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RESEARCH ARTICLE
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Periodontal Health Status and Treatment Needs of Visually Impaired Student Attending "Extraordinary School in Jember Regency

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ABSTRACT

Visually impaired people usually have limitation to do their activities in maintaining oral health including the periodontal tissue. This condition leads to inadequate efforts to maintain oral health that can cause various diseases, one of which is periodontal disease. Periodontal disease will gradually develop become severe, and therefore it is necessary to take proper care in handling it. The aim of this study was to determine the periodontal health status and the level of periodontal disease care needs of blind students in SLB Jember Regency. This research was a descriptive observational study with a cross sectional approach. The research sample of 20 people were obtained using the total sampling method. The health status of the periodontal tissue and the need for treatment are examined using CPITN. Subsequent research data are grouped and distributed based on gender and age. The result showed that the most common periodontal tissue health status was score two with clinical features of subgingival calculus or supragingival calculus with a total of 50%, while the most needed treatment needs were improvement in oral hygiene accompanied by 85% professional scaling.

Keywords: periodontal health status; periodontal treatment needs; CPITN; visually impaired

INTRODUCTION

The 2015 Global Blindness and Visual Impairment data states that the number of blind people in the world in 2015 reached 253 million people out of a total population of 7.3 billion people.(1) Meanwhile, based on the 2013 Riskesdas data, the total number of blind people in Indonesia can be estimated around 3,099,346 people out of a population of 224,714,112 people. The limitations of the visually impaired people certainly would affect their activities in daily life, but one of the most frequently found is their inability to maintain oral health. This inability can be caused by the lack of visualization for visually impaired people to understand and master the techniques of dental and oral hygiene practices, of course, impacting on their ability and actions in maintaining oral health.(2)

Clinical studies showed how visually impaired patients generally have a bad state of oral health with a high caries prevalence and / or periodontal problems.(3) Periodontal disease will develop progressively so that if no proper treatment is carried out it can cause tooth loss.(4) One of the initial steps that can be done is to examine the periodontal tissue using the Community Periodontal Index for Treatment Needs (CPITN). The use of this index aims to estimate the prevalence of the disease, measure the level of patient's need for periodontal disease treatment and recommend the right type of treatment later.

The exact prevalence of how bad the periodontal health status is and the level of periodontal treatment needs among blind students is not known with certainty. Thus, the purpose of this study was to determine the periodontal health status is and the level of periodontal treatment needs among blind students in "*Sekolah Luar Biasa (SLB)"* / Extraordinary School that located in Jember Regency.

METHODS

This research was an observational research with cross sectional approach. The study was conducted at the SLB-A TPA Jember and SLB Negeri Jember, on 4 to 8 October 2019. The research sample of 20 people was obtained using the total sampling method. The research criteria were that the sample was a student in SLB that located in Jember Regency and totally blind with an age range of 7-21 years.

The first step taken after obtaining permission from the Ethics Commission is that the parents or guardians of students fill out the informed consent that has been given previously. Afterwards, the respondent's periodontal tissue will be examined using CPITN to evaluate the health status of the periodontal tissue and

treatment needs. The type of CPITN that used in this study was full CPITN, meaning that all teeth were identified by calculus, bleeding on probing and probing depth. The examination results of each tooth was written on the examination form with a score of 0 means a healthy periodontal tissue condition, score 1 is marked by bleeding after probing, score 2 with the presence of subgingival and supragingival calculus without pathological pockets, score 3 where there is a pathological pocket with a depth of 4 -5 mm and a score of 4 marked by a pocket with a depth of more than 5 mm. Of all the teeth examined, one tooth with the highest score was deemed to be representative of the periodontal tissue health status of the sample.

Data on the health status of periodontal tissue that has been obtained was then used to identify the periodontal treatment needs of the sample. A score of 0 indicates that the sample does not require treatment, a score of 1 means that the sample only requires an increase in oral hygiene, if the sample has a score of 2 or a score of 3 then the treatment needed by the sample is the increase in oral hygiene accompanied by professional scaling while increasing oral hygiene accompanied by complex treatments will be needed if the sample has a score of 4.

All data obtained were then distributed based on age and sex which were later regrouped based on the health status of the periodontal tissue and the need for periodontal tissue treatment. Data calculation is done manually and presented in narration, tables and charts.

RESULTS

The study was conducted at the TPA SLB-A Jember and SLB Negeri Jember starting from 4 to 8 October 2019. The research findings about periodontal health status is and the level of periodontal treatment needs among blind students are such as follows. The sample distribution based on different gender and age can be seen in table below.

