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Factors For Determining Dental Anxiety Level in Elementary School Children with Tooth Extraction: A Cross-Sectional Study

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ABSTRACT Anxiety in the action of tooth extraction is often caused by the use of sharp objects that are carried out gradually into the oral cavity. Anxiety of dental medical personnel can be the main cause decline dental and oral health. The problem in this study is dental anxiety about tooth extraction in children at SDN Pekarungan Kec. Sukodono, from the results of initial data collection, it was found that 40% had low and moderate anxiety. This study aims to determine the effect of factors for determining dental anxiety in elementary school children with tooth extraction. Methods: The type of research used is analytic cross sectional with purposive sampling technique, the total population is 416 students and the sample obtained is 87 respondents using the cross-sectional formula. Data analysis using chi-square test and ordinal regression analysis. The result of the study there are two factors that influence dental anxiety on tooth extraction using chi-square test, namely gender (p=0.035) and parents education (p=0.001) and there is the most influential factor using logistic regression analysis test, namely parents education (p=0.001) with an odds ratio value (9.31). In conclusion, most of the respondents experienced moderate anxiety and the influencing factors were gender and parent's education. The benefit of this research is to provide input for health workers, especially dentists and dental nurses, in providing good dental and oral health care efforts by paying attention to the level of anxiety in pediatric patients who will have their teeth extracted.

INDEX TERMS Characteristics Factors, Child Tooth Extraction, Dental Anxiety Level

I. INTRODUCTION

According to the World Health Organization (WHO), oral health is the most important component of overall health, well-being and quality of life. Oral health means being free from a wide range of diseases including dental caries, periodontal (gum) disease, tooth loss, oral cancer and other diseases, so that disturbances can occur that limit biting, chewing, smiling, and speaking [1]. Most children experience dental caries in their early childhood. Pain and fear due to dental caries and the treatment that will be given do not make a child seek preventive and curative treatment from an early age [2].

Tooth extraction treatment is one of the treatment actions carried out by dental medical personnel. Tooth extraction is a surgical procedure that involves bone tissue and soft tissue in the oral cavity. Tooth extraction is mostly done because of dental caries, not only that it can be caused by periodontal disease (gums), impaction of teeth, teeth that cannot be preserved, and tooth extraction can be done on healthy teeth with the intention of correcting tooth structure and when performing orthodontic treatment. or prosthodontics. Tooth extraction, known as the five scariest procedures in dental practice. Patients are more worried about tooth extraction than feeling pain or feeling helpless [3][4].

Anxiety in children can be seen from normal or natural emotional reactions because the situation they face is a new thing, initially marked by worry [5]. This anxiety is an obstacle for dental medical personnel in their efforts to provide dental and oral health services. In patients who have never experienced tooth extraction treatment, anxiety arises due to several factors, including hearing from other people's experiences and lack of knowledge about the treatment that will be carried out on patients who have never had a tooth extracted [6].

Children generally experience anxiety when it comes to dental treatment. Dental anxiety is usually characterized by stimulus that occur in the dental care room [7]. Anxiety in tooth extraction is often caused by the use of sharp objects such as needles, elevators (bein) and forceps, which are carried out gradually into the oral cavity. Anxiety and fear of dental medical personnel can also be the main cause of declining dental and oral health. Serious problems can cause feelings of anxiety that make patients unable to cooperate properly so that it hampers the performance of dental medical personnel in carrying out tooth extraction [8]. Handling a child's level of anxiety is more complicated than that of an adult. The appearance of the dentist, the clinic environment, and the instruments make children feel more anxious. Behaviors shown when experiencing anxiety include crying, screaming, and avoiding dental care [9].

The prevalence of dental anxiety from the entire populations in children and adolescents reaches 5.7% to 20.2% and factors such as age, sex, cultural context, socioeconomic status, presence of dental caries, parents education, history of toothache and previous dental treatments seem to be associated with dental anxiety occurrence [10][11].

Research conducted by Vinod et al [12], it was found that 63.24% of girls felt anxious about dental treatment compared to 55.42% of boys. Research conducted by Hamudeng [13], that based on gender, there were differences in anxiety levels between boys and girls, girls were significantly more anxious than boys. The cause of children experiencing anxiety is the pain they feel when they are going to be injected with local anesthetics and when they see the tools used in the dentist's office.

