

Oral Hygiene Level of Down Syndrome Children in Bandung City

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Abstract: Oral hygiene is an important factor in supporting dental and oral health as well as the whole body health. Down Syndrome (DS) is a genetical anomaly in the form of Chromosome 21 triplication that might cause retardation of physical growth and development and also mental retardation. The aim of this study was to find out the level of oral hygiene of DS children in Bandung. This was a descriptive study using survey technique. The samples were 30 DS children from a School of Handicapped Children (SLB) in Bandung, collected by multistage cluster sampling. Clinical examination on the subjects using OHI-S Greene and Vermillion index. The result showed, of the 30 DS children/subject, 18 (60%) had poor oral hygiene; 10 (33.3%) had moderate, and only 2 (6.67%) had good oral hygiene. The level of oral hygiene of DS children in Bandung was 3.10. It concluded that the oral hygiene of DS children in Bandung is poor category.

Keywords: oral hygiene level, Down Syndrome

1. Introduction

Down Syndrome (DS) is a genetical abnormality as a result of complete or partial copy of three chromosome 21.[1] DS was firstly identified in 1866 by John Langdon Down as the most general cause of mental retardation.[2, 3] At first, this syndrome was called as Mongolian because those with this syndrome showed typical form of face with narrow eyes like The Mongolian.[4]

DS is oftenly found malformation syndrome.[5] The incidence was about 1 of 600-1000 births. A 45-year-old mother might higher the incidence to 1 of every 30 births.[6] Estimated total number of DS patients in 2013 was 8.5 millions all over the world.[7] About 3000-5000 DS children were born every year. One of the family members of about 250, 000 families in the United States had Down syndrome.[8] As reported by Riskesdas (Riset Kesehatan Dasar), the percentage of DS patients in Indonesia was 0.12% in 2010 and increased to 0.13% in 2013.[9] POTADS (Yayasan Persatuan Orangtua Anak Dengan DS) reported there were about 300, 000 DS cases in Indonesia.[10]

DS children have certain physical characteristics and retarded psychomotor developments.[11] Other characteristics on DS children are macroglossia, tongue fissure, maxillary hypoplasia, tongue thrusting, congenital missing of the tooth, malocclusion, high palatum arch, increased rate of the saliva pH, and macrodontia [12], and also mental retarded.[13]

In general, DS children have mild to moderate mental retardation that causes difficulties for them to care for themselves.[11] They have not only general health problems but also, oral health that is closely related with dental and oral hygiene. A good oral hygiene is an important factor in having optimal condition of dental and oral health. Poor oral hygiene that is marked by plaque and calculus might cause periodontal disease.[14]

DS children usually have problems in dental and oral health.[15] Periodontal diseases are found more on DS children, while caries is similarly found or even less than in

normal children.[16] A study by Reuland and van Dijk in Netherlands (1986) figured the prevalence of periodontitis was 30-100% and gingivitis about 14-100% on DS patients aged less than 30 years.[17] A study by Sasaki et al (2004) in Japan also found 42% of DS children had poor oral hygiene accompanied by gingivitis.[18] Oredugbain Nigeria (2007) found 40% DS children had poor oral hygiene.[12] A study by Hennequin et al in France (2000) reported that 50% DS children were not able to clean their teeth by themselves which was caused by limited motoric ability.[15]

2. Methods

This was a descriptive study on DS children aged 6-18 years in a School of Handicapped Children (SLB) in Bandung. The subject was collected through multistage cluster sampling. All subjects were given informed consents to be filled and signed by their parents or guardians. Ethical clearance was approved by the Ethical Health Research Committee of the Medical Faculty Universitas Padjadjaran. The examination of oral hygiene level was done in accordance with (according to) the Oral Hygiene Index-Simplified (OHI-S) by dripping the disclosing solution under the patient's tongue.

3. Results

This study about the level of oral hygiene on DS children was held in a School for Handicapped Children in Bandung. The subject was 30 DS children consisted of 18 males and 12 females of 7-18 years old. The characteristics of subjects based on gender and age is shown in Table 1.