Table 1. Total sample distribution based on gender

Gender	Frequency	Percentage
Male	12	60
Female	8	40
Total	20	100

Table 2. Total sample distribution based on age

Age	Frequency	Percentage
Childhood (5 – 11 years old)	7	35
Early adolescense (12 – 16 years old)	4	20
Late adolescense (17 – 25 years old)	9	45
Total	20	100

The sample consisted of 20 children with total blind as many as 12 males and 8 females (Table 1). Whereas based on age groups, the sample is divided into three age categories. The age group of children (5-11 years) as many as 7 people, the group of early adolescense (12-16 years) as many as 4 people and the group of late adolescense (17-21 years) as many as 9 people (Table 2).

Table 3. Periodontal health status among blind students in extraordinary school in Jember Regency

Periodontal status score	Frequency	Percentage
0 (normal)	0	0
1 (bleeding on probing)	1	5
2 (calculus supragingiva or subgingiva)	10	50
3 (pathologic pocket with 4-5mm depth)	7	35
4 (pathologic pocket with >5mm depth)	2	10
Total	20	100

Tabel 4. Periodontal treatment needs among blind students in extraordinary school in Jember Regency

Periodontal treatment needs score	Frequency	Percentage
0	0	0
I	1	5
II	17	85
III	2	10
Total	20	100

Note:

0	No treatment needed
1	Increasing oral hygiene by giving education, information and communication (EIC)
II	Increasing oral hygiene by giving education, information and communication (EIC) followed by professional scalling
III	Increasing oral hygiene by giving education, information and communication (EIC) followed by complex treatment

The results of the CPITN examination showed that the health status of the periodontal tissue was at most blind students have score 2 with a total of 10 people (50%) (Table 3), while the most needed periodontal tissue treatment was an increase in oral hygiene accompanied by professional scaling, totaling 17 people (85%) (Table 4).

Table 5. Periodontal health status among blind students in extraordinary school in Jember Regency based on gender

Gender)	Periodontal status score										Total	
	0		1		2		3		4		Σ	%
	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%		
Male	0	0	1	8.3	6	50	5	41.7	0	0	12	100
Female	0	0	0	0	4	50	2	25	2	25	8	100

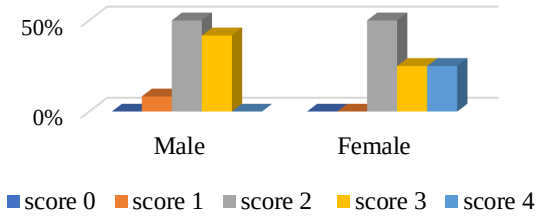

Figure 1. Distribution of periodontal health status among blind students in extraordinary school in Jember Regency based on gender

There were no males with 0 nor 4 periodontal tissue health scores. 8.3% males have score 1. score 2 by 50%. and score 3 is the largest by 41.7%. The health status of periodontal tissue in females shows that no sample has score of 0 nor 1, score 2 is 50%, score 3 and 4 is 25% respectively. Figure 1. shows that the most periodontal health score among males and females is score 2.

Table 6. Periodontal health status among blind students in extraordinary school in Jember Regency based on age

Age	Periodontal status score										Total	
	0		1		2		3		4		Σ	%
	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%		
Childhood (5 – 11 years old)	0	0	1	14.3	5	71.4	1	14.3	0	0	7	100
Early adolescense (12 – 16 years old)	0	0	0	0	1	25	3	75	0	0	4	100
Late adolescense (17 – 25 years old)	0	0	0	0	4	44.5	3	33.3	2	22.2	9	100

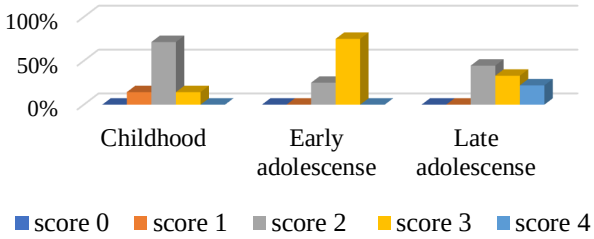

Figure 2. Distribution of periodontal health status among blind students in extraordinary school in Jember Regency based on age

Periodontal tissue health examination in childhood (5 - 11 years) showed that no sample obtained a zero score, score 1 by 14.3%, score 2 by 71.4%, score 3 by 14.3% and none score 4. Periodontal tissue health status in the early adolescent age category (12-16 years) shows that no sample in this age category has a score of 0, 1 nor 4, score 2 is 25% and score 3 is 75%. The later adolescent category did not have a sample with a score of 0 or 1, score 2 is 44.5%, score 3 is 33.3% and score 4 is 22.2% (Table 6). Figure 2. shows that in all age categories no sample was recorded as having a zero periodontal tissue health score, the largest score 2 percentage were found in the childhood category, while the largest score 3 and 4 were found in the early adolescent age category and later adolescent respectively.

