

Article

Effects of Potential Support Program on Drowning Prevention among Primary School Students in Nakhon Si Thammarat Province, Thailand

Kiatkamjorn Kusol ^{*}, Chuda Phromphen and Thidarat Eksirinimit 

School of Nursing, and the Excellence Center of Community Health Promotion, Walailak University, Thasala, Nakhon Si Thammarat 80160, Thailand

^{*} Correspondence: kkiatgum@gmail.com; Tel.: +66-81-979-65-65

Abstract: In this study, we aimed to see how a student potential support program affected drowning prevention among primary school students in Nakhon Si Thammarat. This study was quasi-experimental. The sample consisted of students in Grades 1–6 who were randomly selected based on the inclusion criteria. The experimental and control groups had 120 participants. The experimental group was given the program (House, 1981), while the control group was to resume normal activities. The program lasted 8 weeks. The research instruments and data collection included the program and assessment forms on knowledge, attitudes, and behaviors in drowning prevention. Descriptive statistics, Chi-square statistics, paired sample t-tests, and independent t-tests were employed for the analysis of the data. The results show that the samples were 7–12 years of age ($M = 9.50$, $SD = 1.72$), with male and female students accounting for 37.5, and 62.5 percent, respectively; and 73.33 percent of them lived with their parents. The mean scores of the students in the control and experimental groups before using the program had no statistically significant differences in knowledge, attitudes, and behaviors ($p > 0.05$). As for the mean scores of the students' potential for drowning prevention in the experimental group before and after using the program, it was found that after the program there was a marked increase in all aspects with a statistically significant difference ($p < 0.001$): before and after in knowledge ($M = 17.08$, $SD = 3.22$; $M = 19.15$, $SD = 1.79$, respectively), before and after in attitudes ($M = 48.48$, $SD = 6.24$; $M = 55.23$, $SD = 4.66$, respectively), and before and after in behaviors ($M = 17.97$, $SD = 3.13$; $M = 21.00$, $SD = 2.50$, respectively). The mean scores of the students' potential for drowning prevention in the experimental group after using the program was higher than in the control group, with statistically significant differences in all aspects ($p < 0.001$): in the experimental group, knowledge, attitudes, and behaviors ($M = 19.15$, $SD = 1.79$; $M = 55.23$, $SD = 4.66$; $M = 21.00$, $SD = 2.50$; respectively); and in the control group, knowledge, attitudes, and behaviors ($M = 16.15$, $SD = 3.22$; $M = 48.37$, $SD = 3.61$; $M = 17.85$, $SD = 2.64$; respectively). The program can help students develop better drowning prevention knowledge, attitudes, and behaviors. It can assist students in being able to protect themselves from drowning in risky situations.



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1. Introduction

Drowning is the leading cause of death among children, which is a common problem in all regions of the world [1]. The World Health Organization (WHO) has reported that children aged 5–14 years die more frequently from drowning than from any other cause [2]. In Thailand, drowning is the number one cause of death among children, with 37.2% mortality [3]. In 2018, 681 children died from drowning [4]. Nakhon Si Thammarat is among the first 10 provinces in the country with the highest number of drowning children and is among the top 3 in the southern region. Drowning tends to be higher, causing a huge loss to the future of the nation [5].

School-aged children had the highest mortality rate at 40.2%, with the most common among 6–9 years old [4]. Drowning has an immediate effect including death at 80.4%, physical health problems, and mental and permanent disabilities [4,6]. Drowning prevention through such things as education, swimming and water safety lessons, and proper pool fencing is essential for reducing both mortality and morbidity. Therefore, if students know how to help themselves and have the right methods to help others, this can reduce the rate of mortality from drowning among children [7,8].

The causes of child drowning include the child itself, water sources, and the environment. A child is at risk as a result of age, development, behaviors, lack of knowledge and skills on water safety and self-protection, and sheer ignorance [2,6,9]. Therefore, many deaths may occur at the same time from water source factors, including the physical environment and the lack of safe water resources management in the community [9,10]. Inadequate knowledge of drowning prevention is a risk factor for drowning [11].