Research conducted by Armfield et al [14], that the prevalence of dental anxiety in the population in Australia is 11.9%, equivalent to two and a half million Australians suffering from toothache and experiencing high anxiety, so this can have a negative impact on dental and oral health and be a challenge for dental hygienist in carrying out treatment. For this reason, a study was conducted to analyze the effect factors for determining dental anxiety level in the act of tooth extracting in children's at SDN Pekarungan, Kec. Sukodono. The topic of anxiety during dental treatment, especially tooth extraction treatment requires further research to minimize the impact of dental anomalies that occur at an early age.

The results of the initial data collection on September 25, 2021 at SDN Pekarungan Kec. Sukodono found 15 respondents, of whom 6 children experienced low anxiety as much as 40%, 6 children experienced moderate anxiety as much as 40% and 3 children experienced high anxiety as much as 20%. Based on the description above, it can be concluded that if there are several children who experience dental anxiety, especially in the act of tooth extraction, the problem in this study is the existence of dental anxiety in the act of extracting children's teeth at SDN Pekarungan Kec. Sukodono.

This study aims to determine the effect of characteristic factors to dental anxiety level in the action of a children tooth extraction at SDN Pekarungan, Kec. Sukodono. This study was conducted in order to find out what factors cause dental anxiety in children and to facilitate dental medical personnel (dentists & dental nurses) to be able to provide treatment to pediatric patients and have an understanding of the development of fear and anxiety related to age, treatment at the first visit, and approach during treatment.

II. METHODHOLOGY

The research method used is analytic research with cross sectional method. The research was conducted in January 2022 at SDN Pekarungan Kec. Sukodono which is located on Jl. Diponegoro No. 34 Sukodono, Karangnongko, Pekarungan, Sukodono District, Sidoarjo City, East Java.

The population in this study were all children who attended SDN Pekarungan Kec. Sukodono as many as 416 children. The size of the sample is determined by the cross-sectional research sample formula with the desired level of confidence or accuracy (0.1) so that the number of samples was 78 respondents with purposive sampling technique, namely the sampling technique by selecting a sample among the population according to the researcher's considerations, so that the sample can represent previously known population characteristics. The inclusion criteria are the children of SDN Pekarungan Kec. Sukodono, aged 8-12 years, has had his primary tooth extracted in a health service and is willing to be a research respondent and the exclusion criteria is that he has never had his primary tooth extracted in a health service. There are four variables used, namely the dependent variable is the level of dental anxiety (tooth extraction) and the independent variables is age, gender, and parents education.

The data collection method used in this study used a checklist sheet that was used to identify (select) respondents who had or never had their primary teeth extracted in health services and used a Modified Dental Anxiety Scales Faces (MCDAS-f) questionnaire which was modified and tested for validity and reliability containing questions aimed at revealing indicators of dental anxiety (tooth extraction). The questions in this questionnaire are 10 questions and each item is given a score of 1-5, a score of 5 for the answer is “very worried”, a score of 4 is for the answer to “worried a lot”, a score of 3 is for the answer is “fairly worried”, a score of 2 is for the answer is “very slightly worried”, and a score of 1 for a “not worried” answer [15] [16]. To determine the level of dental anxiety, the researchers used the following mean and standard deviations: low anxiety (score >13), moderate anxiety (score 13-24), and high anxiety (score 25).

The procedure for this research is that each respondent who meets the inclusion criteria will be given a questionnaire sheet to fill in the answers according to the actual situation, there are 5 answer options if you answer " not worried " it means you don't feel tension, if you answer "very slightly worried" it means you feel a little tense, if you answer "fairly worried”, it means your hands are sweaty, if you answer "worried a lot" it means you feel the urge to urinate continuously, can't sit still in the dental unit (dental chair),

and if you answer "very worried" it means crying or canceling the extraction tooth. After the respondent has filled out the questionnaire, the next step is to add up each respondent's answers to determine which category of dental anxiety each respondent belongs to. After the data is collected, the next process is data processing and data analysis.

Data analysis in this study used the following techniques: 1. Univariate (descriptive) analysis to describe the characteristics of research subjects and research variables, 2. Bivariate analysis to determine the factors that influence the dental anxiety level in the action of a children tooth extraction at SDN Pekarungan Kec. Sukodono. The statistical test used at this stage is the chi-square test to determine the effect of gender, age, parents education on the dental anxiety level variable (tooth extraction), 3. The multivariate analysis used in this study was ordinal logistic regression analysis with the aim of looking at the factors that most influence the dental anxiety level in the action of a chidren tooth extraction at SDN Pekarungan Kec. Sukodono. The measure used to assess the most influential factor is the standardized coefficient value and the Odds Ratio (OR) value. With the statistical test with a confidence level of (0.05). If the significant value of $p < (0.05)$ then H_1 is accepted and H_o is rejected. The research hypothesis is as follows:

H_o : There is no effect of characteristic factors on the level of dental anxiety in the act of extracting children's teeth at SDN Pekarungan, Kec. Sukodono.

