JOURNAL Of Medical Science And Clinical Research
IGM Publication   An Official Publication Of IGM Publication

Factors Related to Dental Caries on Elementary School Students in Badung Regency – Indonesia

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Abstract
Caries, dental and oral disease affects 90% of school-age children. Badung regency occupied fourth position of the populations with dental problem in past 12 months. The data shows only 3.6% of Badung population who behaved properly in brushing. Badung regency economically has the highest local revenues in Bali. The objective of this research is to understand the factors associated with dental caries in primary school students in Badung. This research type is quantitative- qualitative, conducted from July to September 2016. The sample was 252 students, selected by multistage random sampling. The result showed 71% of students belong to very high, high, and moderate caries; 64.8% of students belongs to low sosio-economic category and 89.7% of students need guidance in brushing. The results show there is no relationship between the variables of socio-economic category with a classification of dental caries proven by sig value results in 0.552. There is a relationship between variables of behavior criteria in brushing with dental caries classification with sig. value of 0.000. There is a relationship between school dental health (UKGS) with the classification of dental caries with sig. value of 0.001. Multivariate analysis shows sub variable UKGS category 1 and sub variable category 2 are associated with dental caries.
Keywords: Behaviour, children, dental caries, factors; related.

Introduction

The degree of health of a person or community is influenced by four factors: environment, attitudes, hereditary, and health care[1]. There are three factors affecting one's behaviour, predisposition factors, supporting factors, and reinforcing factors[2]. Oral health is a fundamental part of general health and welfare of life. Oral health disorder will have an impact on one's performance.[3]

Dental caries is a dental and oral disease that is widely suffered by 90% of school-age children. Caries is also the cause of primary pathology of decayed tooth that occur due to the lack of child care and parental knowledge[4]. Parents need to observe and regularly record changes occurring at the child's oral cavity in anticipation of early dental disorders and abnormalities, such as dental caries.[5]

The average caries experience (DMF-T) of 12 years old children ranged from 2.4. The DMF-T index according to WHO for school-age children up to 12 years is ≤ 3[6]. School-age children are one of the groups that are vulnerable to caries, as they generally still have a lack of knowledge and behavior that is lacking in dental caries.

There has been an increase in the prevalence of active dental caries in Indonesian population compared to 2007 years ago, namely from 43.4 in

2007 to 53.2% in 2013. More than 93 million Indonesian people suffer from active caries. People with dental and oral problems in past 12 months in Badung

Regency is at the top four in the province of Bali, which is 31.6%[7]. Plaque that is firmly attached to the surface of the tooth and gums may cause disease in the hard tooth tissue and its supporting tissues[8].

Riskesdas Data 2013 shows the percentage of the population aged 10 and above who brush their teeth every day in Badung Regency was 94.2% and only 3.6% that behaved properly in brushing [7].Parents ' participation is indispensable in guiding, caring, understanding, reminding, and providing facilities for children to keep their teeth clean [9]

Parents have an enormous influence on child behavior, as parents are the first figure to their children. Parents are obligated to give and teach positive things as well as compassion. [9]

Dental health services in Health Centre (Puskesmas) can be implemented in and outside the building such as School Dental Health (UKGS) and in Posyandu (Integrated Health Post)[10]. School Dental Health consists of three stages, namely UKGS phase I, UKGS phase II, and UKGS phase III[11].

Badung Regency has the largest economic scale in Bali, in terms of regional revenues and expenditure (APBD). This can be understood because the Badung Regency has the famous tourist destinations[12]. The revenue distribution of Bali province in 2013 shows 40% middle-ranking society covers 15.12% of Badung Regency. Badung Regency is second population with low income after the city of Denpasar [13].

Furthermore, the problem can be formulated with "What is the relation of factors with dental caries in elementary school students in Badung Regency in 2016?"

The purpose is to understand the factors related to dental caries of elementary school students in Badung Regency in 2016.