School-aged children are characterized by growth and development, which can help them more readily learn and nurture self-protection skills from an adult giving advice. If children are equipped with accurate knowledge and attitudes to take care of themselves, this can result in a self-acquired knowledge base and appropriate behaviors [12]. Teaching school-aged children to have good knowledge and attitudes must incorporate the use of interesting activities and media that can ease children's ability to memorize, resulting in good learning outcomes [13]. School-aged children are at the age with the potential for self-care and can receive health information both from teaching and learning from teachers, television media, online media, parents, and public health personnel. A study conducted on knowledge and attitudes about health among school-aged children revealed that they can care for themselves to be healthy [14].

To prevent drowning among children aged 5–14 years, the Thailand Ministry of Public Health instituted safety measures by forming the "Merit Maker for Drowning Prevention" project, which aimed to reduce the rate of mortality from drowning among school-aged children [10,15]. The strategy was aimed to continuously encourage all measures to prevent drowning in the area [16].

As for the guidelines for preventing drowning in children, it was found that children should be taught to swim to survive drowning [17]. The development of a safety program by applying life skills together with the concept of self-control found that it can reduce the risk of drowning [18]. It has been suggested that successful drowning prevention measures should include social support, where focusing on children reduces drowning rates among school-aged children. Operations to prevent children from drowning in Nakhon Si Thammarat Province put the priority on education, teaching drowning prevention skills [19], and providing social support, as well as guidelines for drowning prevention [11]. However, the concern was that drowning prevention seems to focus on helping other people rather than the children's knowledge; while knowledge, attitude adjustments, and skills to practice, as well as strategies for effective learning, should be provided for school-aged children [13]. It should also include convenience and monitoring of students' behavior at school to help achieve goals.

Therefore, a potential support program for preventing drowning in school-aged children should incorporate proactive preventive action by focusing on the development of students' potential in terms of knowledge, skills, and attitudes toward drowning prevention. As community nurse practitioners, the researchers play a role in promoting health and preventing risks that may occur in school-aged children, including the prevention of drowning as drowning problems tend to increase. The researchers realized the importance of this problem and therefore aimed to study the effects of the program on enhancing students' potential in drowning prevention using House's concept of social support as a framework for developing a program to support students' knowledge, skills, and attitudes to protect themselves from drowning [20].

This study aimed to examine the effects of a potential support program on drowning prevention among primary school students. The research hypothesis was that the mean

scores of the students' knowledge, attitudes, and behaviors in drowning prevention in the experimental group would increase after the intervention program. Additionally, the post-intervention mean scores of the students' potential in knowledge, attitudes, and behaviors in drowning prevention in the experimental group would be higher than that of the control group.

2. Materials and Methods

2.1. Study Design

This study had a quasi-experimental research design conducted in two groups with a pre-test and post-test design. The sample consisted of primary school students aged 7–12 years old (Grades 1–6) in educational institutions under the Primary Education Service Area Office, Nakhon Si Thammarat District, Nakhon Si Thammarat Province. Data were collected from August–October 2021.

2.2. Measures

The sample size was calculated using the G*Power Version 3.1.9.2 program, as used in the study on the effects of employing the program to enhance safety by integrating life skills with the concept of self-control on reducing the risk of drowning among junior high school students. The effect size was 1.51. In determining the influence size of the sample, the researchers determined the effect size of 0.7 at a 95% confidence level ($\alpha = 0.05$) with test power at 95%.

The calculation determined 45 cases to prevent sample shrinkage during the study. The researchers, therefore, set the sample size to be increased by 30%, thus obtaining 15 additional samples per group, resulting in a total of 60 samples per group. The sample group was selected by surveying schools in Nakhon Si Thammarat Primary Educational Service Area Office Area 1, which consists of 4 networks, totaling 109 schools using stratified random sampling from 4 networks. Finally, it yielded the Nakhon Si Thammarat network comprising of 58 schools, listing schools that provide educational curriculum for Grades 1–6 through simple random sampling without replacement. Two schools were randomly selected, one of which was a control school and the other an experimental school. The quota of ten students per class was randomly selected as specified in the samples. Students were divided into classes followed by sample drawing using samples without replacement for both male and female students. In the end, the number of experimental and control groups equaled 60 people each.

The inclusion criteria were as follows: (1) Primary school students in Grades 1–6, both boys and girls, aged 7–12 years old, and studying in an educational institution under Nakhon Si Thammarat Primary Educational Service Area Office Area 1, Nakhon Si Thammarat; (2) ability to communicate using the Thai language in speaking, reading, and writing; (3) willing to cooperate in the activities throughout the program; (4) no experience with drowning; and (5) consent of parents and children to participate in research throughout the program activities.

