CARIES AND ORAL HEALTH RELATED QUALITY OF LIFE AMONGS THALASSEMIA MAJOR CHILDREN

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ABSTRACT

Thalassemia patients typically have high caries rates. Children's daily activities and quality of life may be greatly impacted by dental cavities. Studies on the comparison of caries and oral health-related quality of life between thalassemia children and healthy children provides inconsistent results. The study aimed to compare dental caries and oral health-related quality of life between children with thalassemia major and healthy children. This study was a cross-sectional study involving 17 children with thalassemia mayor and 22 healthy children selected by purposive sampling in Banyumas, Central Java. Caries was assessed using the caries index through digital panoramic radiographs and clinical photographs of the oral cavity. Oral health-related quality of life was evaluated using the Indonesian version of the *Child Oral Health Impact Profile-SF 19* questionnaire. Caries scores in thalassemia major children and healthy children were 2.64 ± 2.06 and 2.23 ± 1.38, respectively. Oral health related quality of life scores in thalassemia major and healthy children were 56.82 ± 10.35 and 56.73 ± 7.70, respectively. There was no significant difference between caries scores and oral health-related quality of life scores between thalassemia major children and healthy children (p=0.663 and p=0.974, respectively). Nevertheless, oral health in children with thalassemia should be improved.

Keywords: caries, children, thalassemia, quality of life

INTRODUCTION

Thalassemia is a hereditary condition of decreased or missing hemoglobin α, β, or other hemoglobin-forming chains in red blood cells (Rujito, 2019). Based on its severity, thalassemia can be divided into 3, namely thalassemia minor, thalassemia intermedia and thalassemia major. Thalassemia major is a type of thalassemia that has the most severe symptoms and requires treatment in the form of regular blood transfusions (Karayilmaz et al., 2019).

The Indonesian Minister of Health stated that Indonesia is a country with a high number of thalassemia carriers, ranging from 3-10%. The prevalence of thalassemia in Banyumas reached 44 patients in 2008 and increased by 32.3% to 65 patients (Rejeki, 2012; Rodiani & Anggoro, 2017). It was reported that the incidence of thalassemia continued to increase throughout the years, until finally in 2020 there were reportedly 200 thalassemia patients in Banyumas. Oral manifestations of thalassemia include class II malocclusion, gingivitis, and dental caries (Helmi et al., 2017). Another study reported that thalassemia has an impact on burning and numbness of the oral mucosa, lingual varicosity, dry mouth, anthropic glossitis (Wang et al., 2013)

Dental caries affects people at all societal levels in most of Indonesian population (Nbaia et al., 2018). Dental caries is one of the oral cavity diseases that are frequently found in patients with thalassemia major. Caries in thalassemia major patients occurs due to xerostomia disorder, which causes a decrease in the amount of saliva as one of the natural agents to prevent caries (Akcalı et al., 2019). It was also found that caries in thalassemia patients occurs due to a decrease in the level of immunoglobulin A (IgA) in saliva (Mikael & Al-Allawi, 2018). Caries causes throbbing pain and affects oral function, thus affecting quality of life (Nurwati et al., 2019). Oral health-related quality of life (OHRQoL) is a multidimensional construct used to assess a person's perceptions and feelings about the impact of diseases or abnormalities in the oral cavity. Dental caries can affect oral health-related quality of life in terms of

physical, social, and psychological aspects. Caries in children can cause discomfort when eating, sleeping, smiling, brushing teeth and learning (Souza *et al.*, 2018).

Previous research has shown that children with thalassemia have higher rates of tooth decay than healthy control children. Dental caries will affect the quality of life of thalassemia major patients. Persistent caries will make it difficult for a person to sleep and eat, unable to perform activities, unable to attend school, and require high costs if the caries that occurs is severe (Rozylo dan Orhan, 2020). However, there is still a research gap or contradiction between the comparison of caries rates in thalassemia children and healthy children. The previous study states that there is no significant difference between caries in thalassemia and healthy children (Ali & Al-naimi, 2019; Arora et al., 2014) but the other study (Nabi et al., 2022) actually reports that there is a significant difference between caries in thalassemia children and healthy children. This research gap requires further research to identify caries in thalassemia children and its impact on oral health related quality of life. The aim of this study was to compare the caries and oral health related quality of life between thalassemia major and healthy children.