Method

This research uses quantitative and qualitative method. The research took place in elementary schools (SD) class six, in six sub-districts in Badung Regency, namely: SDN 3 Kuta; SDN 11 Jimbaran; SDN 1 Kerobokan; SDN 1 Pangsan; SDN 2 medium; SDN 3 Sempidi. Data collection and information was done from July to September 2016. The research population is all elementary school students and their parents in Badung Regency. Large sample research is taken with a large formula of cross sectional study[14]. In this study the number of samples was reproduced, taken 42 students in each SD, so the total number of 252 students and 252 parents, taken with multistage random sampling. The FGD informant was from the representatives of the parents, each of the elementary school parents (mothers) of students are ten in number. The in-depth interview informant was a teacher in each of the elected primary schools. Dental caries data is measured by direct examination, tooth brushing with interview and observation, socio-economics using questionnaire, UKGS with interview. While the perception of parents and teachers about dental caries was acquired through FGD and in-depth interview.

Quantitative data analysis was done using univariate, frequency and percentage. Bivariate analysis with cross-tabulation and correlation test Spearmen in multivariate analyses used multi-regression logistics. Qualitative information obtained was used to complement quantitative discussions.

Result and Discussion

School-age children are one of the groups vulnerable to caries, as they still have less knowledge and behaviour against dental caries [15]. Table 1 shows the frequency distribution of students based on caries they suffer from.

Table 1 Student frequency distribution based on dental caries classification

Classification of Dental Caries	f (%)
Very high	74 (29,4)
high	53 (21,0)
moderate	52 (20,6)
low	20 (7,9)
Very low	53 (21,0)
Total	252(100)

Table 2 shows 164 students (64.8%) included in the low socioeconomic category (average income under Rp. 1,500,000.- / month) and moderate (average income from Rp

Rp 1,500,000. - to Rp. 2,500,000.- / month), the remaining 34.9% is categorized as high and very high socioeconomic. Based on this data it can be said that most students are poor families. The most influential factor on health according to [1] is the environment. Within these environmental factors, the economy is a part of it. The environment, including socioeconomic, has the greatest role in health. Many studies show that the prevalence of caries is higher in children who come from low socioeconomic status.

Table 2 Frequency distribution by socio-economic category

Socio-economic category	f (%)
Low	51 (20,0)
Moderate	113 (44,8)
High	56 (22,2)
Very high	32 (12,7)
Total	252(100)

Table 3 shows 226 students (89.7%) need guidance in brushing their teeth. Only 2 students had excellent tooth brushing behaviour and 3 students had good tooth brushing behavior. This data is in accordance with the results of Basic Health Research in 2013[7], where in the population in Badung Regency 94.2% brushed teeth every day, but only 3.6% behaved correctly in brushing.

Table 3 Frequency distribution by socio-economic category

No.	Age Group	Intervention Group		Sample Control Group		Total	
		f	%	f	%	f	%
1.	8	64	51.6	60	48,4	124	50
2.	8,5	1	8	-	-	1	0,4
3.	9	53	42.7	63	50,8	116	46.8
4.	10	6	4,9	1	0.8	7	2.8
	Total	124	100	124	100	248	100

All informants said that if a tooth has a cavity, it must be treated immediately, that is, it is patched to the dentist, not to cause pain / swelling. But if it cannot be treated it should be removed and made denture.

The role of parents, especially a mother in maintaining dental health is very important in underlying the formation of behaviors that support children's dental hygiene so that children's dental health can be maintained properly [16].

Most of the informants said that they should remind their children to brush their teeth. A small number of informants said not always, some informants even said that it was rare and

some said that they did not remind again with the reason that they were bored, because as if the words of their parents were ignored, the children preferred to play mobile phones / games rather than being told to brush their teeth. But actually, all the informants agreed that parents should not be bored and must continue to remind their children to brush their teeth until the child has a habit of being independent in brushing teeth.

The study found inactive UKGS in SDN 1 Pangsan, SDN 3 Sempidi in UKGS Phase I, and four other SDNs namely: SDN 11 Jimbaran, SDN 3 Kuta, SDN 1 Kerobokan, and SDN 2 Sedang, the UKGS was less active. The results of this study are similar to the conclusions of a study conducted by[17] which stated that the UKGS program in the Polonia Puskesmas's work area was not maximal. Dental health services can be carried out in or outside Puskesmas such as the School Dental Health Efforts (UKGS) at schools and at Posyandu. Puskesmas have an important role in the implementation of the UKGS program[11].

