Randomized Controlled Trial of Acute Respiratory Infection Prevention Program among Children with Tonsil Enlargement

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Abstract: Children with frequent acute respiratory infections are likely to have tonsil enlargement, adversely affecting health and development. This randomized controlled trial study was conducted to determine the effects of acute respiratory infection prevention programs on self-care agency and specific health outcomes measured by frequent respiratory infections and tonsil enlargement among children aged 10-12 years old with tonsil enlargement. Sixty-two children were randomly selected from three schools within 50 districts of the Bangkok Metropolis and then randomly assigned to either experiment (n = 31) or control group (n = 31). The experimental group received the acute respiratory infection prevention program and routine care, whereas the control group received only routine care. The instruments used to collect the data were the demographic information interview, the self-care agency interview for children with tonsil enlargement, the number of respiratory infections in the last three months data interview, and the tonsil grading system. Data were analyzed using descriptive statistics, parametric and nonparametric statistics with related samples and two independent sample t-test.

Results revealed that the experimental group had significantly higher self-care agency, fewer respiratory infections during the last three months, and significantly smaller tonsil enlargement than the control group. Moreover, the experimental group had significantly higher self-care agency, fewer respiratory infections during the previous three months, and significantly smaller tonsil enlargement than before receiving the interventions. The findings suggested that this program helps improve self-care agency and specific health outcomes in children with tonsil enlargement. The findings of this study provide evidence for promoting the school nurses and teachers and for further research to validate the results before implementing the practice.

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Introduction

Acute respiratory infection (ARI) in children is a significant health problem in most countries worldwide.[1] Normally, children get upper respiratory tract infections due to a common cold or rhinitis at

least 6-8 times per year,[2] but they can experience these more if their parents do not know how to take care of their children.[3] Because viruses are the most common cause in most ARI cases, estimated at 50 to 60%, antibiotics do not have a role in the early treatment of the diseases.[4,5] Supportive treatments during infection are the only way to prevent serious complications.[2,5] If children receive appropriate treatments and care, they will be better in a week or two. If not, some chronic respiratory problems will follow. Tonsil enlargement is one of the most common for ARI diseases,[3,5,6] thus, avoidance of frequent infections is recommended, and prevention plays a key role.[5,6]

The tonsils are immunocompetent organs located at both sides of the pharynx, serving as the immune system's first line of defense against ingested or respiratory pathogens.[7] The tonsils can become more prominent if children get frequent respiratory infections.[6,7] Tonsil enlargement is when the tonsils become more enlarged than usual, usually caused by inflammation and recurrent tonsillitis. Recurrent tonsillitis creates grooves or crevices that allow particles to remain and cause chronic inflammation to continue.[7,8] Enlarged tonsils can cause either recurring inflammation or difficulty breathing. Snoring or, worse, obstructive sleep apnea can be found in children with large tonsils.[6,7,9] Frequent and severe desaturation during sleep apnea will affect the growth and development of children. Sleep is essential in early adolescence, which is a learning age.[9,10] Daytime sleepiness, one of the most found symptoms of obstructive sleep apnea, can affect the learning process at school for adolescents.[6,9] Previous studies reveal that the number of tonsil enlargements in early adolescents tends to increase,[10,11,12] as found in this study.

The tonsils are the first stronghold against foreign pathogens, so the more children frequently get respiratory infections, the more tonsil enlargement affects to the upper respiratory tract.[6,7,8] Hence, this study aimed to develop and test whether the Acute Respiratory Infection (ARI) Prevention Program could increase self-care agency and reduce the frequency of ARI and tonsil enlargement.

Review of Literature

Orem's Self-care Deficit Theory,[13] ARI Guidelines for children[2,14] and a literature review on the care of children with ARI,[15,16,17,18] were used to develop and implement the ARI Prevention Program in this study.

The key concepts in Orem's Theory[13] are self-care agency, self-care demand, self-care deficit, nursing agency, and self-care. Self-care is the activities that individuals initiate and perform to maintain life, health, and well-being, in which adults voluntarily care for themselves.[13] Infants and children require care from others because they are physically, psychologically, and psychosocially in the early stage of development.[13] Self-care agency is the ability of the individual to seek and utilize knowledge and perform self-care activities.[13] Self-care demand is the total self-care requirement to maintain or restore health and well-being.[13] As Orem postulated, self-care demand increases when health deviation occurs, and if self-care agency is not enough to meet these demands, then a self-care deficit exists.[13] Thus, nurses must exercise their nursing agency by designing a nursing system to increase self-care and meet those demands.[19,20]

Children aged 10-12 have progressed from making judgments based on what they see (perceptual thinking) to making judgments based on reason (conceptual thinking)[21] and can perceive and understand the illness, have thinking ability to solve problems, make decisions and perform actions independently.[21,22] However, when they have a health problem like tonsil enlargement, their self-care agency may not be enough to meet self-care demands to prevent ARI. Thus, nurses exercise their agency in designing educative support for teaching, guiding and directing, providing physical and psychological support, and maintaining the environment conducive to performing self-care.

