI)</td>
<td></td>
</tr>
<tr>
<td>Children’s category</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-DS (n=86)</td>
<td>12.8 (5.4, 19.3)</td>
<td>87.2 (80.6, 94.2)</td>
<td>0.279</td>
</tr>
<tr>
<td>DS (n= 85)</td>
<td>18.8 (11.3, 26.6)</td>
<td>81.2 (73.2, 90.7)</td>
<td></td>
</tr>
</tbody>
</table>

*chi square test

Table 4 shows the prevalence of matured plaque among DS and non-DS children. The prevalence of matured plaque was 81.2% (95% CI: 73.2%, 90.7%) in DS as compared to 87.2% (95% CI: 80.6%, 94.2%) in non-DS. However, the difference of prevalence was not significant (p = 0.279).
3.5 The comparison of mean plaque pH between DS and non-DS children

Table 5: Comparison of mean plaque pH among DS and non-DS children (n=171)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Non-DS n= 86 mean (SD)</th>
<th>DS n= 85 mean (SD)</th>
<th>Mean difference (95% CI)</th>
<th>t statistic&lt;sup&gt;a&lt;/sup&gt; (df)</th>
<th>p- value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plaque status</td>
<td>6.0 (0.51)</td>
<td>5.9 (0.63)</td>
<td>0.2</td>
<td>1.84</td>
<td>0.067</td>
</tr>
<tr>
<td>(pH)</td>
<td>(- 0.01, 0.34)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> independent t-test. Population variances here significantly different (Levene's test p- value = 0.011), therefore t statistic without assuming equal variances was used.

Table 5 shows the comparison of mean plaque pH among the DS and non-DS children. The mean difference between plaque pH of DS and non-DS children was not statistically significant (p = 0.067).

4.0 Discussion

4.1 Type of toothbrush used

Tooth brushing is the most frequently suggested and performed oral hygiene behaviour in developed nations. The use of a good toothbrush for preventive measure is relatively cheaper when compared to most dental procedures (Hedge, Kakade, Rajesh, & Kumar, 2011). There are many types of toothbrushes in the market nowadays. Powered or manual toothbrushes were developed with a variety of designs and features with the aim to safely remove a greater quantity of plaque (Tirapelli, de Carvalho, Ribas, & Panzeri, 2006). In this study, most of the DS and non-DS children used ordinary children toothbrush. Only a few portion of them used the toothbrush with modified handle. Similarly in a study done in the north part of Malaysia, most of the subjects used the ordinary children toothbrush with fluoridated toothpaste (Tay, Zainudin, & Jaafar, 2009). Besides, Zhu, Petersen, Wang, Bian and Zhang (2003) in China reported that DS children preferred ordinary children toothbrush with small head and soft bristles.

4.2 Problems encountered during tooth brushing practices among mothers of the DS and non-DS children

In our study, majority of DS mothers (74%) brushed their children’s teeth while only a quarter by non-DS mothers (21%). Al-Hussyeen and Al-Sadhan (2006) reported that in Riyadh, about 60% of the DS children received parental help and 12.4% were helped by their caregivers giving a sum of 72% receiving help during tooth brushing. This was in agreement with our study. However, among the non-DS children, the percentage was lower compared to the study done by Randell, Harth and Seow (1992) who reported that 84% of non-DS children receiving
help during tooth brushing. This might reflect a parental belief of a reduced importance of oral health in comparison to the overall scheme of general health management. Apart from dental care, more time was also devoted to assist these DS children in other daily activities as compared to their non-disabled counterparts (Randell et al., 1992). However, the finding from the present study was also lower from the study done in the Netherlands. There were about 93% of DS children whose teeth were brushed by their care takers (De Jongh et al., 2008). Allison and Lawrence (2004) reported that DS children were less likely to have their teeth cleaned daily compared to their non-DS counterpart. This may reflect the parents’ lack of understanding on the importance of oral health care for a child with DS when they are in the midst of making decision whether choosing to deal with other medical problems that required immediate treatment (Allison & Lawrence, 2004). Al Habashneh, Al-Jundi, Khader and Nofel (2012) had found a very low percentage whereby 8.7% of children with DS got help from their mothers and 2.7% from their caregivers during their oral hygiene practice in Jordan.