H_1 : There is an effect of characteristic factors on the level of dental anxiety in the act of extracting children's teeth at SDN Pekarungan, Kec. Sukodono.

III. RESULTS

Based on the results of the study, the characteristics of the respondents are known as follows. Based on TABLE 1, it is known that the research subjects amounted to 87 respondents. Most of the respondents are dominated by girls. Based on age group, the majority of respondents in this study were aged 10-12 years (62.1%) followed by ages 8-9 years (37.9%). Based on grade level, it is known that most of the respondents who have had their teeth extracted are grade 6 students (33.3%).

TABLE 1
Frequency Distribution of Respondents Characteristics

Characteristics	Frequency	Percentage
Gender		
- Boys	37	42,5%
- Girls	50	57,5%
Age		
- 8-9 years	33	37,9%
- 10-12 years	54	62,1%
Class		
- Grade 3	13	15%
- Grade 4	20	23%
- Grade 5	25	28,7%
- Grade 6	29	33,3%
Primary tooth extraction visit		
- 1	23	26,4%
- ≥1	64	73,6%
Parents Education		
- Basic education (Primary School-Junior High School)	50	57,5%
- Secondary and Higher education (Senior High School-College)	37	42,5%

TABLE 2
Frequency Distribution of Respondents Dental Anxiety Level Category

No.	Dental Anxiety Level	Frequency	Percentage
1.	Low anxiety	10	11,5%
2.	Moderate anxiety	63	72,4%
3.	High anxiety	14	16,1%
	Total	87	100%

TABLE 3
Distribution of Respondents' Anxiety Frequency related to Anxiety Thoughts when Tooth Extraction will be Performed

Statements	Answers										N
	Not Worried		Very Slightly Worried		Fairly Worried		Worried a Lot		Very Worried		
	F	%	F	%	F	%	F	%	F	%	
I feel anxious the next day when I go to the dental clinic for a tooth extraction.	37	42,5	40	46	8	9,2	1	1,1	1	1,1	87
I feel anxious when my teeth feel loose and disturbed when eating and then the next day have to be extracted.	35	40,2	39	44,8	9	10,3	3	3,4	1	1,1	87
Total	72	82,7	79	90,8	17	19,5	4	4,5	2	2,2	
Mean	36	41,3	39,5	45,4	8,5	9,7	2	2,25	1	1,1	

TABLE 4
Frequency Distribution of Respondents' Anxiety related to Anxiety Thinking of Health Workers

Statements	Answers										N
	Not Worried		Very Slightly Worried		Fairly Worried		Worried a Lot		Very Worried		
	F	%	F	%	F	%	F	%	F	%	
I feel anxious the next day when I go to the dental clinic for a tooth extraction.	49	56,3	27	31	7	8	3	3,4	1	1,1	87
Total	49	56,3	27	31	7	8	3	3,4	1	1,1	

TABLE 5
Frequency Distribution of Respondents' Anxiety related to Anxiety Thinking about Dental Extraction Equipment

Statements	Answers										N
	Not Worried		Very Slightly Worried		Fairly Worried		Worried a Lot		Very Worried		
	F	%	F	%	F	%	F	%	F	%	
I feel anxious when my teeth are being examined with a sharp, pointed instrument.	10	11,5	29	33,3	30	34,4	14	16	4	4,6	87
Total	10	11,5	29	33,3	30	34,4	14	16	4	4,6	

TABLE 6
Frequency Distribution of Respondents' Anxiety related to Anxiety Thinking about Experiences or Trauma in Dental Health Services

Statements	Answers										N
	Not Worried		Very Slightly Worried		Fairly Worried		Worried a Lot		Very Worried		
	F	%	F	%	F	%	F	%	F	%	
I once felt anxious when I went to the dental clinic to have a tooth extracted.	48	55,1	25	28,7	10	11,5	2	2,3	2	2,3	87
I felt anxious and scared when one day I had to extract another tooth.	30	34,4	38	43,6	14	16	4	4,6	1	1,1	87
Total	78	89,5	63	72,3	24	27,5	6	6,9	3	3,4	
Mean	39	44,7	31,5	36,1	12	13,7	3	3,4	1,5	1,7	