The exclusion criterion was if the sample group experienced health problems related to physical activities and was unable to perform body movements in the activities. Additionally, termination would be applied if they have congenital diseases, such as heart disease, blood disease, or cancer.

2.3. Research Instruments

1. Questionnaire on general information of primary school students, Grades 1–6 (i.e., general characteristics of primary school students)
2. An assessment form on the potential for drowning prevention among school-aged children, as follows:
 - (1) Assessment form on Drowning Prevention Knowledge, consisting of a total of 20 questions (a total score of 20), which was an instrument adapted from the study of the effects of a teaching program on the knowledge and attitudes to-

ward drowning prevention among school-aged children [20]. This experiment was carried out in a group of 30 similar students using the Kuder–Richardson Confidence Test with the formula KR-20, generating a reliability value of 0.84 for the assessment form.

- (2) Assessment form on Drowning Prevention Attitudes consisting of a total of 20 questions with 3 answers, Agree, Unsure, or Disagree, and 10 negative questions assessed on a 3-point scale (a total score of 60). The criteria-related scores were 3, 2, and 1 following the study of the effects of teaching programs on knowledge and attitudes toward drowning prevention among school-aged children [21]. The assessment form was trialed in a group of 30 similar students using the Cronbach alpha coefficient reliability formula. The reliability value of the assessment was 0.87.
 - (3) Assessment form on Drowning Prevention Behaviors consisting of 8 questions with 3 answers, Yes, Unsure, or No, and 1 negative question assessed on a 3-point scale (a total score of 24). The criteria-related scores were 3, 2, and 1 following the study of the effects of using a safety promotion program by applying life skills together with self-control concepts on junior secondary school students' reduction of drowning risks [18]. The experiment was trialed in a group of 30 similar students using the Cronbach alpha coefficient reliability formula. The students' reliability value was 0.76.
3. The Potential Support Program on Drowning Prevention, based on the concept of social support by House (1981) [20], emphasizes the promotion of the students' potential together with the teachers to promote knowledge, ability, and positive attitudes toward self-prevention against drowning. The focus consists of support in four areas: (1) Emotional support would be provided through discussions; knowledge exchange; and relationship-building to create trust, positive thoughts, and feelings in conducting activities. (2) Informational support would be provided, where children would learn in small groups to cultivate skills on self-prevention from drowning as well as skills to use safety equipment. (3) Instructional support would be provided through equipment support, learning guides for kids, a manual for nurses, and learning materials along with time and advice given to children on using the manual for self-directed learning. (4) Appraisal support would be provided to assist children in assessing their potential before participating in the program. There would be a reflection on what has been learned and practiced, as well as an assessment of one's knowledge, opinions, feelings, and potential.

The Potential Support Program on Drowning Prevention in Primary School Students, Grades 1–6, was adapted from House's social support concept that was modified from the Survival Swimming Curriculum and Handbook from the Bureau of Non-Communicable Diseases, Department of Disease Control, Ministry of Public Health, [22] combined with media featuring drowning prevention and a program guide, which had been content-validated by 5 experts. The IOC value equaled 0.98. Activities in the 8-week program consisted of two 60 min sessions. For the activities, the primary school students were divided into Grades 1–3 and Grades 4–6.

The activities were conducted as guided by the manual that was developed by the researchers. The concept of social support was integrated into four aspects: (1) emotional support, (2) appraisal support, (3) informational support, and (4) instructional support. The aims were for the students to promote knowledge, understanding, skills, and attitudes, and to be able to act appropriately in risky situations. The researchers conducted participatory educational activities for students including drowning prevention using teaching materials and teaching manuals that were easy for students to understand.

2.4. Data Collection

To prepare for the 8-week program, the researchers met with the sample group to clarify details one week before the experiment, introduce themselves, and explain the study

objectives as well as different stages entailed in the research. The researchers also asked for cooperation in answering the questionnaire and data collection activities. More importantly, the researchers explained to the participants their right to accept or decline research participation as well as clarification on confidentiality of information. The participants could stop participating in the research project or withdraw from the study at any time.