The implementation of the UKGS involved a number of staff, from Puskesmas namely dentists and dental nurses, while the implementers from the schools were health sports teachers. The attitude of the health sports teacher towards the UKGS program is very influential on the changes in students' attitudes to oral health and the success of this program[10].

The cross table between the socioeconomic categories and the classification of dental caries

presented in table 4, does not show a certain trend. Table 4 shows the spearman correlation test between socioeconomic categories of variables with the classification of dental caries with the result of sig. 0.552. A sig value> 0.05 means that there is no relationship between socioeconomic categories of

variables and dental caries classification. There is no influence on the socioeconomic level of parents on dental caries of children[18]. Besides, no significant relationship significant from the proportion of the caries status of the respondent with the income of the respondent's parents[19].

Table 4 Cross tabulation of socio-economic category with dental caries classification

Classification of dental caries	Socio-economic category				Total (%)
	Low n(%)	Moderate n(%)	High n(%)	Very High n(%)	
Very high	14 (19,0)	32 (43,2)	18 (24,3)	10 (13,5)	74 (100)
high	11 (20,8)	29 (54,7)	10 (18,9)	3 (5,6)	53 (100)
moderate	15 (28,8)	22 (42,3)	7 (13,5)	8 (15,4)	52 (100)
low	2 (10)	7 (35)	6 (30)	5 (25)	20 (100)
Very low	9 (17,0)	23 (43,4)	15 (28,3)	6 (12,7)	53 (100)
Total	51 (20,3)	113 (44,8)	56 (22,2)	32 (12,7)	252 (100)

The cross tabulation between the criteria for tooth brushing behavior with the classification of dental caries presented in Table 5, shows the tendency of the better behavior, the lower the caries. This is proven by the Spearman correlation test between the behavioral brushing criterion variables with the

classification of dental caries with the result of sig. 0,000 and the correlation coefficient (r) 0.203. Sig value <0.05 means that there is a relationship between the variable brushing behavior criteria with the classification of dental caries with a weak relationship strength.

Table 5 Cross tabulation criteria with dental caries classification

Classification of dental caries	Socio-economic category				Total (%)
	Need guidance n(%)	Moderately n(%)	Good n(%)	Very good n(%)	
Very high	**73 (98,6)**	1 (1,4)	0 (0)	0 (0)	74 (100)
high	49 (92,5)	4 (7,5)	0 (0)	0 (0)	53 (100)
moderate	43 (82,7)	6 (11,5)	2 (3,8)	1 (1,9)	52 (100)
low	16 (80)	3 (15)	1 (5)	0 (0)	20 (100)
Very low	45 (89,9)	7 (13,2)	0 (0)	1 (1,9)	53 (100)
Total	226 (89,7)	21 (8,3)	3 (1,2)	2 (0,8)	252 (100)

The conclusions of (Anitasari and Rahayu)[18] states that there is a correlation between the frequency of tooth brushing and the level of dental and oral hygiene. Table 6 shows the better implementation of the UKGS, the higher the caries rate. Spearmen correlation test between UKGS category variables and dental caries classification obtained sig. 0.001 and the correlation coefficient (r) -0.252. This means that there is a

relationship between the two variables with the strength of the weak relationship in the opposite direction. The results of this study are different from the results of research conducted previously where students in primary schools who did not carry out UKGS program have a higher risk of caries exposure compared to students in primary schools who receive the UKGS program[20].

