Effects of Animated Cartoon Information on Cooperation and Preparation Time in Preschool Children with Congenital Heart Disease Undergoing Cardiac Catheterization: A Quasi-experimental Study

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Abstract: Cardiac catheterization is a threatening condition that affects pediatric patients physically, emotionally, and psychologically. Therefore, emotional and psychological preparation is essential to enhance cooperation and reduce the time required for preparation before cardiac catheterization. This quasi-experimental study investigated the impact of providing information accompanied by cartoon animation on cooperation and preparation time for cardiac catheterization among preschool-aged children with congenital heart disease. A total of 70 children were purposively recruited based on the inclusion criteria. The first 35 children were assigned to the control group and received routine nursing care. The remaining 35 children were placed in the experimental group, receiving animated cartoon information regarding cardiac catheterization in addition to routine care. Data were collected using the Demographic and Clinical Characteristics Questionnaire, as well as the Thai version of the Children's Emotional Manifestation Scale (CEMS). Descriptive statistics and Quade's nonparametric ANCOVA were used for data analysis.

The results showed that the experimental group demonstrated a significantly higher level of cooperation than the control group. Additionally, the experimental group had a significantly shorter average preparation time for cardiac catheterization than the control group. Therefore, pediatric nurses can use this program as a guideline to effectively provide information that enhances cooperation and reduces the preparation time for cardiac catheterization in preschool children with congenital heart disease. However, further studies using a larger sample size across multiple sites are needed before it can be widely applied.

Keywords: Cardiac catheterization, Cartoon animation, Children, Congenital heart disease, Cooperation, Pediatric nursing

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Introduction

Congenital heart disease (CHD) is the most common congenital anomaly worldwide, with an estimated prevalence of about 9.4 cases per 1,000 live births, affecting over 4.18 million children under the age of five as of 2021.[1,2] In Thailand, the prevalence decreased from approximately 8.59 to 7.95 per 1,000 live births between 2020 and 2022.[3] Children diagnosed with CHD often require complex, ongoing medical management, which includes diagnostic and interventional procedures such as cardiac catheterization. Cardiac catheterization (CC) is the gold standard for evaluating hemodynamics in children with both congenital and acquired heart disease.[4] However, this procedure can induce significant anxiety in preschool-aged children due to their limited cognitive development and immature emotional regulation.[5] Consequently, preprocedural anxiety can lead to restlessness and increased uncooperative behavior in children, which can significantly complicate the procedure.[6-8] Uncooperative behavior in children often leads to longer preparation times, as healthcare providers must allocate additional time and resources to calm and engage the child. This extension can disrupt procedural schedules, increase healthcare costs, and heighten emotional strain for both caregivers and the child.[9,10] Moreover, a lack of cooperation may affect the procedural efficiency and accuracy of CC, potentially causing adverse outcomes such as vascular injury, arrhythmias, and even procedural failure.[11]

In studies focusing on surgery, which is similar to a painful procedure of cardiac catheterization, non-pharmacological methods for reducing perioperative anxiety in children include educational approaches, behavioral techniques, parental presence at induction of anesthesia, and complementary medicine techniques.[12] Techniques, such as distraction, preparation videos, music, relaxation, and virtual reality, have proven effective.[8,13-17] Parental presence, combined with video games, has been identified as the most effective intervention for reducing preoperative anxiety in children.[18] Animated cartoon education, which helps demystify medical procedures and makes children feel less intimidated,[19] is more suitable for younger children than video games due to its developmental appropriateness. Positive outcomes of cartoons in alleviating anxiety have been reported in various medical procedures, including surgery, CC, IV therapy, and IV insertions.[20-25]

While psychological support for pediatric patients has been widely explored, behavioral outcomes, such as cooperation and procedural time, have remained underexamined, particularly in preschoolers. Moreover, existing research primarily focuses on older children. A recent scoping review highlighted the lack of age-appropriate materials for children under 13 with congenital heart disease (CHD), underscoring the need for engaging and developmentally suitable interventions to improve cooperation and health literacy.[26] This study helps to address this gap by evaluating animated cartoon information designed to enhance cooperation and reduce preparation time in preschool-aged children with CHD undergoing CC. The findings aimed to inform nursing practice by promoting innovative, non-pharmacological approaches in routine care.