Various guidelines have been established[2,14] to take care of ARI in children. These guidelines usually include: eating healthy food, drinking clean water, 6-8 glasses, stay in a well-ventilated area, avoid air pollutants such as particulate matter and smoke exposure (mainly ambient particulate matter, $PM_{2.5}$ significantly associated with the development of ARI, especially in children exposed to high concentrations of $PM_{2.5}$),[17] get enough sleep 9-11 hour/day, keep the body clean, take a shower, wash hair, cut nails, do not share personal items with other people, exercise at least 2-3 times a week, doing enjoyable activities, such as reading cartoons, watching movies, and listening to music, and helping parents with housework.[15]

Hand hygiene is the most effective and practical way to prevent ARI in children by washing hands with soap or alcohol before eating and touching the nose, eyes, or mouth. Moreover, hand washing can be easily practiced, convenient, and economical.[4,16,18] Face masks have proved to be the best way to prevent ARI.[16,18] Effective tepid sponges help reduce fever and increase comfort.[14] Children who use saline nasal washes six times per day have a faster resolution of nasal secretion and nasal obstruction, and reduced use of antipyretics, decongestants, and antibiotics[16] and early adolescents (aged 10-12) can do this safely by themselves after they are taught about these.[18,23,24]

Telephone follow-up has been utilized with a record diary can help children take care of themselves. A telephone follow-up is a stimulant, continuously promoting, supporting, and reassuring children to do self-care, improving health outcomes, and saving cost[25,26] and providing support by complimenting and encouraging. Home visits providing help to reassure children and their families to maintain children's self-care agency.[27] Many studies showed that family members can help, influence, and encourage children to keep their self-care agency properly.[28,29,30]

Even though previous studies suggest the benefit interventions mentioned above, there are few studies in children aged 10-12 years old with tonsil enlargement. Thus, this study investigated the effect of a developed ARI Prevention Program with the following hypotheses:

1. Mean scores of self-care agency in the experimental group would be significantly higher. In contrast, the number of respiratory infections during the last three months would be significantly fewer, and tonsil enlargement would be significantly smaller than that of the control group measured at week 12 of the intervention program.

2. In the experiment group, the mean scores of self-care agency would be significantly higher, whereas the number of respiratory infections during the last three months would be fewer, and tonsil enlargement measured in week 12 of the program would be significantly smaller than pre-intervention.

Methods

Design: A randomized controlled trial (RCT) was used in this study and is reported here using the Consolidated Standards of Reporting Trials (CONSORT) guideline.

Sample and Setting: The sample were children aged between 10-12 years with tonsil enlargement. The sample size was calculated using G*power, with the level of significance (α) = .05, power of test = .80, and an estimated effect size of 0.7 based on a previous study.[30] Following the calculation, together with a 20% possible attrition rate, the optimal total sample size was 62. Inclusion criteria comprised 1) aged between 10-12 years; 2) tonsil enlargement grade 1 or grade 2; 3) no underlying diseases such as allergies, asthma, cancer, heart diseases, autoimmune disease; 4) ability to listen, speak, read, and write in Thai; and 5) able to be contacted by telephone. Exclusion criteria were those who participated in the study less than 80%.

This study was carried out in Metropolitan Bangkok, Thailand. Multi-stage random sampling was used to recruit the participants. There were 50 districts with 437 elementary schools, where the children aged 10-12 years attended. Simple random sampling was

used to select 50 schools in each district, then three schools out of 50 schools were again selected using simple random sampling by lottery method. There were 1,058 children aged 10-12 years in these three schools. Then the primary investigator (PI) performed screening to select 385 children of tonsil enlargement. Finally, random sampling by the lottery method with matching by gender and tonsil enlargement was used to select sixty-two (62) out of 385 children and then randomly assigned to the experiment (n = 31) or control group (n = 31). **Figure 1** shows the flow of the participants.