Table 6 Cross tabulation category UKGS with dental caries classification

Classification of dental caries	UKGS category			Total (%)
	No UKGS n(%)	UKGS Inactive n(%)	UKGS Phase I n(%)	
Very high	7 (9,5)	47 (63,5)	**20 (27,0)**	74 (100)
High	10 (18,8)	31 (58,5)	12 (22,7)	53 (100)
Moderate	9 (17,3)	34 (65,4)	9 (17,3)	52 (100)
Low	3 (15)	17 (85)	0 (0)	20 (100)
Very low	**13 (24,5)**	39 (73,6)	1 (1,9)	53 (100)
Total	42 (16,6)	168 (66,8)	42 (16,6)	252 (100)

Table 7 shows SDN 3 Sempidi (UKGS Phase I category) having the most students who need guidance on brushing and none of their students behave well and very well. This factor may have contributed to the high caries in SDN 3 Sempidi. Though they are in the UKGS Phase I category, their teeth brushing behaviour is bad. Unlike the case with SDN 1 Pangsan, although in SDN 1 Pangsan there was no UKGS, but his teeth-brushing behaviour was generally the best, there were found two students with excellent tooth-brushing behaviour. In (Suryani)[20] shows that the scope of UKGS program had not met the target. The supervision and control of UKGS program does not yet have clear indicators. Supervision is only carried out by a small proportion of Puskesmas. Lack of guidance and supervision at the level of district and unclear UKGS structure at the provincial level. This is also possible in Badung District, which has an impact on outputs that are not as expected.

In addition, caries etiology is very much, not only from UKGS program. The internal factors are directly related, consisting of four factors, namely the host (teeth and saliva), the causative agent of the disease (microorganisms in plaque), the substrate (carbohydrate), and the time. External factors include factors such as age, ethnicity, culture, social population, awareness, attitudes, and behaviour of individuals towards dental health.

Table 7 Elementary tabulation with dental behaviour

Elementary School	Dental Brushing Behavior				Total
	Need guidance.	Moderate	Good	Very good	
SDN 11 Jinbaran	39	3	0	0	42
SDN 3 Kuta	37	5	0	0	42
SDN 1 Kerobokan	39	3	0	0	42
SDN 3 Sempidi	41	1	0	0	42
SDN 2 Sedang	37	4	1	0	42
SDN 1 Pangsan	33	5	2	2	42

Table 8 shows logistic regression multivariate test results of UKGS variable and tooth brushing behavior variable that were simultaneously tested with dental caries variable, showing the results of the UKGS sub variable category 1 (UKGS not active / no UKGS) (sig. 0.001) and the UKGS sub variable category 2 (UKGS less active / there is a UKGS but not Phase I) (sig. 0,000). The results of this test can be interpreted if the UKGS variable and the variable brushing behaviour are simultaneously tested with dental caries variable, then UKGS sub variable category 1 (UKGS is inactive / no UKGS) and the UKGS sub variable category 2 (UKGS is less active / there is UKGS but not Phase I) associated with dental caries. This can be understood even though SDN 3 Sempidi is included in the UKGS category 3 (UKGS Phase I), but because almost all respondents way of brushing still need guidance and other factors not examined in this study, which may be a cause of high caries in SDN 3 Sempidi So that in this study UKGS seems not useful in preventing dental caries.

Table 8 Test results Multivariate Logistic regression

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Loc	[ukgs=1]	1.409	.415	11.538	1	**.001**	.596	2.222
	[ukgs=2]	1.161	.327	12.607	1	**.000**	.520	1.802
	[ukgs=3]	0(a)	.	.	0	.	.	.
	[brus =1]	-1.257	1.370	.842	1	.359	-3.941	1.428
	[brus =2]	-.229	1.415	.026	1	.872	-3.002	2.545
	[brus =3]	-.743	1.692	.193	1	.661	-4.060	2.575
	[brus =4]	0(a)	.	.	0	.	.	.

Conclusions

Most students of SDN in Badung Regency have dental caries with classification of high and very high caries. They come from moderate and low socio-economics and need guidance of brushing their teeth. Most of the UKGS at SDN in Badung Regency are inactive categories. Regarding socie-economic and dental caries on students at SDN Kabupaten Badung, there is no relation between those variables but there is a relationship between brushing and dental caries on students at SDN Kabupaten Badung as well as there is a relationship between UKGS and dental caries on students at SDN Kabupaten Badung. Either inactive or less active UKGS, they have relation to dental caries on students at SDN Kabupaten Badung. Qualitative study concluded that parents of students and sports teachers have a good knowledge and attitude about dental caries.

Acknowledgement

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