Conceptual Framework and Review of Literature

In this study, animated cartoon education was guided by Jean Piaget's Cognitive Developmental Theory[27] and Robert Gagné's Theory of Learning.[28] Piaget posits that children in the preoperational stage (ages 2-7) learn best through visual and symbolic forms, such as stories and animations, due to their limited capacity for logical and abstract reasoning. Complementing this, Gagné outlines a series of instructional events—such as gaining attention, presenting content, and supporting learning through modeling and feedback—that are necessary for effective

knowledge acquisition. Cartoon animations naturally fulfill these instructional requirements by capturing children's attention, presenting content in a sequenced and comprehensible format, and offering behavioral models for children to imitate. In the context of this study, cartoon animation served not only as a cognitive tool aligned with developmental readiness but also as an instructional strategy that enhances learning through emotionally and audiovisually engaging media. As children became more familiar with the procedure, they were expected to demonstrate greater cooperation since they had a better understanding of what to expect and how to respond. When children cooperated with the procedure, it was anticipated that preparation time would be reduced, as healthcare professionals spent less time managing fear-based behaviors and providing repeated explanations.

Non-pharmacological strategies have been extensively studied to reduce anxiety, thereby enhancing cooperation among hospitalized preschoolers by addressing their informational needs and alleviating fears of unfamiliar environments. A systematic review and network meta-analysis have shown that psychological health interventions paired with digital health interventions, particularly parental presence and video games, are the most effective non-pharmacological strategies for alleviating preoperative anxiety in children.[18] To date, research on preprocedural preparation has primarily focused on audiovisual (AV) interventions.[29] A recent systematic review and meta-analysis indicated that AV interventions, especially videos and animations, significantly reduce preoperative anxiety levels in children undergoing surgery.[30] They also improve compliance during anesthesia induction, as highlighted in a systematic review.[31] In specific situations, a randomized control trial found that an Animated Education Program (AEP) provides adequate information for school-aged children concerning events before, during, and after the CC procedure, leading to reduced anxiety, enhanced cooperation, decreased immobilization time, and fewer vascular complications.[22] This study suggested that animated cartoon education offers a dual benefit for both emotional and physical well-being. Compared to cartoon videos and the control group, animated educational media about IV insertion resulted in the lowest mean anxiety score in children.[25]

Animated cartoon education programs were found to be beneficial for the general population. For example, the CARTOON psychoeducation program was designed to teach hygiene behaviors and dispel fear during the COVID-19 pandemic to children ages 3 to 15.[32] In the Thai context, Muangchan et al. demonstrated that cartoon-based tools were both culturally appropriate and educationally effective in teaching preschool children about hand, foot, and mouth diseases.[33] However, these studies primarily focused on disease awareness and behavior change rather than procedural readiness or cooperation in clinical contexts. Among these programs, multimedia content stands out as the most developmentally appropriate and effective strategy, as it better captures children's attention, clearly communicates procedural expectations, and models desired behaviors. Therefore, in this study, animated cartoon education utilized audiovisual materials to provide a visual representation of the CC process, appropriate coping skills, and the environment within a CC room.

The use of recorded maternal voices can directly enhance cooperation.[34,35] However, these auditory-only interventions did not engage the visual-symbolic modalities that are critical to preschool cognitive processing. Unfortunately, research specifically addressing preparation time remains limited. One study found that storybook-based cooperative protocols reduced overall processing time for transthoracic echocardiographic examinations in children under three.[36] This total processing time spanned from the child's arrival at the examination unit to discharge, encompassing logistical and administrative components such as randomization, consent, medical evaluations, and preparation. Preparation time, a subset of this broader metric, directly reflects the immediate impact of

interventions, such as cartoon-based education, on procedural readiness. In this study, preparation time refers to the interval between the child's entry into the preparation area and their readiness for the procedure. Collectively, existing studies often target anxiety reduction or knowledge acquisition but rarely assess behavioral cooperation and preparation time, particularly among preschool children with congenital heart disease (PCW-CHD) undergoing invasive cardiac procedures.

Study Aim and Hypotheses

This study examined the effects of providing information through animated cartoon videos by comparing cooperation and preparation time between an experimental group, which received both the videos and usual care, and a control group, which received only usual care. We hypothesized that: 1) the cooperation score in the experimental group would be higher than that of the control group, and 2) the preparation time in the experimental group would be shorter than that of the control group.

