Majalah Kedokteran Gigi Indonesia
Vol 7 No 3 – December 2021
ISSN 2460-0164 (print), ISSN 2442-2576 (online)
Available online at https://jurnal.ugm.ac.id/mkgi
DOI: http://doi.org/10.22146/majkedgiind.60834

RESEARCH ARTICLE

Dental caries and family expenditures as determinants of oral health-related quality of life in children, in Gamping, Sleman, and Yogyakarta

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ABSTRACT

Inadequate oral health conditions would prevent children from participating in normal activities, which in turn would lead to changes in the children's development and well-being. The aim of the study was to know whether dental caries and family expenditure are associated with quality of life related to dental and oral health among children aged 10–12 years. This study was conducted using observational quantitative with cross-sectional design. The research respondents were 126 students (n= 126) aged 10–12 years who were attending elementary school in Gamping Subdistrict, Sleman Regency, Yogyakarta. The respondents were selected based on proportional random sampling by applying inclusion and exclusion criteria. Quality of life related to dental and oral health assessment was done using CPQ11-12 ISF-16 version regarding their dental caries status (DMF-T) and family expenditure. The results of this study, based on Pearson's correlation analysis showed that dental caries status and family expenditure were significantly correlated with quality of life related to dental and oral health ($p = 0.013$ and $p = 0.001$). The findings of multiple regression analysis suggested significant effects of family expenditures and caries status on quality of life related to dental and oral health ($p = 0.001$ and $p = 0.037$) and $R^2 = 0.161$. Lower dental caries was associated with better quality of life related to dental and oral health. Higher family expenditure was associated with better quality of life related to dental and oral health. Dental caries status and family expenditure contributed to 16.1% of quality of life related to dental and oral health.

Keywords: dental caries; family expenditure; quality of life related to dental and oral health

INTRODUCTION

The quality of life in relation to oral health is an indicator to assess the condition of oral health and its effect on daily life.[1] While oral health has improved in developed countries, countless number of children (nearly 80%) in developing countries are suffering from oral diseases[2] with dental caries as the most common problem in children's oral health.[3]

Poor oral health conditions lead to dental caries which cause toothache, while sensitive teeth also have a major impact on the quality of life of children in developing countries.[4] Family expenditure is one indicator that can provide an overview of socio-economic conditions, which affects the ability to meet the needs, including in the health sector.[5] Children from low income families have a low quality of life and also poor dental health.[6] Children aged 10-12 years is at the critical age when physiologically primary teeth will be replaced with permanent teeth which marks the end of puberty, during which the last permanent teeth will grow, except for the last molars. The growth and development of school-age children is strongly influenced by stimuli. Thus, a child can develop to a level of intelligence due to various factors, one of which is the continuous stimulation of the environment.[7]

This research was conducted in Gamping Sub-District because the rapid development of the area may affect the children living there. The sub-district is included as a mixed area inhabited by children of urban and rural population with their respective characteristics.

The research objective was to determine the effect of dental caries status and family expenditure

on oral health related to quality of life (OHRQoL) in children aged 10-12 years. This study contributes to the improvement of quality of life related to oral health by removing barriers and strengthening the enabling factors to prevent carries.

MATERIALS AND METHODS

This research used a quantitative observational method with a cross-sectional design. The population of this research were children aged 10-12 years in elementary schools located in the Gamping Sub-District, Sleman District, Yogyakarta. This research was conducted in elementary schools throughout Gamping Sub-District, Sleman District, Yogyakarta between February and March, 2020. The research sample consisted of 126 children as respondents who met the inclusion and exclusion criteria. The respondents were selected through Proportional Random Sampling. This research had been approved by the Ethical Commission Board of the Faculty of Dentistry, Universitas Gadjah Mada with the issuance of Ethical Clearance No. 00361/KKEP/FKG-UGM/EC/2020 and had received permission from the Sleman District Education Office, Yogyakarta. The independent variables in this research were dental caries status measured using the Decay Missing Filled Tooth (DMF-T) measurement tool and family expenses measured using the respondent's identity sheet. The dependent variable was quality of life related to oral health which was measured by the CPQ11-14 ISF16 Version questionnaire.

The validity and reliability tests were carried out on children aged 10-12 years at public primary school Gamping located in Gamping Sub-District, Sleman District, with 30 respondents. The results of the questionnaire validity test showed that 12 items of quality-of-life statements related to oral health were valid (r between 0, 393-0.752) and reliable (Cronbach α = 0.829). Data were analyzed using Pearson correlation analysis because the data were normally distributed and appropriate for the association between independent variables and the dependent variable. This research also used multiple regression analysis to see the adjusted effects of the independent variables on the dependent variable.

RESULTS

Table 1 showed that 33.30% respondents who had a low quality of life due to dental and oral health problems were mostly having dental caries status with high and very low criteria. 61.30% respondents who had a high quality of life in terms of oral health mostly had a very low percentage of dental caries.

Table 2 showed that the majority of respondents with family expenditures in the low and high categories had a high quality of life related to oral health. 3 respondents (2.40%) with low expenditures had low quality of life related to oral health. Likewise, 3 respondents (2.40%) with high expenditure categories had low quality of life in terms of oral health.

Table 3 showed the significant correlation coefficient between dental caries status and quality of life associated with positive oral health. In other words, the higher the dental caries status, the higher the CPQ_{11-14} score or the less quality of life associated with oral health ($r = 0.220$; $p = 0.013$). The correlation coefficient of family expenditure and quality of life related to oral health was negative, meaning that the lower family expenditure, the higher the CPQ_{11-14} score or the less quality of life associated with children's oral health ($r = - 0.362$; $p = 0.000$).