The researchers scheduled an appointment with both the experimental group and the control group at both schools to (1) collect general information from the students; (2) assess the knowledge, skills, and attitudes toward drowning prevention among primary school students in Grades 1–6 before using the program; (3) conduct potential promotion activities for the experimental group for 8 weeks, 2 days per week, with each session taking 60 min; and (4) assess the potential for drowning prevention among the students at the 8th week for both the control and experimental groups after the 8-week program.

The students were subdivided into two groups according to the activity levels in Grades 1–3 and Grades 4–6. Activities were arranged at schools and in the community with the focus on participatory activities giving students opportunities to exchange ideas by creating relationships and shaping good attitudes. The researchers also provided knowledge on underlined content about drowning prevention, problem-solving attitudes and techniques to prevent drowning, and drowning prevention skills both with and without life-saving equipment, as well as reflection on drowning prevention.

During the activities in the experimental group, teaching materials and lesson plans were applied, comprising of the handbook on promoting the potential for drowning prevention among students. The researchers also continually incorporated teaching materials, picture cards, diagrams, symbols, learning exercises, and equipment to practice drowning prevention skills. As for the control group, the students followed the school's curriculum.

The study was approved to proceed by the Human Research Ethics Committee, Walailak University (Project Certification Number WUEC-21-035-01).

2.5. Statistical Analysis

Statistics used in the data were analyzed using descriptive statistics, comparing the differences in general information among the experimental group and control group using the Chi-square and independent t-test statistics. The differences in mean scores suggesting students' potential for drowning prevention skills before and after the program in the experimental and control groups were analyzed using the paired sample t-test. The differences in mean scores suggesting students' potential for drowning prevention skills were tested to compare the experimental group and control group using independent t-test statistics.

3. Results

As for the general information of the sample consisting of 120 subjects, the average age was 9.5 years (SD = 1.72), with 37.5% male students and 62.5% female students. All students were in primary education in Grades 1–6. Each grade represented 16.7%. The majority of the sample group lived at home with parents (73.33%), and the remaining lived with grandparents (26.67%). The socio-demographic data of the students in the experimental group and the control group before participating in the program suggested no statistically significant difference ($p > 0.05$) as shown in Table 1.

Table 1. Socio-demographic characteristics of the study group ($n = 120$).

Data	Total ($n = 120$)		Control ($n = 60$)		Experiment ($n = 60$)		χ^2	p -Value	
	Number	%	Number	%	Number	%			
Age	(Min = 7, MAX = 12, Mean = 9.5, SD = 1.72)								
7–8 years	40	33.33	20	33.33	20	33.33	0.00	1.00	
9–10 years	40	33.33	20	33.33	20	33.33			
11–12 years	40	33.33	20	33.33	20	33.33			
Gender									
Boy	45	37.5	22	36.7	23	38.3	0.036	0.85	
Girl	75	62.5	38	63.3	37	61.7			
Education Level									
Grade 1	20	16.7	10	16.7	10	16.7	0.00	1.00	
Grade 2	20	16.7	10	16.7	10	16.7			
Grade 3	20	16.7	10	16.7	10	16.7			
Grade 4	20	16.7	10	16.7	10	16.7			
Grade 5	20	16.7	10	16.7	10	16.7			
Grade 6	20	16.7	10	16.7	10	16.7			
Child's Residence									
Live with parents	88	73.33	45	75.0	43	71.67	0.17	0.68	
Live with grandparents	32	26.67	15	25.0	17	28.33			

$p > 0.05$.

The results demonstrate low mean scores, suggesting the students' potential for drowning prevention before participating in the program in the control group and experimental group in each of the aspects: knowledge ($M = 16.05$, $SD = 3.39$; $M = 17.08$, $SD = 3.22$), attitudes ($M = 48.22$, $SD = 3.88$; $M = 48.48$, $SD = 6.24$), and behaviors ($M = 17.67$, $SD = 2.56$; $M = 17.97$, $SD = 3.13$; respectively). When comparing the mean scores for each aspect of the students' potential for drowning prevention before participating in the program between the control group and experimental group, there was no statistically significant difference ($p > 0.05$) as shown in Table 2.

Table 2. Mean scores and standard deviations regarding the samples' potential to prevent drowning between the experimental group and control group before participating in the program.