Methods

Design: This study employed a quasi-experimental design. This report adheres to the Transparent Reporting of Evaluation with Non-randomized Designs (TREND) checklist as a guideline for quality reporting.

Sample and Setting: The participants included parents and PCW-CHD who underwent CC procedures at a tertiary hospital in Bangkok, Thailand, from May 2021 to March 2022. Eligibility criteria for children included being aged 3 to 6 years, undergoing the catheterization procedure for the first time or having done so more than a year since their last procedure, being accompanied by a mother and/or father to the catheterization unit, and having no sensory, visual, or communication impairments. Children with developmental delays or ADHD were excluded, as were those experiencing unstable symptoms, hypoxia, or cyanosis. The inclusion criteria for parents required them to be 18 years or older, able to care for the patient during the study, and fluent in Thai.

The sample size was determined using a power analysis in G*Power software (version 3.1.9.2)[37] for ANCOVA, based on the effect size derived from similar research on cooperation in children aged 2 to 5 years.[34] The effect size was calculated as 0.89, with a significance level of 0.05 and a power of 80%. As a result, each group (control and experimental) required a sample size of 35 children.

Ethical Considerations: This study obtained approval from the Research Ethics Committee of the Faculty of Medicine Ramathibodi Hospital, Mahidol University (Certificate No. COA. MURA2021/348) and from the Research Committee of the studied hospital (Certificate No. COA.NO. 558/2021). Participants received a comprehensive explanation of the study details and were informed of their right to withdraw at any time. Parents or legal guardians were asked to sign a consent form permitting their children to participate in the study. All data collected were used solely for academic purposes and presented in aggregate form, ensuring anonymity.

Research Instruments: There were two types: data collection instruments and experimental instruments. The data collection instruments included the Demographic and Clinical Characteristics form and the Children's Emotional Manifestation Scale, as follows:

The Demographic and Clinical Characteristics Form, developed by the primary investigator (PI), collected data on the child's age, gender, cardiac catheterization history, medical diagnosis, procedures received, vital signs recorded 15 minutes before and 15 minutes after entering the CC recovery room, and the total amount of sedative drugs administered during the procedure.

The Children's Emotional Manifestation Scale (CEMS) is an objective observational tool originally developed by Li and Lopez[38] to assess emotional

responses in children during medical procedures. The PI obtained written permission to use the instrument for translation and research purposes. The questionnaire was translated from English to Thai using the back-translation method by the Translation Center, Faculty of Liberal Arts, Mahidol University. In this study, the cooperation score was derived from a single item of the CEMS, rated on a 5-point Likert scale. A lower score indicates a higher level of cooperation, with a score of 1 representing complete cooperation and active participation in the procedure. Conversely, a higher score reflects lower levels of cooperation, with a score of 5 indicating behaviors that disrupt the procedure. Thus, lower scores on this scale signify more adaptive and cooperative behavior during the medical process. The Thai version of the adapted CEMS for cardiac catheterization was reviewed for content validity by three experts: a pediatric cardiologist, a pediatric cardiac nurse, and a cardiac catheterization nurse. The content validity index (CVI) was 1.0. The original scale reported an interrater reliability coefficient of 0.96.[38] In this study, a pilot test was conducted with ten children who shared similar characteristics with the study sample, yielding an interrater reliability coefficient of 0.86 between the PI and the research assistant.

Preparation time for cardiac catheterization refers to the period before the actual procedure. It begins when the child arrives in the CC unit and continues until they are ready for the procedure. This preparation time is measured in minutes and recorded on the sheet by a research assistant.

Experimental Instrument: The Animated Cartoon Media Titled "Nong Paew Waew: A Strong Heart"

The PI developed an animated cartoon using a structured design process to illustrate the journey of a young girl named Nong Paew Waew through the CC procedure. The story follows her from her first day in the unit to her transfer to the CC room and back to the ward. Initially anxious and fearful, Nong Paew Waew gradually gains understanding and confidence through the nurse's support and clear explanations. She bravely receives venous access, transfers with her mother, waits in the preparation area with a smile, and lies calmly on the procedure bed. The animation concludes with her safe return to the ward. Produced in Thai, the video features a friendly animated character and child-friendly language to briefly explain the purpose of CC, the environment in the CC room, and how the procedure will be carried out, helping children to have a basic understanding of what to expect. The video duration is about 3 minutes and 25 seconds. To ensure quality, age appropriateness, and comprehensibility, a pilot viewing session was conducted with ten children aged 3 to 6 years, who were comparable in characteristics to the target population. Observations were made regarding their ability to understand the storyline, relate to the character, and follow the procedural sequence. Children's verbal feedback and non-verbal responses (e.g., attention span and emotional reactions) were also documented. *The content in the Nong Paew Waew* animation was evaluated for validity using a structured expert review process. The same panel of experts who reviewed the translation of the CEMS was also consulted to rate the accuracy, clarity, and appropriateness of the content. The content validity index (CVI) for the video was calculated based on these ratings, yielding a CVI of 1.0, indicating excellent content agreement among the experts.