Table 1: Characteristics of the subjects based on gender and age

Age (years)	Male		Female	
	N	Percentage	N	Percentage
7-10	5	27.78	5	41.67
11-14	7	38.89	3	25.00
15-18	6	33.33	4	33.33
Total	18	100.00	12	100.00

The subjects' plaque index was examined using Oral Hygiene Index-Simplified. The result is shown in Table 2.

Table 2: Frequency Distribution of Subjects' Plaque Index

Plaque Index	Criteria	Frequency	Percentage
0.0 – 0.6	Good	0	0
0.7 – 1.8	Moderate	11	36.7
1.9 – 3.0	Poor	19	63.3
Total		30	100.00

The calculus index of the subjects was examined using the Oral Hygiene Index-Simplified. The result is shown in Table 3.

Table 3: Frequency Distribution of Subjects' Calculus Index

Calculus Index	Criteria	Frequency	Percentage
0.0 – 0.6	Good	4	33.33
0.7 – 1.8	Moderate	26	86.67
1.9 – 3.0	Poor	0	0
Total		30	100.00

Further on, we acquired the index of oral hygiene of the subjects by adding the plaque index and calculus index. The frequency distribution of oral hygiene index is shown in Table 4.

Table 4: Frequency Distribution of OHI-S Index of the Subjects

OHI-S	Frequency	Percentage
Good	2	6.67
Moderate	10	33.33
Poor	18	60
Total	30	100.00

The rate of oral hygiene index of the subjects is presented in Table 5. Based on those results, the level of oral hygiene of the subjects in this study was classified as poor.

Table 5: The Rate of OHI-S Index of the Subjects

Index	Rate	Criteria
Plaque	2.1	Poor
Calculus	1.0	Moderate
OHI-S	3.1	Poor

4. Discussion

Table 1 showed the characteristics of the subjects based on gender and age that were consisted of 18 (60%) males and 12 (40%) females. Based on gender, the comparison of male and female subjects was 3:2, which means the total amount of male DS children was higher than female. DS occurs more often on males as a result of meiosis disturbance of the father that might influence the sex chromosome or higher accessibility of the sperm towards the ovary while bringing the chromosome Y during fertilization, which then resulted in more DS children to be born male. [19, 20]

Studies on the prevalence of Down Syndrome based on gender were done in several countries such as Uchida [21] in Canada 1970, Lindsten et al [22] in Sweden 1981, Bishop et al [23] in California 1997, and Shin et al [24] in the United States 2009. All those studies found that DS occurred more on males compared to females.

Table 2 showed most of the subjects (19 = 63.33%) were DS children with poor criteria of plaque index. This was similar with the study by Bradley and McAllister in Ireland in 2004 that found 50% DS children had poor criteria of plaque index.[25] Other study by Kumar et al in Udaipur (2009) found 132 (77.2%) DS children had poor criteria of plaque index.[26]

Poor plaque index might occur as a result of lacking optimal care of dental and oral hygiene. Plaque forming should be prevented or minimized by plaque control, as an attempt to avoid and remove the plaque accumulation on the tooth surface and gingiva.[27, 28] Plaque control could either be mechanically or chemically done. Mechanical control is more effective and easier to be done using the toothbrush.[29]

The most influencing factor in oral hygiene care is the individual habits.[30] To brush the teeth is simple and easy to do for a normal child, but not for handicapped children like a DS child. DS children have mental retardation that makes it difficult for them to do the instruction in the right way.[31, 32] DS children also have motoric limitation that makes their movement rigid and rough. In addition, they have difficulties to hold a thing such as a toothbrush when brushing the teeth. [11, 33]

The frequency of tooth brushing is various. The recommended time to brush the teeth is after meals and before bedtime. [34] Sometimes tooth brushing before bedtime is missed due to the lack of understanding of the parents or child about its importance. [35] Mathewson stated that brushing teeth before bedtime is important because the rate of saliva lessens while sleeping, which then will cause the plaque to form. Some of the subjects' parents stated that their children usually brush their teeth while bathing and that they only brush the front part of the teeth. Other studies also found that the children brush only the labial surface of the anterior teeth and occlusal surface of the lower molar, while lingual and palatal areas are missed.[34]