Table 4 showed that the dental caries status and family expenditure variables had a significant influence on quality of life related to oral health ($B = 0.971$ and $p = 0.037$) and ($B = -1.8256$ and $p = 0.001$). One unit increase of dental caries status was associated with 0.971 increase of OHRQol suggesting worse quality of life. On the other hand, one unit increase (rupiah) of family expenditure was related to 1.8×10^{-6} decrease in OHRQol. Higher OHRQol score means lower quality of life. It was concluded that the independent variables of dental caries status and family expenditure had a significant association with the quality of life related to children's oral health ($p < 0.05$).

Majalah Kedokteran Gigi Indonesia. December 2021; 7(3): 132 – 136
ISSN 2460-0164 (print)
ISSN 2442-2576 (online)

Table 1. Distribution of respondents based on dental caries status and quality of life related to oral health in children aged 10-12 years (n = 126)

Dental caries status	Quality of life related to oral health					
	Low		Moderate		High	
	(f)	%	(f)	%	(f)	%
Very Low (0-1.1)	2	33.30	14	51.90	57	61.30
Low (1.2 – 2.6)	1	16.70	5	18.50	17	18.30
Medium (2.7 – 4.4)	1	16.70	5	18.50	13	14.00
High (4.5 - 6.5)	2	33.30	3	11.10	6	6.50
Very High (> 6.5)	0	0.00	0	0.00	0	0.00

Table 2. Distribution of respondents based on family expenditures and quality of life related to oral health in children aged 10-12 years (n = 126)

Family expenditure	Quality of life related to oral health					
	Low		Moderate		High	
	(f)	%	(f)	%	(f)	%
Low	3	2.40	12	9.50	20	15.90
High	3	2.40	15	11.90	73	57.90
Average	Rp. 1,333,333		Rp. 1,698,148		Rp. 2,656,989	

Table 3. Bivariate correlation between OHRQol and independent variables (n = 126)

Independent variable	Correlation (r)	P
Dental Caries Status	0.220	0.013
Family Expenditure	-0.362	0.001

Table 4. Multiple regression of OHRQoL on dental caries status and family expenditure (n = 126)

Independent variable	Regression coefficient B	t Count	(p)	F Count	(p)
				Anova	Anova
(Constant)	13.604	8.504	0.001	11.800	0.001
Dental caries status	0.971	2.104	0.037		
Family expenditure	-1.825E-6	-4.062	0.001		

R = 0.401
R^2 = 0.161

DISCUSSION

The regression analysis found that dental caries status had a positive and significant effect on oral health related to quality of life of children. Dental caries status is also the most dominant factor influencing the oral health related to quality of life. The results of this study were in accordance to the study in China, indicating that dental caries had a negative impact on the quality of life related to children's oral health.[8] The factor that mainly affected the children's quality of life was dental caries lesions, especially if it was not treated.[9]

Dental caries had a negative impact on OHRQoL and children suffering from dental caries can experience more severe toothaches, so that they had difficulty in chewing food, worrying about toothache and missing the learning process at school. This could lead to perceptions of poor health and overall poor quality of life in elementary school children.[10]

The regression analysis suggested that the higher the dental caries status score, the higher the CPQ11-14 score or the less quality of life associated with children's oral health. Severe caries could affect the children's quality of life, particularly in activities such as eating, sleeping, talking and socializing.[11] Poor oral health, such as caries will affect a person physically, psychologically, and how they enjoy life, appearance, speech and social life.[12]

The results of this analysis might also occur with more than one permanent tooth caries, causing pain, interfering with chewing, thus reducing the quality of life of children. Pain condition caused by the inflammatory process in dental caries causes discomfort, limits chewing function, and leads to psychological disturbances. The dental caries status was mostly found in the first molars, remaining roots of the teeth, and the presence of an open pulp, which could disrupt the chewing function.[13] Dental caries occurred mostly in school-age children, which mostly had the permanent first molars, even as much as 70% must be extracted.[14]

The multiple regression analysis found that there were different quality of life in terms of children's oral health between high and low family expenditure. The results of this research concluded that family expenditure had an effect on quality of life related to children's oral health. The results of this research might be caused by other influential factors, including family income. Family income affected a person's purchasing power. Thus, those with a larger income are better able to buy various food sources.[15] Low family expenditure caused a decrease in the quality of life of children related to oral health.[16]

Family income could affect the amount of non-food expenses, such as education costs and medical expenses. Inadequate family income caused less fulfilled provision of health facilities, which served as limitations in fulfilling access to dental health services and meeting the need for the prevention of dental diseases.[9] Children of high-income families usually showed better dental health, better habits, and better access to preventive and dental care to access health services.[17] The results of this research were different from those found by other studies, which did not report the association between socio-economic conditions and the quality of life of children. These studies indicated that the average household consumption expenditure and the number of children living at home had no direct correlation with children's quality of life.[18,19]

CONCLUSION

The dental caries status and family expenditure have an influence on the quality of life related to oral health. The lower the level of dental caries, the better the quality of life in relation to oral health and the greater the family expenditure, and thus the better the quality of life in relation to oral health. The variables of dental caries status and family expenditure have an effect of 16.1% on the quality of life related to oral and dental health. Family expenditure has a greater influence on quality of life associated with oral health.

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