Usual care was provided to both study groups by health team members in the pediatric ward. Usual care involved the hospital's standard preprocedural preparation, which typically included brief, age-appropriate verbal explanations from nurses about the CC procedure, along with responses to any questions from the child or their caregivers. This process lasted approximately five minutes and did not incorporate any visual aids, videos, or cartoon-based educational materials.

Data Collection: After receiving study approvals, the PI met with the parents or caregivers of children who met the inclusion criteria upon admission to the inpatient unit to invite them to participate in the study.

To prevent contamination, the PI completed data collection for the control group before starting the intervention for the experimental group. A research assistant (RA) with five years of experience in a pediatric cardiac catheterization unit was trained by the PI to evaluate the child's cooperation levels using the CEMS during preparation for cardiac catheterization, until the interrater reliability between the RA and PI reached 0.86. The study was single-blinded, meaning the research assistant was unaware of the group assignments.

In the experimental group, participants were hospitalized one day prior to the experiment. The PI collected demographic and clinical data from parents who agreed to participate in the study. On the day of the procedure, the PI conducted the intervention by having the children watch an animated educational cartoon video on a tablet with their parents in a private room for 15 minutes before being sent to the CC unit. The nurse at the unit administered premedication, specifically chloral hydrate, before transferring the children to the CC unit. Their parents accompanied them during the transfer, supporting the child and staying with them until they were ready to enter the CC room. Upon reaching the holding area of the CC unit, vital signs were measured, and intravenous sedatives—fentanyl and midazolam—were administered. The RA recorded the CEMS 15 minutes after the children arrived at the cardiac catheterization unit and measured the preparation times for cardiac catheterization from the patient's arrival at the unit until they were ready for the procedure.

In the control group, children received only usual care. The parents were allowed to accompany the child during the transfer to the CC unit and remained with them in the holding area until they were taken to the CC room.

Data Analysis: Before conducting the ANCOVA, the statistical assumptions were examined, including normality, linearity, homogeneity of regression across groups, and homogeneity of variance. All assumptions were satisfied except for normality. Therefore, Quade's nonparametric ANCOVA was used to address the nonnormality of the data. Age was considered a covariate due to the variation in mean age scores between the experimental and control groups. The significance level for hypothesis testing was set at 0.05.

Results

Both the experimental and control groups exhibited similar demographic and clinical characteristics, including gender, history of cardiac catheterization, diagnosis, procedures received, time since the last cardiac catheterization, and administration of midazolam and fentanyl. However, the age distribution varied between the two groups. The mean age of the experimental group was 61.31 months (SD = 18.14), with a mean rank of 41.43 months and a median of 66 months, while the mean age of the control group was 50.30 months (SD = 16.47), with a mean rank of 29.57 months and a median of 45 months.

When comparing the patients' gender, history of cardiac catheterization, diagnoses, and procedures received between the experimental and control groups using the chi-square test, the results revealed no significant differences in the proportions of males and females with a history of cardiac catheterization, those without cardiac catheterization, those diagnosed with cyanotic and acyanotic CHD, and those who received cardiac catheterization for diagnostic procedures and therapeutic interventions between the experimental and control groups ($p > 0.05$). Before comparing the patients' age and the time since the last cardiac catheterization as well as the administration of midazolam and fentanyl between the experimental and control groups, the assumption of normality for the four variables was examined in both groups. The results indicated a violation of normality for these four variables. The Mann-Whitney U test was employed, and the analysis demonstrated that the ages of patients between the

experimental and control groups were significantly different ($p < 0.05$). However, the time since the last cardiac catheterization, as well as midazolam and fentanyl administration, showed no significant differences between the experimental and control groups ($p > 0.05$). The results are displayed in **Table 1.**