Mothers of DS encountered so many problems during tooth brushing of their DS children. The highest reported problems were children turning their head away (73.3%) and closing their mouth (50%) while mothers attempted to brush their teeth. The same finding was also reported by a study done in Netherlands (De Jongh et al., 2008). One explanation for this finding might be that problems with brushing rose as an indicator that there was a great need for mothers or caregivers to effective oral hygiene instruction despite behavioural difficulties. However, this study showed a tendency for children who were dependent on caregivers for self-care activities. Those requiring assistance in tooth brushing had poorer oral hygiene than those who were able to brush their teeth, reflecting the inadequacy with which oral care may be provided by caregivers (Desai et al., 2001). Irrespective of the function level, oral hygiene should be supervised or performed by a caregiver; otherwise tooth brushing can become of low priority among the daily care activities performed at school and home (Desai et al., 2001).

The highest reported problem by the non-DS mothers was their children ran away (88.9%) when the tooth brushing practice was about to take place. The problems were different with the DS mothers because of the condition of the children. For normal children, their muscle and bone were developing accordingly and they have the tendency to run away from their mother. However, the DS children mostly have muscle hypotonia and they were quite careless and easily to fall down due to the physical anomalies (Wilcock & Griffin, 2013). It was not easy for them to run away from their mother. Thus, turning the head away and closing the mouth were the best solutions to avoid their teeth from being cleaned.

4.3 Association between DS and the presence of matured plaque

In the present study, matured plaque between DS and non-DS children was high and not significantly different. It was in agreement with the study done in Turkey whereby the oral hygiene of the disabled children and young adults was poor due to heavy plaque accumulation that was found in approximately one in three subjects (Altun et al., 2010). A study done among 12 years-old disabled children in Belgium also showed poor oral hygiene in 31.8% of children, with no significant difference was found among the disabled and non-disabled
subjects (Gizani et al., 1997). A study of oral hygiene in Riyadh among mentally retarded female children reported very poor oral hygiene (Al-Qahtani & Wyne, 2004). These outcomes could be due to low physical abilities, which could cause problems in tooth brushing among special needs children. According to a longitudinal study done in Dunedin, New Zealand, by controlling sex, socioeconomic status and dental visiting pattern, they found that the person who have has lower plaque score at the earlier life will have lower plaque score throughout their life (Broadbent, Thomson, Boyens, & Poulton, 2011).

For both DS and non-DS children, the dependency on the family is high until the skills necessary to survive on his/her own are acquired. According to De Jongh et al. (2008), adequate oral hygiene care is important for prevention of dental diseases; however, 68% of the caretakers of mentally disabled children considered non-cooperation as the most troublesome aspect of their patients’ daily oral care. Therefore, for both groups of children, attending the dental surgery for regular check up is solely the responsibility of the parents and caregivers. Despite the difficulties with communication, social and functional skills, mentally handicapped individuals will benefit only if their parents, family members and caregivers have the knowledge about diet modifications, including avoiding giving candy as a reward, a comprehensive oral hygiene practices and obtaining dental check up regularly (Tin-Oo, Saddki, Rahman, Yusoff, & Ismail, 2010).

The findings can be used as a baseline data on caries risk assessment of DS individuals towards oral health problem. The strategy in targeting the DS children who are considered at high risk and susceptible to oral diseases should be implemented. This programme can be effectively carried out by the oral health care team especially by the mobile dental team that aims to deliver current preventive methods and materials as well as targeting the family members and caregivers. The family members and caregivers must be educated on the importance of good oral health care through knowledge and proper way of handling their special needs children in fulfilling their oral hygiene routine.

5.0 Conclusion and recommendation

In conclusion, most of the DS and non-DS children used ordinary children toothbrush. The proportion of the type of toothbrush used between DS and non-DS children was not significantly different (p = 0.339). The matured plaque among DS was 81% (95% CI 80%, 94%) and it was slightly low as compared to non-DS children with the prevalence of 87% (95% CI 73%, 90%). The mean difference between plaque pH of DS and non-DS was not statistically significant (p = 0.067, 95% CI -0.01, 0.34). The highest self-reported problems by DS mothers were children turning their head away (73%) and followed by closing the mouth (50%). For non-DS mothers, the highest reported problems were children running away (89%) and followed by children closing their mouth (61%). There was significantly more mothers (71%) of DS children perceived to have problems during tooth brushing practice of their children compared to non-DS mothers (p < 0.001).
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Declaration

The authors declare that:

i) The article mentioned above has not been published or submitted for publication in any other journal;

ii) We also declare that the authorship of this article will not be contested by anyone whose name is not listed here;

iii) We declare that we contributed significantly towards the research study i.e., conception, design, analysis and interpretation of data and to (b) drafting of the article or revising it critically for important intellectual content;

iv) There is no conflict of interest on this article.

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References