TABLE 7
Distribution of Respondents' Anxiety Frequency related to Anxiety Thinking on Environmental Effects, namely Family or Friends

Statements	Answers										N
	Not Worried		Very Slightly Worried		Fairly Worried		Worried a Lot		Very Worried		
	F	%	F	%	F	%	F	%	F	%	
I was worried when my teeth got stuck (bumping) and my parents forced me to go to the dental clinic for extraction.	28	32,1	33	37,9	18	20,6	4	4,6	4	4,6	87
I felt anxious when my friend told me that tooth extraction was painful.	52	59,7	20	23	10	11,5	5	5,7	0	0	87
Total	80	91,8	53	60,9	28	32,1	9	10,3	4	4,6	
Mean	40	45,9	26,5	30,4	14	16	4,5	5,1	2	2,3	

TABLE 8
Distribution of Respondents' Anxiety Frequency related to Anxiety Thinking of the Situation or Environment of Dental Health Services

Statements	Answers										N
	Not Worried		Very Slightly Worried		Fairly Worried		Worried a Lot		Very Worried		
	F	%	F	%	F	%	F	%	F	%	
I feel anxious while sitting in the waiting room of the dental clinic.	37	42,5	29	33,3	18	20,6	3	3,4	0	0	87
I feel anxious when I sit in the dental chair for extraction.	17	19,5	30	34,4	31	35,6	7	8	2	2,3	87
Total	54	62	59	67,6	49	42,5	10	11,4	2	4,6	
Mean	27	31	29,5	33,8	24,5	21,2	5	5,7	1	2,3	

TABLE 9
Statistical Results Using The Chi-Square Test

Variable	Dental Anxiety Level Category (%)			p-value
	Low anxiety	Moderate anxiety	High anxiety	
Age				0,429
- 8-9 years	2 (6,1)	26 (78,8)	5 (15,2)	
- 10-12 years	8 (14,8)	37 (68,5)	9 (16,7)	
Gender				**0,035**
- Boys	8 (21,6)	23 (62,2)	6 (16,2)	
- Girls	2 (4,0)	40 (80,0)	8 (16,0)	
Parents Education				**0,001**
- Basic education (Primary School-Junior High School)	2 (4,0)	35 (70,0)	13 (26)	
- Secondary and Higher education (Senior High School-College)	8 (21,6)	28 (75,7)	1 (2,7)	

Based on primary tooth extraction visits, it is known that most of the respondents who performed primary tooth extraction based on visits were ≥1 (73.6%) and based on the education of the respondent's parents, the percentage of most have basic education (Primary School-Junior High School) (57.5%) followed by secondary and higher education (Senior High School-College) (42.5%). Based on TABLE 2, it is known that most of the respondents who have answered the research questionnaire are in the category of moderate anxiety (72.4%). Based on table 3, it is known that most of the respondents expressed a very slightly worried related to anxious thoughts when they were about to have their teeth extracted (45.4%). TABLE 4 shows that most of the respondents stated that they were not worried about their anxious thoughts towards health workers (56.3%). TABLE 5 shows that most of the respondents stated that they were fairly worried about anxious thoughts about tooth extraction equipment (34.4%). TABLE 6 shows that most of the respondents stated that they were not worried about the thoughts of anxiety about experiences or trauma in dental health services (44.7%). TABLE 7 shows that most of the respondents stated that they were not worried about their anxious thoughts on environmental influences, namely family or friends (45.9%). and also in TABLE 8, it is known that most of the respondents expressed a very slightly worried related to anxious thoughts about the situation or the environment from dental health services (33.8%).

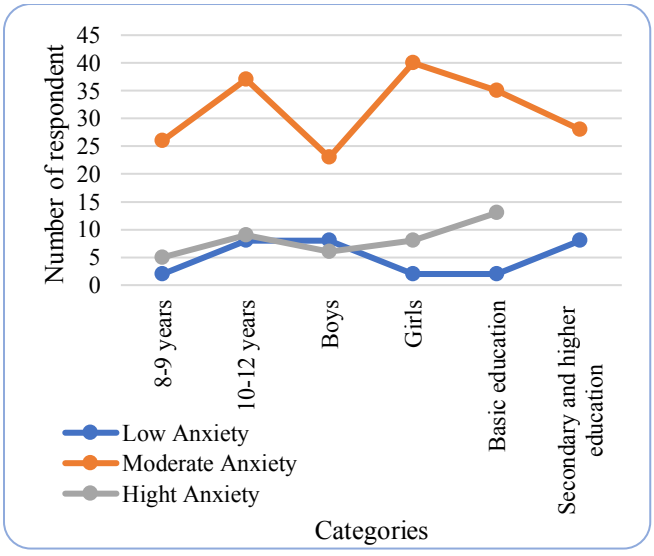

FIGURE 1. Graph of Statistical Results of Chi-square analysis of dental anxiety levels