Table 1. Demographic and clinical characteristics of the experimental group and the control group (N = 70)

Characteristics	Categories	Experimental group (n = 35)		Control group (n = 35)		χ^2 or Z	p-value
		n	%	n	%		
Gender	Male	17	48.60	18	51.40	0.06[a]	1.00
	Female	18	51.40	17	48.60		
Medical history of cardiac catheterization	Ever	25	71.40	24	68.60	0.07[a]	1.00
	Never	10	28.60	11	31.40		
Diagnoses	Cyanotic	31	88.60	29	82.90	0.47[a]	0.733
	Acyanotic	4	11.40	6	17.10		
Procedure received	Diagnostic	14	40.00	23	65.70	4.64[a]	0.055
	Therapeutic	21	60.00	12	34.30		
Age (months)	M (SD)	61.31 (18.14)		50.30 (16.47)		2.45[b]	0.014
	Mean Rank	41.43		29.57			
	Median	66		45			
	Min-Max	36-83		36-83			
Time after the last cardiac catheterization (months)	M (SD)	23.00 (19.21)		22.77 (23.93)		4.17[b]	0.677
	Mean Rank	36.50		34.50			
	Median	21		21			
	Min-Max	0-72		0-88			
Received midazolam	M (SD)	5.53(2.40)		5.53 (3.56)		-0.71[b]	0.479
	Mean Rank	33.90		31.34			
	Median	1.50		5.0			
	Min-Max	1.50-13		0-15			
Received fentanyl	M (SD)	60.57 (24.82)		61.86 (37.12)		-0.27[b]	0.814
	Mean rank	33.62		31.87			
	Median	60		55			
	Min-Max	20-120		0-160			

Note: [a] = Chi-square test; [b] = Mann- Whitney U test

Effectiveness of the Animated Cartoon Media

The mean score for cardiac catheterization cooperation in the experimental group was 1.86 (SD = 1), with a median of 2 (IQR: Q1-Q3 = 1-2). In contrast, the control group had a mean score of 3 (SD = 1.24) for CC cooperation from CEMS, with a median of 3 (IQR: Q1-Q3 = 2-4). When comparing cooperation in cardiac catheterization between the experimental and control groups while controlling for age, the results indicated that cooperation was higher in the experimental group than in the control group ($p < 0.05$). This result is presented in **Table 2.**

Also, the experimental group's mean score for CC preparation time was 13.14 minutes (SD = 8.66), with a median of 11 (IQR: Q1-Q3 = 7-15). In contrast, the control group's mean score for CC preparation time was 29.51 minutes (SD = 11.09), with a median of 30 (IQR: Q1-Q3 = 20-35). When comparing the CC preparation time between the groups while controlling for age, the results indicated that the preparation time for the experimental group was significantly shorter than that of the control group ($p < 0.05$). The results are shown in **Table 2.**

Table 2. Comparisons of cooperation and preparation time for cardiac catheterization between the experimental group and the control group (N = 70)

Dependent variables	Sources of variation	SS	df	MS	F	p-value
Cardiac catheterization cooperation	Cartoon animation	3311.16	1	3311.16	11.67	< 0.05
	Error	19301.62	68	283.85		
	Total	22612.77	69			
Cardiac catheterization preparation time	Cartoon animation	10985.48	1	10985.48	48.62	< 0.05
	Error	15363.19	68	225.93		
	Total	26348.67	69			

Note. SS = Sum of squares; df = Degree of freedom; SS = Mean square

Discussion

Our findings supported the research hypotheses and suggested that animated cartoon education can enhance cooperation in PCW-CHD undergoing CC. One possible explanation is that the effectiveness can be attributed to key psychological mechanisms, which are the promotion of familiarity and predictability.[25] The animated cartoon promotes child cooperation through several thoughtfully designed elements. By featuring a relatable character, Nong Paew Waew, who initially feels scared and uncertain, the video validates children's emotions and creates a sense of empathy. The nurse's calm and friendly dialogue uses simple, reassuring language to explain the CC process, helping to reduce fear and build understanding. Audio-visual demonstrations of the procedure, such as placing a soft oxygen sensor or giving "sleepy medicine," familiarize children with what to expect in a non-threatening way. As Nong Paew Waew begins to understand and feel supported, she models cooperative behavior by expressing readiness and bravery. The use of playful audiovisuals, positive reinforcement, and a hopeful outcome further encourages children to view the experience as manageable and safe, promoting trust and willingness to participate in their care. This interpretation aligns with Cash et al., who found that children related to the 'Hank the Heart' animation because it reflected their experiences with pulmonary hypertension.[39]