METHODS

This cross-sectional study included 39 participants: 17 children with thalassemia major being treated at RSUD Banyumas and 22 healthy children. The respondents were chosen using a purposive sampling technique, with the following criteria: children aged 9-17 years who have been diagnosed with thalassemia major by a doctor, are willing to become respondents, and are actively receiving transfusions at Banyumas Regional Hospital, as well as healthy children aged 9-17 years who are willing to become research participants. Exclusion criteria included pediatric patients who had other chronic systemic diseases other than thalassemia major, and who were not willing and/or did not have parental consent. This study was conducted in August 2022 after obtaining ethical approval from the Health Research Ethics Committee of

RSUD Banyumas no: 167/KEPK-RSUDBMS/V/2022.

The DMFT index was used to measure caries in this study. Every tooth element's radiographic image on a digital panoramic radiograph is examined in order to determine the DMF-t index. (Oteri et al., 2013). The DMF-t index is reported with the following information: D = Decayed, M = Missing, F = Filled. This study was conducted when restrictions on activities and oral examinations were still limited due to the Covid 19 pandemic, which influenced the consideration of caries measurement methods. Caries detection in this study was performed on digital panoramic radiographs (Fig.1) and clinical photographs of the oral cavity (Fig.2). Digital panoramic radiography was performed in the RSGMP Unsoed radiology laboratory, and respondents independently took clinical images of their dental cavities under the researchers' supervision. The use of radiographic images in caries detection has more accuracy, especially in the detection of interproximal caries. In addition, panoramic radiography is an extraoral radiograph that is suitable for examining the general condition of the teeth during the COVID-19 pandemic with a very low risk of exposure (Hervina, 2020). A decayed tooth is characterized by a radiolucent image with indistinct borders on radiographs indicating a decrease in the amount of minerals in the tooth. In contrast, in a filled tooth, the filling is seen as a more radiopaque image with a firm border on the tooth. The number of teeth with caries is counted to determine DMF-t (WHO, 2013).

The assessment of oral health-related quality of life in children with thalassemia major was conducted using the Indonesian version of the Child Oral Health Impact Profile - Short Form (COHIP SF 19) questionnaire. This questionnaire describes the situation in the last 3 months felt by children with thalassemia major. There are 5 items on the oral health subscale, 4 items on the functional well-being subscale, and 10 items on the socio-emotional subscale. There are 2 positive question items that are reverse scored. Each question is answered almost always, fairly often, sometimes, rarely, and never. Scoring for each

questionnaire item will be on a scale of 0-4 with total score of 76. The higher scores indicating better quality of life (S. Nuraini et al., 2021). The results of the data normality and homogeneity test showed that the OHRQoL score is normally distributed, so the data analysis used was independent t-tests. In contrast, the DMFT score is not normally distributed so the data analysis used is the Mann-Whitney test.

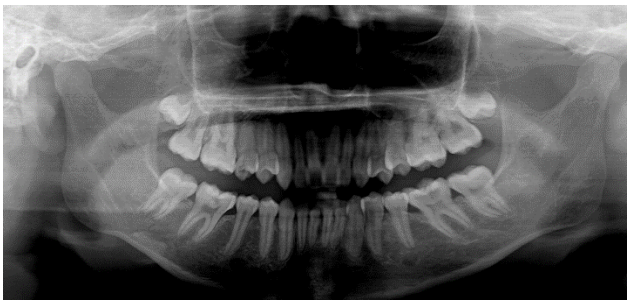

Figure 1. Digital panoramic radiograph samples of respondents

Figure 2. Sample clinical photos of respondents' oral cavity

RESULT

The characteristic of respondents were shown in Table 1.

Table 1. Characteristics of Respondents

Characteristics	Thalassemia Children n (%)	Healthy Children n (%)
Sex		
Boy	7 (41,1)	9 (40,9)
Girl	10 (58,9)	13 (59,1)
Age		
9-13 years old	9 (52,9)	11 (50)
14-17 years old	8 (47,1)	11 (50)

Description: n, number of respondents

Table 1 shows that the majority of respondents from both groups were female (58.9% and (59.1%), respectively). The age range of respondents from both groups was fairly balanced.

