ORIGINAL ARTICLE

Pulse Rate Change After Childhood Anxiety Management with Modeling and Reinforcement Technique of Children's Dental Care

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Abstract

Objective: To know the influence of handling child anxiety with modeling and reinforcement technique on changes in pulse rate in dental and oral care. **Material and Methods:** The sample consisted of 53 children aged 6-12 years who first came to pedodontic clinic in dental and oral hospital education of Hasanuddin University. Anxiety level was measured using objective parameters, measurement of radial pulse. Measurement of anxiety level was done before and after modeling and reinforcement was given through three treatments: I: dental models; II: game and III: video modeling and reinforcement. Data analysis was done using the Kolmogorov-Smirnov test and Friedman test. **Results:** There was a decrease before and after modeling and reinforcement. Before intervention, the average pulse rates in treatment I, II and III were 90.79, 88.00 and 88.38, respectively. After intervention, the average decrease in pulse rate of five beats per minute seen in the first treatment (85.15), a decrease of seven beats per minute on the second treatment (81.98), while in treatment III the average decrease was eight beats per minute (80.19) (p<0.001). **Conclusion:** Modeling and reinforcement technique effectively reduces children's anxiety levels for dental and oral care.

Keywords: Dental Care for Children; Behavior and Behavior Mechanisms; Anxiety.

Introduction

Oral and dental health is one of the factors behind the status of public health. Based on the 2013 National Basic Health Research Report (RISKESDAS) 25.9% of Indonesia's population had dental and oral problems [1]. The dental health of children in Indonesia is still a concern; especially many parents consider that their child's primary teeth do not need to be treated. Dental and oral care often causes fear and anxiety, so when visiting a dentist, children often become uncooperative and the treatment action that the dentist will give is not optimal [2].

The prevalence of anxiety in dental care is reaching 6-15% of the entire population. A previous study in Australia stated that between 50% and 80% of all cases of the disease were directly related to anxiety. Anxiety starts from childhood (51%) and adolescents (22%) [3]. Various populations, cultures from developing countries show patients who are afraid tend to avoid dental and oral care that in the end they delay or even refuse treatment, as a result the quality of health of their teeth and mouth become low [3,4].

Cooperative behavior in children is influenced by the care given at the first visit. Negative reactions arise when feelings of pain arise in treatment. Anxiety comes from the experience of extracting teeth on a previous visit, the experience of a parent or other family member [5]. Dentists need to understand the anxiety and impact that patients experience on dental and oral care that will be given. When dealing with pediatric patients, the dentist can analyze the emotional feelings and conditions the child has [5,6].

The ability to identify patient's anxiety by building trust between the dentist and the patient has a goal to minimize the anxiety that arises due to the care provided [6]. The first visit should be made as attractive as possible because this is the introductory stage. The comfort they have will have a positive effect so that the treatment will be optimal [5]. Children often make judgments about the dentist based on appearance, every word, movement and gesture during the first visit to the clinic [7].

Dental and oral care in children is not as easy as giving care to adults. This is because children have various factors that influence behavior when they are given care. The ability of a dentist is needed to manage the behavior and anxiety of patients with dental and oral care measures [8]. Various ways of handling behaviors that can be given including the communication approach modelling and reinforcement, tell-show-do, home, and distraction [2,8].

One form of handling anxiety is modeling and reinforcement. This technique is based on the psychological principle that people study their environment by observing other behaviors using models or video [9]. Modeling and reinforcement or learning by observation not only to acquire new behaviors, but also to reduce unwanted behavior so that children can learn to eliminate anxiety behavior. This technique has been proposed since 1969 and is still used by practitioners [10].

Pulse is part of the work system of the heart, thus in a state of heart pounding in the theory put forward by psychologists is one manifestation of physical symptoms in physiological level anxiety [11]. Measurement of pulse through palpation of the pulse is an objective parameter for

measuring anxiety levels. Measurement of pulse is chosen as an analysis because biological parameters are simple to measure. Increased pulse rate is a commonly used physiological indicator measuring anxiety. Therefore, this research analyzed the influence of handling child anxiety with modeling and reinforcement technique for changes in pulse rate in dental and oral care.

Material and Methods

Sample

The study population was 53 pediatric patients aged 6-12 who will be given dental and oral care at dental and oral hospital education Hasanuddin University on 1st until 24th September 2016. The sampling method used was purposive sampling, sampling was based on the criteria set by the researcher.