DS children need their parents or guardians' help when they brush their teeth.[31] This should be done continuously until they get adequate ability to do it by themselves.[36] There are difficulties for the parents or guardians, such as the child rejects to open their mouth longer, swallow the toothpaste, push the toothbrush with the tongue, and/or too many movements.[32] Hypotonia orofacial and macroglossia in DS children may also make difficulties in tooth brushing activity. Their big tongue may cover the occlusal and lingual surfaces of the lower jaw. This may become worse by the weak control of the muscles that causes inaccurate movement of the tongue and cheek, that would further cause the tooth brushing process not being able to eliminate the plaque optimally. [36, 37]

Table 3 shows that most of the subjects (26 = 86.7%) were DS children with moderate calculus index. This means that most of the subjects had low ability in caring their dental and oral hygiene. Plaque is closely related with the calculus, as the accumulated plaque on the oral cavity might have mineralization and form calculus. If the dental and oral

hygiene is not well cared, then as the child grows older, the amount calculus sedimentation will increase.[38, 39]

Calculus forming could be prevented by cleaning existing plaque as soon as possible, and brushing the teeth is the effective way for this.[29] Frank and Winterstated that electric toothbrush is effective to eliminate the plaque in handicapped children such as children with DS.[40] Some of the DS children might feel disturbed by the sound of the brush, so the triple-headed toothbrush may be alternately used. This type of toothbrush will clean the plaque on the buccal, occlusal and lingual areas, but not effectively on the interproximal areas. Interdental brush may be alternately used in flossing on DS children because the brush's bristles will effectively remove the plaque on the interdental area and it is easy to use.[32]

Table 4 showed most of the subjects (18 = 60%) were DS children with poor criteria of oral hygiene. This was similar with a study by Oredugba in Nigeria 2007, that 17 (40%) of 43 DS children had poor dental and oral hygiene.[12] Other study by Haliza et al in Malaysia 2015, found 28 (87.5%) of 32 DS children had poor dental and oral hygiene.[41]

Table 5 showed that oral hygiene is in poor category if the value is at 3.1. This result was similar with the study by Kumar et al in Udaipur 2009, that found the index rate of dental and oral hygiene was 3.82.[26]

The factor influencing oral hygiene of DS children is mainly the mental retardation, since it causes the children having difficulties to understand the instruction of how to take care of dental and oral hygiene independently.[42] Other factor influencing the dental and oral hygiene in DS children is malocclusion. Crowding might result in food debris retention that is difficult to be cleaned. Food debris retention might become plaque and if not cleaned for a long time, then calculus would be formed and the dental and oral hygiene would turn worse.[43, 44]

Poor dental and oral hygiene of DS children may cause problems of the dental and oral health such as caries and periodontal disease that need more treatment. [36, 37] Based on the information from the parents, they visit the dentist when there is problem of the teeth. Two of the parents said that they were worry when their child must have general anesthesia on the treatment, so they delayed the visit. American Dental Association declared that the best visit to the dentist is every 6 months.[45] This will routinely keep the oral health, not only to have treatment for dental problem.

Oral hygiene of DS children depends on the parent's role and the child's ability. The dentist also has an important role in educating the parents about the importance to care dental and oral hygiene. The ability of DS children to care for dental and oral health can be increased by the right and intensive motoric training. [32, 46]

A good cooperation between the parents and the dentist is needed to get a successful dental care of DS children. In dental treatment, usually a DS child will act cooperatively. Dentist can use the same method used on other child patients

that is: "Tell, Show, Do", while sedation or general anesthesia will only be used for uncooperative children. The parents or guardian is suggested to stay near the DS children during the treatment, to keep them cooperative in such situation.[36, 37]

5. Conclusion

Based on the examination done in School for Handicapped Children in Bandung, it has been concluded that the oral hygiene of DS children in Bandung was in poor category.

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