Based on TABLE 9, it is known that the age characteristic variable, the p-value shows 0.429. Then the p-value > 0.05, it can be concluded that there is no influence between the age characteristic factors on the level of dental anxiety in the act of tooth extraction. on the gender characteristics variable, the p-value shows 0.035. Then the p-value <0.05, it can be concluded that there is an influence between the sex characteristics factors on the level of dental anxiety in the act of tooth extraction. on the variable of parent's education characteristics, the p-value shows 0.001. Then the p-value <0.05, it can be concluded that there is an influence between the characteristics of parent's education on the level of dental anxiety in the act of tooth extraction. From the result, can be seen that the respondents experienced the most moderate anxiety (FIGURE 1)

TABLE 10
Statistical Results Ordinal Logistic Regression Test Using Wald's Test Partially

Parameter	B	SE	Wald	p-value	*OR*
Constant (1)	-1.638	0.489	11.196	0.001	
Constant (2)	2.986	0.677	19.464	0.000	
X_1 (Age)	0.053	0.506	0.011	0.917	1,05
X_2 (Gender)	-903	0.505	3.199	0.074	0,41
X_3 (Parents Education)	2.231	0.673	10.999	**0.001**	9,31

Based on table 10, the ordinal logistic regression model can be obtained as follows:

$$\text{Logit}(\gamma_1) = \log\left(\frac{\gamma_1}{1-\gamma_1}\right) = -1{,}638 + 0{,}053(X_1) - 0{,}903(X_2) + 2{,}231*(X_3)$$

$$\text{Logit}(\gamma_2) = \log\left(\frac{\gamma_2}{1-\gamma_2}\right) = 2{,}986 + 0{,}053(X_1) - 0{,}903(X_2) + 2{,}231*(X_3)$$

*: significant at 95% confidence level

It is known in table 10 that the age variable p-value is 0.917 > 0.05 and has a positive value. This means, that age has a unidirectional direction and is not significant to dental anxiety level in the action of a children tooth extraction. In the gender variable, the p-value is 0.074 > 0.05 and is negative. This means, that gender has a not in the same direction and is not significant to dental anxiety level in the action of a children tooth extraction. In the parents' education variable, the p-value is 0.001 <0.05 and is positive. This means, that parent's education has a direct and significant direction to dental anxiety level in the action of a children tooth extraction. The standardized coefficient value for the parents education variable is 0.673, which means that it has a strong effect and the odds ratio value is exp (2.231) = 9.31. This means that the education of parents with basic education has a tendency of 9.31 times greater to have a higher level of dental anxiety than the education of parents with secondary and higher education. It can be concluded that of the three independent variables, it is the education of parents that significantly influences to dental anxiety level in the action of a children tooth extraction at SDN Pekarungan Kec. Sukodono.

IV. DISCUSSION

Based on the results of the analysis of research on 87 respondents at SDN Pekarungan, Sukodono District in January 2022. In this study, the level of dental anxiety for tooth extraction was measured using the Modified Child Dental Anxiety Scale Faces (MCDAS-f) questionnaire which had been modified and tested for validity and reliability. The MCDAS-f questionnaire consists of 10 questions and each question represents a different aspect of tooth extraction. According to the results of research by Javadinejad et al [17], that MCDAS-f can be used with certainty to evaluate dental anxiety in children. MCDAS-f is a reliable measure of dental anxiety in children aged 8-12 years which shows good reliability and validity [18]. The modified method of filling out the questionnaire was done by using a picture tool that describes the situation of dental treatment, especially regarding tooth extraction. The use of these tools is intended so that respondents who are the research sample get an accurate picture and remember when visiting health services when carrying out tooth extraction the questions contained in the questionnaire.