Data Collection

Prior to the study, training was conducted on perceptions of how to measure radial pulse in children. Next the researcher filled out the respondent's form according to the predetermined criteria, measures the level of anxiety in the child by measuring the pulse in children before and after anxiety management was done by modeling and reinforcement measured for one minute manually using a stopwatch. Modeling and reinforcement through gear and game models. Then the child was given modeling and reinforcement again through modeling and reinforcement videos. There were, therefore, 3 groups: I: dental models; II: game and III: video modeling and reinforcement. Information on the sex and age of the child, pulse rate and type of treatment were collected.

Data Analysis

Data were analyzed using IBM SPSS Statistics for Windows Software, version 20 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to calculate the absolute and relative frequencies, mean and standard deviation. Analysis of the data used to view the distribution is the Kolmogorov Smirnov test while non-parametric Friedman test was used to test the hypothesis.

Results

The percentual of girls was 62.3% and 49.1% were between 6-8 years of age (Table 1). The mean age was 8.51 years.

Table 1. Sample distribution according to gender and age.

Variables	N	%	Mean ± SD
Sex			
Male	20	37.7	
Female	33	62.3	
Age Group			
6-8 Years	26	49.1	8.51 ± 1.395
8-10 Years	23	43.4	
10-12 Years	4	7.5	

In male there is an average decrease of five beats per minute to the first treatment, in the second treatment a decrease in the pulse rate of seven beats per minute and the third treatment occurs decrease in the average of nine beats per minute. Whereas in women there is an average decline of five beats per minute on the first treatment, in the second treatment there is a decrease in the average of six pulse rates per minute and in the third treatment there is an average decrease of eight beats per minute. The results showed that the average pulse rate in the three treatments before intervention in female was more than for men. After being given modeling and reinforcement treatment, there was a decrease in both men and women, but the average pulse rate of women was higher (Table 2).

Table 2. Distribution of mean of pulse rates prior to intervention and after intervention for each treatment modeling and reinforcement based on sex.

Sex	Tooth Model		Game		Video Modelling and Reinforcement	
	Pre Mean ± SD	Post Mean ± SD	Pre Mean ± SD	Post Mean ± SD	Pre Mean ± SD	Post Mean ± SD
Male	89.00 ± 5.351	83.40 ± 5.305	87.00 ± 5.496	80.35 ± 5.122	87.00 ± 5.448	77.65 ± 5.284
Female	91.88 ± 6.254	86.21 ± 6.504	88.61 ± 6.567	82.97 ± 6.757	89.21 ± 6.646	81.73 ± 6.672

In the 6-8 year age group, there is a decrease in the average pulse rate in the first five pulse per minute treatment, the second treatment is six beats per minute and the third treatment is eight beats per minute. The 8-10 year age group decreases six beats per minute on the first treatment, the second treatment is six beats per minute and the third treatment is eight beats per minute. The 10-12 year age group, at the first treatment, with a five beats per minute decrease, the second treatment is six beats per minute and the third treatment is seven beats per minute. The highest pulse rate before and after treatment was the age group of 6-8 years, while the age category with the lowest pulse was aged 10-12 years (Table 3).

Table 3. Distribution of mean of pulse rates prior to intervention and after intervention for each treatment of modeling and reinforcement based on age.

Age Group	Tooth Model		Game		Video Modelling and Reinforcement	
	Pre Mean ± SD	Post Mean ± SD	Pre Mean ± SD	Post Mean ± SD	Pre Mean ± SD	Post Mean ± SD
6-8 Years	92.04 ± 5.902	86.35 ± 5.720	89.19 ± 6.053	83.38 ± 6.067	89.77 ± 5.969	81.35 ± 6.209
8-10 Years	90.39 ± 5.750	84.83 ± 6.147	87.65 ± 5.797	81.48 ± 6.134	88.00 ± 5.931	79.96 ± 6.554
10-12 Years	85.00 ± 6.377	79.25 ± 7.274	82.25 ± 7.274	75.75 ± 5.315	81.50 ± 6.608	74.00 ± 4.619

The difference in average pulse rate of each group before and after the intervention in handling anxiety with modeling and reinforcement technique can be seen in Table 4. The results showed that of the three treatments there was a decrease before and after modeling and reinforcement. Before being intervened, the average pulse rates in treatment I, II and III were 90.79, 88.00 and 88.38, respectively. The average decrease in pulse rate of five beats per minute seen in the first treatment, averaged a decrease of seven beats per minute on the second treatment, while in

treatment III the average decrease is eight beats per minute (p<0.001). This shows that there is an effect of handling child anxiety with modeling and reinforcement technique for changes in pulse in dental and oral care.