Table 7. Periodontal treatment needs among blind students in extraordinary school in Jember Regency based on gender

Gender	Periodontal treatment needs score								Total	
	0		I		II		III		Σ	%
	Σ	%	Σ	%	Σ	%	Σ	%		
Male	0	0	1	8.3	11	91.7	0	0	12	100
Female	0	0	0	0	6	75	2	25	8	100

Note:

0	No treatment needed
I	Increasing oral hygiene by giving education, information and communication (EIC)
II	Increasing oral hygiene by giving education, information and communication (EIC) followed by professional scalling
III	Increasing oral hygiene by giving education, information and communication (EIC) followed by complex treatment

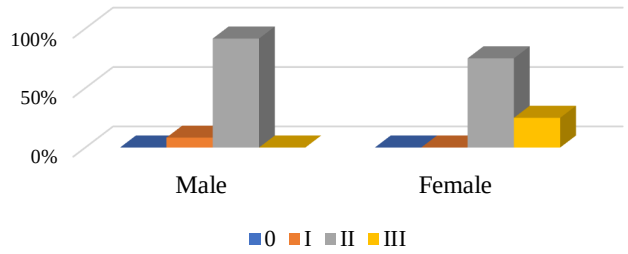

Figure 3. Distribution of periodontal treatment needs among blind students in extraordinary school in Jember Regency based on gender

The percentage of male samples requiring treatment that was limited to an increase in oral hygiene (IEC) amounting to 8.3% while 91,7% samples need an increase in oral hygiene (IEC) accompanied by professional scaling. The need for periodontal tissue treatment in women shows that all samples requiring periodontal tissue treatment are more than improvement in oral hygiene, 75% of them require increased oral hygiene (IEC) accompanied by professional scaling while the remaining 25% require increased oral hygiene (IEC) accompanied by complex care (Table 7). Figure 3. shows that periodontal treatment with increased oral hygiene (IEC) accompanied by professional scaling occupies the largest percentage where the percentage of female who need this treatment is greater in number than male.

Table 8. Periodontal treatment needs among blind students in extraordinary school in Jember Regency based on age

Age	Periodontal treatment needs score								Total	
	0		I		II		III		Σ	%
	Σ	%	Σ	%	Σ	%	Σ	%		
Childhood (5 – 11 years old)	0	0	1	14.3	6	85.7	0	0	7	100
Early adolescense (12 – 16 years old)	0	0	0	0	4	100	0	0	4	100
Late adolescense (17 – 25 years old)	0	0	0	0	7	77.8	2	22.2	9	100

Note:

0	No treatment needed
I	Increasing oral hygiene by giving education, information and communication (EIC)
II	Increasing oral hygiene by giving education, information and communication (EIC) followed by professional scalling
III	Increasing oral hygiene by giving education, information and communication (EIC) followed by complex treatment

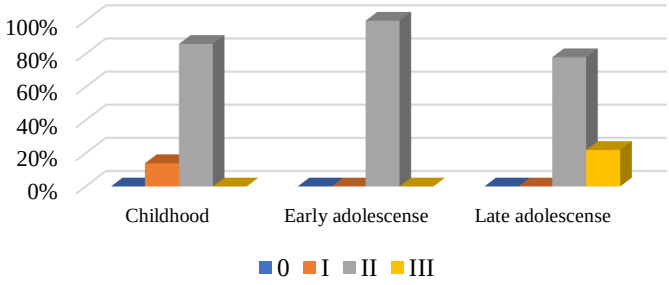

Figure 4. Distribution of periodontal treatment needs among blind students in extraordinary school in Jember Regency based on age

Table 8 shows all samples in the childhood category (5 - 11 years) requiring periodontal tissue care. The percentage requiring treatment is only limited to an increase in oral hygiene (IEC) amounting to 14.3% and the remaining 85.7% requires periodontal tissue treatment with an increase in oral hygiene (IEC) accompanied by professional scaling. The need for periodontal tissue treatment in the early adolescent age category (12-16 years) shows that all samples of 100% require periodontal tissue treatment accompanied by professional scaling. The need for periodontal tissue treatment in the late adolescence category (17-25 years) shows 77.8% of the sample requires increased oral hygiene (IEC) accompanied by professional scaling while 22.2% of them require increased oral hygiene (IEC) accompanied by complex care. Figure 4. shows that periodontal tissue treatment with increased oral hygiene (IEC) accompanied by professional scaling occupies the largest percentage in each age category, but the early adolescense age category has the largest percentage, followed by the age category of childhood and late adolescence.