Potential of the Sample	Control Group ($n = 60$)		Experimental Group ($n = 60$)		Mean Difference	df	t	p -Value
	M	SD	M	SD				
Pre-Intervention								
Knowledge	16.05	3.39	17.08	3.22	1.03	118	1.71	0.09
Attitudes	48.22	3.88	48.48	6.24	0.27	118	0.28	0.78
Behaviors	17.67	2.56	17.97	3.13	0.30	118	0.58	0.57

$p > 0.05$.

The mean scores for the experimental group's potential for drowning prevention before and after receiving the program increased in all aspects: knowledge ($M = 17.08$, $SD = 3.22$; $M = 19.15$, $SD = 1.79$), attitudes ($M = 48.48$, $SD = 6.24$; $M = 55.23$, $SD = 4.66$), and behaviors ($M = 17.97$, $SD = 3.13$; $M = 21.00$, $SD = 2.50$) with statistically significant difference ($p < 0.001$) as shown in Table 3.

Table 3. Comparison of mean scores and standard deviations regarding the subjects' potential for drowning prevention before and after participating in the program ($n = 120$).

Subjects' Potential	Before		After		Mean Difference	df	t	p-Value
	M	SD	M	SD				
Experiment Group ($n = 60$)								
Knowledge (20 scores)	17.08	3.22	19.15	1.79	2.07	59	6.71	0.001 ***
Attitudes (60 scores)	48.48	6.24	55.23	4.66	6.75	59	9.31	0.001 ***
Behaviors (24 scores)	17.97	3.13	21.00	2.50	3.03	59	9.07	0.001 ***
Control Group ($n = 60$)								
Knowledge (20 scores)	16.05	3.39	16.15	3.22	0.10	59	0.59	0.56
Attitudes (60 scores)	48.22	3.88	48.37	3.61	0.15	59	0.52	0.60
Behaviors (24 scores)	17.67	2.56	17.85	2.64	0.18	59	1.47	0.15

*** $p < 0.001$.

When comparing the mean difference in the students' drowning prevention potential in the control group before and after participating in the program, there was no statistically significant difference ($p > 0.05$) in all aspects: knowledge (M = 16.05, SD = 3.39; M = 16.15, SD = 3.22), attitudes (M = 48.22, SD = 3.88; M = 48.37, SD = 3.61), and behaviors (M = 17.67, SD = 2.56; M = 17.85, SD = 2.64) as shown in Table 3.

When compared, the mean difference of the students' potential for drowning prevention in the experimental group in each of the aspects including knowledge, attitudes, and behaviors increased after participating in the program (M = 19.15, SD = 1.79; M = 55.23, SD = 4.66; M = 21.00, SD = 2.50; respectively). On the contrary, the control group showed relatively lower scores on the students' potential in drowning prevention in all aspects including knowledge, attitudes, and behaviors (M = 16.15, SD = 3.22; M = 48.37, SD = 3.61; M = 17.85, SD = 2.64; respectively).

When comparing the mean differences in the students' potential for drowning prevention between the experimental and control groups after participating in the program, it was found that there was a statistically significant increase in the experimental group ($p < 0.001$) as shown in Table 4.

Table 4. Mean scores and standard deviations regarding the samples' potential for drowning prevention between the experimental group and control group after participating in the program.

Samples' Potential	Control Group ($n = 60$)		Experimental Group ($n = 60$)		Mean Difference	df	t	p-Value
	M	SD	M	SD				
Knowledge	16.15	3.22	19.15	1.79	3.00	118	6.31	0.001 ***
Attitudes	48.37	3.61	55.23	4.66	6.87	118	9.03	0.001 ***
Behaviors	17.85	2.64	21.00	2.50	3.15	118	6.70	0.001 ***

*** $p < 0.001$.

4. Discussion

Based on House's concept, the results of the Student Potential Support Program on Drowning Prevention among primary school students suggested that post-intervention means demonstrated a statistically significant difference in the students' potential for drowning prevention in each aspect, including knowledge, attitudes, and behaviors, with an increase in the experimental group when compared to the control group. This is consistent with the pre-determined hypothesis. This is evident through the higher scores gained by the students in the experimental group after participating in the Student Potential Support Program on Drowning Prevention in all aspects, including knowledge, attitudes, and behaviors. The support focused on enhancing knowledge, understanding, attitudes, and behaviors in drowning prevention so that the students could cultivate accurate knowledge,

confidence, and behaviors in drowning prevention as well as the ability to help themselves and others when confronted with the situation.