Table 4. Influence of modeling and reinforcement technique on changes in pulse rate in dental and oral care.

Groups	Pre-Test Mean ± SD	Post-Test Mean ± SD	p-value
Tooth Model	90.79 ± 6.043	85.15 ± 6.181	<0.001*
Game	88.00 ± 6.180	81.98 ± 6.271	
Video Modelling and Reinforcement	88.38 ± 6.261	80.19 ± 6.448	

*Friedman test.

Discussion

The results showed that the average pulse rate in the three treatments before intervention in female sex was greater than that of male sex. After being given modeling and reinforcement treatment, there was a decrease in both men and women, but the average pulse rate of women was higher. This shows the level of anxiety of women is higher than men. In line with the research in Pakistan anxiety is more common in women than men in the ratio of 1:5 [10].

Women have higher pain than men. This is because women have a low pain tolerance threshold and in general women also have a high level of anxiety. Research in the West Denpasar Health Center showed anxiety about tooth extraction in school-age children who went to Puskemas out of 91 children treated 5.5% said they were not anxious about dental extractions, 8.8% said they were anxious and 85.7% expressed anxiety about the act of extracting teeth with male anxiety levels far lower than women, so that girls tend to express fears that are stronger and more numerous than boys [4]. It is inversely proportional to research conducted in pre-school children who showed no significant results in differences in anxiety response between male and female. There is no difference in expressing anxiety and fear of dental care based on gender [11].

Based on the age category, the highest pulse rate before and after treatment is the age group of 6-8 years, followed by the age group of 8-10 years, while the age category with the lowest pulse is aged 10-12 years which can be seen in table 3. This proves that the younger the age, the higher the level of anxiety. The prevalence of dental anxiety is at most 5-20% per child population and tends to decrease with age [12]. This is in line with research demonstrated that the higher the age of the child the score from anxiety is increasingly decreased. In the younger age group, the level of anxiety is higher than the older age group, this is because the young age group has not been able to express the basic emotions of fear and anxiety [4] ages 6-7 years old, children will often be associated with dental care because in this age range many permanent erupting teeth start from the first molar. It is probable that the child will be faced with his first experience visiting a dentist, causing excessive anxiety. Children aged 8-10 years are able to express what they feel and tend to be able to control what they feel, while children aged 11-12 years and above are able to distinguish, perceive things and consider between behavioral goals and consequences that they will face in dental care. Age factor

greatly influences children's behavior towards dental and oral care [10]. A previous research showed that no significant results were obtained on the effect of age on anxiety [11].

There is an effect of handling child anxiety with modeling and reinforcement technique for changes in pulse in dental and oral care. The modeling and reinforcement is a way of learning behavior through observations from a model, adding information through cognitive processes so as to produce behavior changes according to the modeled [12,13].

The results of this study are modeling and reinforcement techniques are very effective in changing children's behavior. Live modeling and reinforcement effectively reduces the anxiety of children aged 6-9 years in oral and dental care compared to giving tell show do technique. In children aged 8-16 years show that modeling and reinforcement through video films is effective in reducing dental anxiety in children given nasal mask in the inhalation sedation procedure [14,15].

In the first treatment modeling and reinforcement was given through the dental model (the researcher as a model) while the second and third treatments were given modeling and reinforcement through games and videos. Giving modeling and reinforcement through video and games was preferred by respondents. Children who enjoyed playing video and games had lower anxiety than children who were only accompanied by their parents during dental and oral care. Other studies also show that video and games not only reduce fear levels but also reduce child unwanted behavior during dental and oral care [15]. Modeling and audiovisual reinforcement has a significant influence on children's fear, fear in response to stimulus in a dental situation [16].

The limitation of this study is that there is no measurement of anxiety level when the child is given dental and oral care in the unit chair. In video modeling and reinforcement, the model shown in children has different age and treatment procedures. Thus it is expected for future researchers to pay attention to this.

Conclusion

There is an effect of handling dental anxiety by giving modeling and reinforcement technique to changes in pulse rate in dental and oral care at dental and oral hospital education of Hasanuddin University. There are significant differences in pulse rates before and after given modeling and reinforcement techniques for children who will perform dental and oral care. Giving modeling and reinforcement technique can reduce children's anxiety levels in dental and oral care.

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