When children are introduced to procedural details in a developmentally appropriate format through an animated cartoon, they are better able to understand what to expect, which helps reduce preprocedural anxiety.[40] Although this study did not directly measure anxiety levels, it is reasonable to infer that animated cartoon education contributed to reduced preprocedural anxiety, which in turn facilitated better cooperation. This interpretation aligns with findings from Yang et al., who demonstrated that preschool children aged 3 to 6 years experienced significantly lower anxiety and better compliance during anesthesia induction after receiving a surgery-related picture book one week before their procedure.[19] Similarly, other studies have shown that structured animated education programs provided before, during, and after procedures can reduce anxiety, minimize vascular complications, and shorten recovery time in pediatric patients.[22] Other studies have found that showing children video-based

education programs before their magnetic resonance imaging (MRI) scan helps lower their anxiety and fear, resulting in fewer children refusing to enter the room.[41] In contrast, Ustun et al. found that cartoon-assisted visual and auditory distraction did not significantly reduce anxiety or pain perception during local anesthesia.[42] However, it effectively reduced pain and improved cooperation during dental procedures. To enhance effectiveness, the authors recommended combining the cartoon with the traditional tell-show-do approach, which involves providing verbal explanations and demonstrating the visual, auditory, olfactory, and tactile aspects of the procedure. This recommendation emphasizes the importance of educational elements in preparing children, aligning with the purpose of our animated cartoon education video, which was used as a pre-procedural intervention in this study. A previous study on cartoon animation for school-aged children undergoing intravenous therapy found a post-intervention decrease in fear within the experimental group but no significant difference in fear or cooperation between the experimental and control groups.[24] The authors suggested that factors such as parental presence and nurse reassurance may have improved cooperation in both groups, regardless of the interventions.

Children in the control group received routine verbal explanations and traditional preparatory methods, which may be less effective for preschool-aged children. At this developmental stage, children often struggle to understand abstract concepts or understand purely verbal information. A systematic review found that animation was more effective than standard care or spoken information in improving knowledge and behavior. It also suggested that animations may be especially beneficial for children and individuals with lower education or health literacy levels.[43]

Our findings also support the research hypothesis that the experimental group experienced shorter preparation time. One possible explanation is that when children in the experimental group had higher cooperation scores, they were likely to follow instructions and cooperate during preprocedural tasks such as venous access and sedation administration. This cooperation enables healthcare teams to carry out procedures more efficiently, reducing the need for repeated explanations, extended preparation time, or additional interventions to manage distress. This finding aligns with the observation that storybook-based cooperative protocols reduce overall processing time for transthoracic echocardiographic examinations in children under 3.[36] The results from using recorded mothers' voices during CC for congenital cardiac preschool children showed a shorter mean time for needle insertion compared to the usual nursing care group.[34] Preschool children who watched cartoons while undergoing echocardiograms demonstrated a statistically significant reduction in echocardiography time compared to those who received standard care.[44]

Limitations

This study has some limitations that should be considered when interpreting the findings. First, while the results provide valuable insights, their generalizability is limited due to the relatively small sample size and the recruitment of participants from a single medical center. Second, the study used a single-blind design, where only the research assistant was blinded to group assignments; this may introduce bias in the outcome assessments. Third, while efforts were made to control for potential variables, other confounding factors—such as parental anxiety, previous medical experiences, or individual temperament—may have influenced the level of cooperation observed. Lastly, the control and experimental groups were studied at different times. Thus, the history might be different and might affect the outcomes. Therefore, the threat to internal validity could not be avoided.

Conclusion

This study demonstrated that providing information through animated cartoons is an effective

educational strategy for enhancing cooperation and reducing preparation time in preschool children with congenital heart disease undergoing CC. The use of age-appropriate, engaging visual media helped children better understand the procedure and decreased anxiety-related behaviors, contributing to smoother procedural preparation.