TABLE 2 shows that most of the respondents belong to the category of moderate anxiety. This can be seen from the results of the answers to the questionnaires in TABLE 3, table 8, and table 5 that the respondents stated that they were a little anxious about the thought of taking a tooth extraction, a little worried about thinking about the situation or the environment of dental health services, and quite anxious about thinking about the equipment. tooth extraction. The results of this study are supported by the opinion, that anxiety in tooth extraction is often caused by the use of sharp objects such as needles, elevators (bein) and forceps which are carried out gradually into the oral cavity. Someone who is in a foreign environment will more easily experience anxiety than someone who is in an ordinary environment occupied [8][19]. These results are in line with research conducted by Abanto et al [20], with the Face Image Scale (FIS) method showing that out of 100 respondents, most of them experienced anxiety in the moderate anxiety category.

The age characteristic factor has no effect in this study. It can be seen that the children who experience the most anxiety are aged 10-12 years. The results of this study are in line with research conducted by Dahlander et al [21], showed that the percentage of children who experienced dental anxiety was higher in children aged 9 years than children aged 7 years. The results of this study are different from the research conducted by Raj et al [22], using the CFSS-DS questionnaire which stated that children at a younger age had a higher level of dental anxiety when compared to children with an older age. This is supported by several studies that the increasing age and cognitive development of children, dental anxiety will decrease [21][23]. Age characteristic factors have no effect, this can occur due to the difference in

the number of respondents and the age range used is not evenly distributed.

The gender characteristic factors influence in this study. it can be seen that the gender of girls is more likely to have moderate anxiety than boys. The results of the study are in line with research conducted by Vinod et al [12], that respondents with low and high levels of anxiety are more likely to be found in girls than boys. The results of this study are also in line with Al-Saddi, that anxiety in dental care is higher in girls respondents than boys [24]. In contrast to research conducted by Yoshiaki et al [25], that male gender and high anxiety traits were identified as the main factors underlying anxiety and were better able to admit feelings of anxiety than women in the Japanese population. Based on the results of this study, it can be seen that girls are more able to express pain during tooth extraction, and girls are more likely to seek emotional support as a coping strategy than boys [26]. This shows that girls have a lower level of endurance to endure pain. This supports those girls are more likely to feel anxious when doing dental treatment than boys.

The educational characteristics of the respondent's parents have an effect on this research. Based on the data analysis that has been carried out, it is known that most of the respondents' parents' education with basic education (primary School-Junior High School) has a moderate level of anxiety. The results of the study are in line with research conducted by Júnior et al [27], that there is a significant relationship between parents education and anxiety in children, it can be seen that if parents have a lower level of education, their understanding of oral health will also be low. Also in line with research conducted by Colares et al [28], there is a relationship between parents education and dental anxiety in children, it can be seen that the higher the child's anxiety, the lower the parent's education. Based on several studies that have been conducted, it is known that children who have received good knowledge from parents about dental health will have a better level of dental anxiety when compared to children who never know the importance of maintaining dental health. The role of parents is very important in shaping the behavior and knowledge of children in undergoing dental treatment [6]. Anxiety in children can be caused by one of the factors of parents' education. Parents with low education can result in children not getting knowledge about maintaining oral health and dental care from an early age. On the other hand, children who do not experience anxiety are supported by the role of parents who have provided early knowledge about dental and oral health and dental care to the child.

The implication of this study is to provide data on the characteristic factors that influence dental anxiety in the action of a children tooth extraction, so that the data from this study can be used as input for health workers, especially dentists and dental nurses in providing dental and oral health services. Good treatment by paying attention to the level of anxiety in pediatric patients who will have a tooth extraction procedure performed.

The limitations of this study are the short research time and respondents must remember the time when the tooth extraction was carried out at the health service to be able to answer the questions on the questionnaire.

V. CONCLUSION

The purpose of this study was to determine the effect of characteristic factors to dental anxiety level in the action of a children tooth extraction at SDN Pekarungan Kec. Sukodono. From the results of the study, The level of dental anxiety in the act of tooth extraction is known to be the most in the category of moderate anxiety (72,4%) and it can be concluded that there are two factors that influence the level of dental anxiety in the act of tooth extraction using chi-square test, namely the gender factor ($p = 0.035$) and parents education ($p = 0.001$) and the most significant factor is the parents education factor ($p=0.001$) with an odds ratio value (9.31). The results of this study can be used as input for dental medical personnel to be able to improve services and good communication to pediatric patients to be able to overcome anxiety about dental care, especially tooth extraction. For future researchers, it is hoped that it can cover a wider age of respondents with a more even distribution and also pay attention to the anxiety measurement tools that will be used and the need for research with other independent variables regarding the factors of dental anxiety.

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