Independent t-test was used to determine the comparison of DMFT scores and oral health-related quality of life scores between thalassemia major and healthy children. The results of the bivariate analysis are shown in Table 2

Table 2. Comparison of caries and OHRQOL scores between groups

Variable	**Group**	**Mean ± SD**	**p**
deft/DMFT score	Thalassemia Children	2,64 ± 2,06	0,663
	Healthy children	2,23 ± 1,38	
OHRQoL score	Thalassemia Children	56,82 ± 10,35	0,974
	Healthy Children	56,73 ± 7,70	

Description: deft/DMFT, decayed, missed, filled tooth; OHRQoL, oral health related quality of life; SD, standard of deviation; p, significance at the level <0,05;

Table 2 shows that there is no significant difference between the deft/DMFT score in the thalassemia respondent group and the control group with a p value>0.05 (p=0.663). Similarly, the OHRQoL score between the thalassemia respondents

and the control group showed no significant difference (p=0.974).

DISCUSSION

This study was conducted to assess dental caries and oral health-related quality of life in thalassemia major children. Patients with thalassemia are at increased risk for dental caries due to poor oral hygiene, reduced salivary flow, frequent sugar intake, and neglected oral health. (Hattab, 2017) Blood transfusions in patients with beta thalassemia major can also lead to iron accumulation in the salivary glands, which can trigger the formation of non-cavitated carious lesions (P. Nuraini et al., 2022) . There are still inconsistencies in research findings regarding the relationship between caries and thalassemia. Therefore, in-depth research is needed to explain this condition(Arora et al., 2014). The results of this study showed that there was no difference between Deft/DMFT scores in the thalassemia and control groups. This is supported by previous studies that reported the same results (Moosazadeh et al., 2020; Shooriabi et al., 2016)

Dental caries in children with thalassemia can be explained by the fact that parents pay more attention to general physical health. Oral health care is provided only when there are dental complaints (Arora et al., 2014). Oral health is not a priority for children with disabilities or systemic diseases. No difference in mean DMFT scores can be attributed to differences in study sample size, age range, and method used to determine caries prevalence. Small sample size may negatively affect the reliability of survey results. The panoramic radiographs used in this study have weaknesses in thoroughly detecting caries (Kweon et al., 2018). Although panoramic radiographs can be used as an effective tool to diagnose oclussal caries with 100% specificity, the sensitivity in detecting proximal caries is still low (Bui et al., 2021)

Previous research states that dental caries is an oral manifestation that is commonly found in thalassemia patients and has an impact on oral health-related quality of life (Amirabadi et al., 2019; Fadel et al., 2020; Phrai-in et al., 2017). The results of this study indicate that there is no difference between the oral

health-related quality of life of thalassemia children and healthy children. This condition may occur because the caries rate is not too significant in both groups, which continuously affects the value of quality of life related to oral health. However, the oral health of children with disabilities such as thalassemia requires special attention. Parents of children with disabilities generally do not make oral health a priority due to lack of knowledge and awareness, focusing more on general health needs. Other factors may also be caused by the difficulty of the parents to access adequate dental health services and to be able to take care of the special needs of their children. Physical changes associated with thalassemia such as stunted growth may affect a child's confidence and self-esteem, which can impact their overall quality of life (Shafie et al., 2020). Untreated oral conditions in thalassemia children can lead to more serious problems and affect their quality of life.

Completing an oral health-related quality of life questionnaire provides a subjective picture of individual opinions about the impact of oral health on daily life. This often leads to social desirability or to respondents tending to answer inappropriate questions. Qualitative studies are needed to further explore this variable. Limitations of this study are: the method of measuring caries through panoramic radiographs and clinical photographs of the oral cavity is very limited and is feared to affect the validity of the data obtained, as well as the limitations of online data collection. The cross-sectional research design does not allow for in-depth analysis of the causal relationship between variables. This study did not control for other variables that affect oral health-related quality of life.

CONCLUSIONS

This study concluded that there was no significant difference in the average caries scores of children with thalassemia major compared to healthy children. Furthermore, there is no difference in oral health-related quality of life between thalassemia major children and healthy children based on the results of this study. Nevertheless, there is a need for improvement in the prevention and

promotion of oral health in children with thalassemia. It is intended that oral health will continue to be one of the health priorities that will receive special attention. Otherwise, the quality of life of children with thalassemia may be severely compromised.

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