Implications for Nursing Practice and Future Research

For nursing practice, these findings highlight the significance of incorporating developmentally appropriate educational tools into pre-procedural care. Animated cartoons can act as a practical, low-cost, and easily implementable method to enhance pediatric patient engagement, reduce stress, and improve workflow efficiency. Nurses in the inpatient unit can utilize this audiovisual material by playing it on electronic devices such as tablets, computers, or smartphones at any time and in any location. Nurses, as frontline providers of patient education and support, are well-positioned to integrate this approach into routine preoperative preparation, ultimately contributing to better patient experiences and procedural outcomes in pediatric cardiac care.

The study focused on immediate outcomes and did not evaluate the long-term effects of the intervention on children's cooperation or psychological well-being following the procedure. It remains unclear whether this information persists beyond the post-procedure period. Further studies should assess the long-term effects of the procedure, including vital signs, psychological impacts, fear, anxiety, and the potential for enhanced recovery. Additionally, further research should involve a larger sample and multi-site settings to represent the population of PCW-CHD better. Finally, studies that combine animated cartoon education with parental presence are needed, since this study did not determine the role of parental presence regarding its effect on child cooperation and preparation time.

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ผลของการให้ข้อมูลด้วยสื่อการ์ตูนแอนิเมชันต่อความร่วมมือและระยะเวลาการเตรียมในเด็กโรคหัวใจแต่กำเนิดที่เข้ารับการสวนหัวใจ : การวิจัยกึ่งทดลอง

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บทคัดย่อ: การสวนหัวใจเป็นภาวะคุกคามที่มีผลกระทบต่อผู้ป่วยเด็กทั้งด้านร่างกาย อารมณ์ จิตสังคม จึงควรมีการเตรียมความพร้อมด้านอารมณ์และจิตใจให้กับผู้ป่วยเด็กเพื่อส่งเสริมความร่วมมือและลดระยะเวลาการเตรียมสวนหัวใจ การศึกษาครั้งนี้เป็นการวิจัยกึ่งทดลองเพื่อศึกษาผลของการให้ข้อมูลด้วยสื่อการ์ตูนแอนิเมชันต่อความร่วมมือและระยะเวลาในการเตรียมสวนหัวใจของเด็กวัยก่อนเรียนโรคหัวใจแต่กำนิด จำนวน 70 ราย เลือกกลุ่มตัวอย่างเฉพาะเจาะจงตามเกณฑ์ที่กำหนด โดยผู้ป่วยเด็ก 35 คนแรก ถูกจัดเข้ากลุ่มควบคุมที่ได้รับการดูแลตามปกติและผู้ป่วยเด็ก 35 คนหลัง ถูกจัดเข้ากลุ่มทดลองที่ได้รับข้อมูลการสวนหัวใจรูปแบบสื่อการ์ตูนแอนิเมชันร่วมกับการดูแลตามปกติ รวบรวมข้อมูลโดยใช้แบบบันทึกข้อมูลทั่วไปและข้อมูลทางคลินิกของเด็กและแบบวัดการแสดงออกทางอารมณ์ของเด็ก ฉบับภาษาไทย วิเคราะห์ข้อมูลโดยใช้สถิติพรรณนาและการวิเคราะห์ความแปรปรวนร่วมนอนพาราเมตริกของควอด ผลการศึกษาพบว่า กลุ่มทดลองมีระดับความร่วมมือมากกว่ากลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติที่ระดับ .05 และกลุ่มทดลองมีค่าเฉลี่ยของระยะเวลาการเตรียมสวนหัวใจน้อยกว่ากลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติที่ระดับ .05 ดังนั้น พยาบาลสามารถใช้โปรแกรมนี้เป็นแนวทางในการให้ข้อมูลเพื่อช่วยส่งเสริมความร่วมมือในการเตรียมสวนหัวใจและลดระยะเวลาการเตรียมสวนหัวใจของเด็กโรคหัวใจแต่กำเนิดที่เข้ารับการทำสวนหัวใจได้อย่างมีประสิทธิภาพ อย่างไรก็ตาม จำเป็นต้องมีการศึกษาต่อไปในกลุ่มตัวอย่างที่ใหญ่ขึ้นและในบริบทที่แตกต่างกันก่อนนำไปใช้อย่างกว้างขวาง

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คำสำคัญ: การสวนหัวใจ สื่อการ์ตูนแอนิเมชัน เด็ก โรคหัวใจแต่กำเนิด ความร่วมมือ การพยาบาลเด็ก

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