DISCUSSION

The periodontal health status of a person with a disability is influenced by several factors such as the types of disabilities, the level of parental knowledge, socio-economic status, age and subject's knowledge about oral health. The results of the study in Table 5 describe both male and female have periodontal health status with varying score. The

periodontal health score that is most often found in both male and female groups is score 2 with percentage of both groups reaching 50%. Similar results were also found in a study conducted by Mohd Tuti (2010)[6] to 39 members of the Malaysian Association for the Blind (MAB) in Malaysia which showed the highest periodontal tissue status found in blind people is score 2. Score 2 is an interpretation of the state of periodontal tissue in the presence of supragingival and subgingival calculus that is followed or without bleeding on probing.

In this study, the most common found calculus was supragingival calculus, especially in the area of the lingual posterior segment of the mandible. After score 2, in the male group, the score 3 was the most frequent score with a percentage reaching 41.7%, while in the female group, 25% of them obtained score 4. Score 2 and 3 have a clinical appearance of periodontal pocket. Normally, the humoral and cellular immune systems will be able to eliminate pathogens that cause periodontal disease, but will be different in some circumstances such as in the presence of calculus. Calculus with rough surface will be a good retention for bacteria such as P. gingivalis or A. actinomycetemcomitans to able to pass through the defense system, so tissue damage cannot be avoided. Plaque-causing bacteria will produce collagenase enzymes that degrade periodontal tissue collagen which can cause loss of attachment between teeth and gingiva.[7] The difference between the two groups is that in the female group no sample has a score below two, whereas in the male group one sample was found with a score of one. In addition, score 4 in female group also has a higher percentage than in male group. This shows that female tend to have worse periodontal health status than male. Jafri et al (2015)[8] in their journal describe the effect of female hormones on the condition of periodontal tissue. Estrogen and progesterone hormones play a role in the inflammatory process by increasing capillary permeability and increasing gingival sulcus fluid flow which is thought to be a risk factor for periodontal disease.

Table 6 describes the distribution of periodontal health status among blind students in three age categories. The distribution of scores is quite significant from one age category to another. In the age category of childhood score 2 is the most frequently found with a percentage of 71.4%. In the early adolescenset category, score 3 reaches a percentage of 75%, while the late adolescense category has 44.5% sample with a periodontal tissue health of score 2. But besides score 2, score 3 in the late adolescense population is also quite large because it reaches 33.3%.

Gingival inflammation is almost always associated with the presence of caries. The degree of inflammation is determined based on the presence of bacteria on the biofilm, the degree of destruction of the teeth and the host response.[9] The prevalence of gingivitis tends to be low in children and will increase as a teenager. Although in childhood the presence of plaque tends not to be supported by adequate plaque control, the risk of gingival inflammation will remain minimal as long as there is no dental caries.[9] In addition, one of the factors that influence the health or illness of periodontal tissue is the composition of biofilms in the oral cavity in children, adolescents and adults. An understanding of the diversity of oral microbiota during childhood develops using metagenomic techniques.[10] Metagenomics is a study of taxa in the saliva of children and adolescents found that at 3 years of age, children exhibit complex salivary microbiome that changes with age but it is still different from the microbiome at puberty or adulthood.[10] This statement has a correlation with the results of the study obtained, namely the low prevalence of periodontal tissue damage found in children of childhood age category. Research data shows that most teeth examined in childhood category have score 0, meaning that their periodontal tissue is still normal without any inflammation.

At puberty, there is a hormonal impact on gingival inflammation. Sex hormones can induce endothelial damage and increase vascular permeability, affect the recruitment of leukocytes to inflamed tissue, affect the formation of granulation tissue, and affect changes in the composition of subgingival flora[9]. Microflora changes during puberty are believed to occur in part in response to changes in hormone levels. Given the age category of early adolescents having a range of ages from 12 to 16 years, it is most likely the cause of the periodontal tissue health status is very bad that is due to fluctuations in sex hormones that are very unstable. Hormonal fluctuations, biofilm composition shifts and inadequate plaque control will aggravate the state of periodontal tissue could be the factors. Entering the age of late adolescents to adulthood, fluctuations in this hormone will be reduced so that the condition of the periodontal tissue can improve from before. In this research, most periodontal pockets that had depths of up to six millimetres mostly found in the periodontal tissue area of the anterior teeth. The structure of the gingiva is clinically apparent in the presence of edema, redness and fluctuations. The presence of plaque and calculus is also found in the area.

CONCLUSION

Based on the results of the study, the most frequently health status of the periodontal tissue among students with visual impairment in SLB-A TPA Jember and SLB Negeri Jember is a score 2, which means there are calculus either supragingival or subgingival, while the most rarely found is score 0 or normal. Meanwhile, the most needed periodontal treatment is an increase in oral hygiene (EIC) accompanied by professional scaling. Suggestions from this study are that further research is needed on the health of periodontal tissue with a larger population so that the results can later be used globally in order to improve the health of teeth and oral cavity among visually impaired people.

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