

THE EFFECT OF THE POP-UP BOOK *AKU DAN GIGIKU* ON PULSE RATE IN CHILDREN AGED 4–6 YEARS

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ABSTRACT

Objective: Anxiety is regarded as a major problem in children undergoing dental treatment. One of the physiological responses to anxiety is an increased pulse rate. Young children respond aggressively to anxiety and are in need of psychological intervention. Pop-up books can be used as an instrument to improve their interest and to help them understand the substance of dental health education.

The objective of this study was to utilize pulse rate measurements to investigate the intervention of a pop-up book in reducing anxiety. A total of 78 children aged 4–6 years were divided into two groups: An intervention group with the pop-up book *Aku dan Gigiku* and a control group without intervention. The pulse rates of both groups were measured. This study comprised an experimental clinical research design. The independent *t*-test was used to measure comparisons of decreased pulse rate between the two groups.

Result: The result showed that there was a statistically significant difference in decreased pulse rate with and without the intervention of the pop-up book *Aku dan Gigiku*. Pop-up books are often used as an educational medium for children because they present interesting illustrations and are easy to understand.

Conclusion: As a medium of dental health education, pop-up books can contribute significantly to reducing anxiety in children.

Keywords: Pulse rate, Children, Oral health education.

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INTRODUCTION

Dental anxiety is a major factor in dental practice. In pediatric dental care, children may become uncooperative due to anxiety or stress related to treatment, making the treatment difficult to perform [1]. The child's perception of the dental environment is also a significant factor causing the anxiety [2]. Several studies have suggested that dental procedures might induce patient stress and thus affect the cardiovascular system [3]. According to the National Institutes of Health, a rapid pulse or arrhythmia may occur during episodes of anxiety [4]. Normally, in children, the pulse is frequently found to increase in the dental environment due to anxiety [5]. If patients are not managed appropriately, it is quite possible to establish what has been referred to as a "vicious cycle of dental fear."

Patients avoid making dental visits due to their fear, which results in a worsening of problems, requiring more intensive and potentially traumatic treatment, which then reinforces or exacerbates the fear, which leads to continued avoidance [6]. Thus, evaluating the psychophysiological reactions involve pulse rate can enable professionals to identify its occurrence and search for solutions to reduce its negative effects [5,7].

A variety of behavioral interventions designed to reduce distress in children during intrusive dental treatment have been investigated [5]. Young children respond more aggressively to anxiety and are therefore in need of psychological intervention [8]. Pop-up books are often used as a medium of education for children because they present interesting illustrations and are easy to understand [9]. Pop-up books are a form of three-dimensional interactive literature that allows the child to become involved with the story. It has grown to become a genre that delights and educates children of all ages. These interventions have sought to

decrease anxious and disruptive behavior and to teach children to be more adaptive [8].

Good communication skills and establishing rapport with the patient are critical in these circumstances [10]. The objective of this study was to assess the effect of the pop-up book *Aku dan Gigiku* to changes in the pulse rate in children aged 4–6 years.

METHODS

The study subjects comprised 78 children from five kindergartens, between the ages of 4 and 6 years. They were evaluated to ascertain compliance with the following inclusion criteria: Absence of dental treatment; absence of chronic illness; absence of pain of dental origin; and no use of medication. We excluded subjects with special needs. Parents were informed of all the details of the investigation, and their written consent was required for their child's participation.

On children arrived at school, they were asked to take a seat in the classroom, where the first pulse rate measurements were recorded. An automatic wrist pulse rate monitor was used for the measurement. To use this monitor, the cuff is placed over the child's wrist and wrapped securely around for taking accurate measurements while the palm is facing upward. The cuff should be at the same level as the heart. The cuff will start to inflate automatically after pressing the start button. All the symbols appear on display.

Subsequently, half of the children were randomly assigned to the control group, which received no intervention before the oral prophylaxis procedure. The other half received the intervention of the pop-up book *Aku dan Gigiku* before the dental procedure. Thereafter, the second

pulse rate measurements were performed immediately before the oral prophylaxis procedure.

This is an experimental clinical research design. The independent *t*-test was used to compare the changes in the pulse rate between the intervention and control groups. $p < 0.05$ was considered a statistically significant difference (Table 1).

RESULTS

To assess the effect of the pop-up book *Aku dan Gigiku* in reducing dental anxiety in early-aged children, changes in the pulse rate in the two groups were recorded. Before each analysis, the test of normality was applied to evaluate the data. In the statistical analysis, mean values and standard deviations were calculated for the number of changes in the pulse rate between the intervention and control groups.

The independent *t*-test was used to assess significant differences in the comparisons of the changes in pulse rate between the two groups. Statistical comparisons of the number of changes in the pulse rate indicated significant differences between the intervention groups with the pop-up book *Aku dan Gigiku* and the control group $p = 0.001$ ($p < 0.05$).

DISCUSSION

Physiological responses to stress and anxiety result from interactions between the environment and the information processed by the central nervous system [7]. Several studies have suggested that dental procedures might induce patient stress and thus affect the cardiovascular system [3]. In normal children, the pulse is frequently found to increase in the dental environment due to anxiety [5]. Many treatments, which have been found to be effective in decreasing anxious and disruptive behavior, consist of a package of interventions [8].

The present study provides information about the effects of an intervention using the pop-up book *Aku dan Gigiku* to check the pulse rate in children aged 4–6 years who are undergoing dental treatment. The statistical analysis revealed significant differences in changes in pulse rate between the control groups, with no intervention, and the intervention group on being read the pop-up book *Aku dan Gigiku* before the oral prophylaxis procedure ($p < 0.05$).

Previous studies showed no significant differences in changes in pulse rate before and after the dental procedure [7]. The study by Rodrigues Gomes *et al.* differed from the present study, in that, the latter utilizes the intervention of the pop-up book *Aku dan Gigiku*, which was given to each child of the intervention group before the dental procedure.

Pop-up books are a form of interactive literature that is often used as a medium of education for children because they present interesting illustrations and are easy to understand [9]. These interventions have sought to decrease anxious and disruptive behavior as well as to teach children to be more adaptive [8].

Our result suggests that the intervention of the pop-up book *Aku dan Gigiku* was an appropriate strategy in reducing children anxiety before

Table 1: Changes in pulse rate between the two groups

Group	n	Mean±SD (bpm)	p
Intervention group	39	-12.8±4.8	0.001
Control group	39	9.4±5.3	

SD: Standard deviation

dental procedures. Thus, the pop-up book *Aku dan Gigiku* is effective at reducing anxiety in young children.

CONCLUSION

The pulse rate measurements recorded in this study lead us to conclude that as a medium of dental health education, the pop-up book *Aku dan Gigiku* appears to be an effective method of reducing anxiety in young children before undergoing dental procedures. The pulse rate increases in response to a psychosocial stress paradigm. The sight of the dental procedure represents a significant source of stress among children aged 4–6 years. This finding is important in the behavioral management of young children who experience anxiety while undergoing dental procedures. Further, research is required to determine whether this finding holds true in special needs children of different age groups.

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