Together with the teacher team, the researchers and community nurses directly provided social support to primary school students in all four areas, according to the concept of House [20]. The first type of support is emotional support emphasizing understanding, relationship building, and adjustment of positive attitudes to prevent drowning for students. The second is informational support underlining knowledge on the nature of drowning prevention, the danger of drowning, and the techniques for using life-saving equipment when faced with drowning. The third is instructional support emphasizing handbooks, teaching and learning materials, life-saving equipment against drowning, arrangement of the time for learning activities, and valuation support. The last is appraisal support allowing the students' potential to be assessed in terms of both knowledge and skills.

There was an appraisal of the students' potential in terms of knowledge, attitudes, and behaviors toward drowning prevention before and after participating in the program to understand the students' potential, confidence, and self-worth in learning before joining the program. The evaluation results after joining the program would project the changing potential of the students in both the experimental and control groups in terms of knowledge, ability to avoid and survive drowning, safety awareness, and ability to recognize their behaviors to prevent drowning and respond appropriately and safely to drowning events [1].

Potential for drowning prevention in students after participating in the program improved as shown in relatively higher scores regarding knowledge, attitudes, and behaviors compared to the control group. The mean scores on all three aspects in the experimental group were significantly higher than those in the control group. It has been shown that supporting students' drowning prevention potential through handbooks, learning materials, and direct transmission in learning activities has resulted in the students' effective learning and development of a good attitude as well as the ability to develop the right set of behaviors, constructing confidence in self-protection against drowning. This is consistent with the suggestions that school-aged children at the age defined by learning development and readiness can learn and be responsible for self-care [14,18].

This is an important element for developing the ability to take care of oneself and to be able to understand the behaviors that positively affect one's health. The process occurs under the supervision of adults giving advice. This is based on the belief that having knowledge and good self-care attitudes will result in the development of good behaviors going forward [11,17,18]. On the other hand, in the control group, which received no potential support program for drowning prevention, the students showed a poor level of knowledge, attitudes, and behaviors in preventing drowning. It is quite evident that in promoting the potential of school-aged children's learning and attitudes, the researchers should organize interesting and short-term activities with the assistance of learning-boosting media that stimulates learning interest. This can assist the students in the memorization of the story. The program yielded promising learning outcomes and an emphasis on participatory learning, teaching students to use protective equipment in the event of a drowning. This is consistent with the study on drowning prevention operations among children, affirming that the focus on participatory learning is essential [11,23]. Likewise, it is in line with the results of the evaluation of drowning prevention performance among children under 14 years of age in Nakhon Ratchasima Province, proposing that drowning prevention should be directed to children themselves, which would lower the rate of drowning in school-aged children [24]. Additionally, the evaluation of drowning prevention operations among children in Nakhon Si Thammarat Province found that successful implementation of drowning prevention originates from educating them [19]. Teaching them drowning prevention skills, social policies and social support, and cooperation from teachers in facilitating and monitoring the behaviors of students at the school will help students achieve their goals [25,26]. In this research, there has been tremendous cooperation from the chil-

dren and their families and the teachers. In conclusion, the experimental group and control group were significantly different in all aspects with a statistically significant difference.

The limitations in this study were due to the COVID-19 pandemic situation, causing a delay in the process of the program in teaching and learning and the follow-up with participants. The sample size of 120 participants might represent a community in Nakhon Si Thammarat but not a whole country. In addition, the number of samples included more girls than boys in each group, and the mean scores of the experimental group were a little higher than the control group before participating in the program but with no statistically significant difference. For further research on the subject, potential support programs for drowning prevention among children should be developed for student leaders and families. This will help to strengthen the knowledge, attitudes, and behaviors in drowning prevention and improve the potential to prevent drowning among students and family members.

5. Conclusions

The Potential Support Program on Drowning Prevention in Primary School Students was able to develop students' potential to prevent drowning in terms of knowledge, attitudes, and behaviors, which can be seen by the significant increase in the average scores. As a research suggestion, the researchers should follow-up with the school-aged children from this study in regard to the effects of the program on drowning prevention.

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Informed Consent Statement: Informed written consent was obtained from all parents and subjects involved in the study.

Data Availability Statement: The data that supported this study's findings are available from the corresponding author upon reasonable request.

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