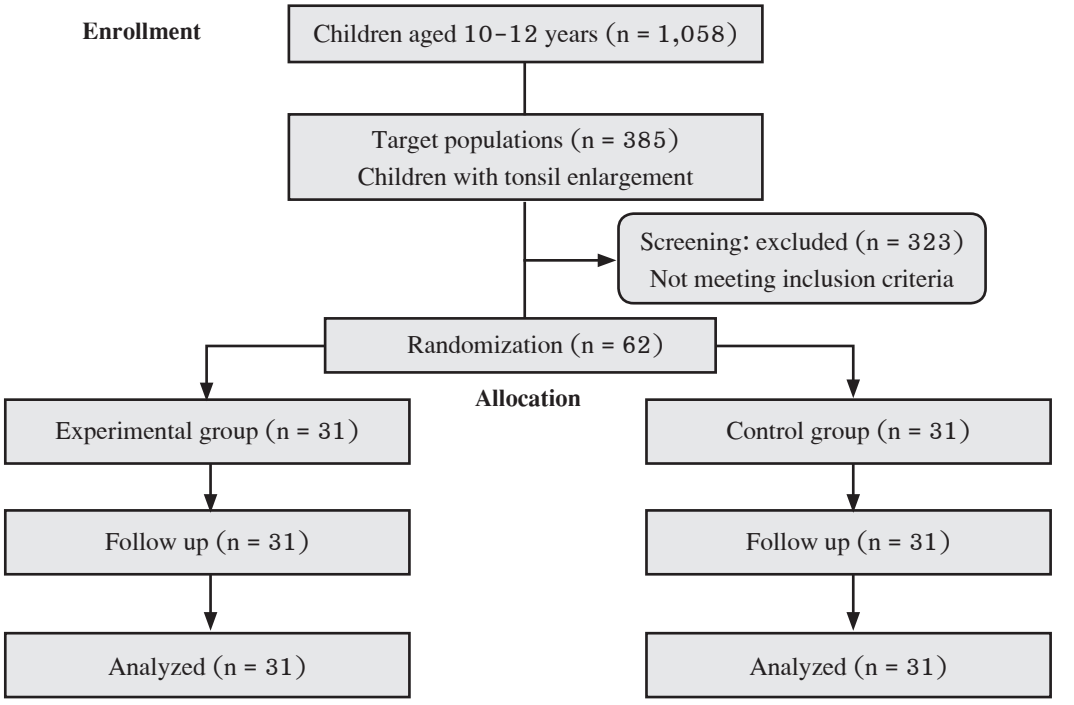

Figure 1: Flow chart of participants

Ethical Considerations: Approval of this study was obtained from the ethics committee, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Thailand (COA. MURA 2020/155). The PI introduced the study to the children, and their parents, explained the study objectives, processes, benefits, potential risks, and confidentiality, then asked participants' parents for permission. During the study, participants were assured that they could withdraw at any time if they wished, and this would not affect the school or health care service. All participants' identities were kept confidential, and data were presented only as group data without individual identification. After the children gave assent to participate with the agreement of their parents, they were asked to sign an informed consent form.

Research Instrument: The data collection instruments consisted of three parts:

Part 1. The Demographic Information Interview was developed to obtain the participants' gender, date of birth, age, weight, height, body mass index, educational level, underlying diseases, type of family, type of housing, number of family members, history of household smokers, information received about the common cold.

Part 2. The Self-care Agency Interview for Children with Tonsil Enlargement was modified from the Self-care Agency for Caregivers of the Toddler with Pneumonia

developed by Primkamol Kaewchuay[32] with permission. The original questionnaire was based on Orem's Self-Care Deficit Theory[13] and consisted of 45 items. In this study, the researchers modified the questions to suit the context of children and asked 27 questions, divided into three sections: 1) universal self-care requisites (12 items) such as brush teeth at least two times a day, morning and evening; 2) developmental self-care requisites (4 items) such as when you feel bored you will do your favorite activities such as watching movies, listening to music, playing games, drawing a picture, reading comic books; 3) health deviation self-care requisites (11 items) such as when you have a fever you ask parents for help with tepid sponging to reduce fever. The questions were rated on a 4-point rating scale (1 = never practice, 2 = practice 1-3 days per week, 3 = practice 4-6 days per week, and 4 = practice every day per week). The total score ranges from 27-108, a higher score indicating better self-care agency. Three experts validated this questionnaire: a physician, a respiratory practice nurse specialist, and a nursing faculty member. The content validity index (CVI) was equal to 1.0. The reliability was pre-tested with 30 children who had the same characteristics as the studied participants. The Cronbach's alpha reliability was .762 in the pilot study and .736 in the main study.

Part 3. The Specific Health Outcomes consists of two instruments to obtain information on the number of ARI in the last three months and the grade of tonsil enlargement.

The PI asked the question, Did you have any of the following symptoms in the last three months, such as fever, sore throat, cough, hoarseness, runny nose, or purulent sputum, and were you sick with a common cold? The answers options could be: never had a common cold in the last three months, got a common cold 1-2 times in the last three months, and got more than or equal to 3 common colds in the last three months.

The Tonsil Grading System of Friedman[31] is standardized and commonly used to assess tonsil enlargement during physical assessment. A score is assigned from 0 to 4: Grade 0 = absence of tonsillar tissue, Grade 1 = within the pillars, Grade 2 = extended to the pillars, Grade 3 = extended past the pillars, and Grade 4 = extended to the midline.

The ARI Prevention Program:

The researchers developed this program based on guidelines to take care of ARI in children,[2,14] literature reviewed on the care of children with ARI,[15,16,17,18] and the concept of the supportive-educative nursing system from Orem's Theory.[13] The intervention content was drawn from the guidelines and literature about taking care of ARI in children presenting in a comic book. Examples of the content about tonsil enlargement were: the meaning of tonsils, the danger of tonsillitis, symptoms, effects of the common cold, and self-care to prevent and treat a cold. Other content was self-care related to daily living. The detail of the intervention program and the implementation are shown in **Table 1**.

Table 1 Schedule, content, helping method and activities of ARI Prevention Program, experimental group

Time schedule	Contents	Helping method / Activities
Week 1 (35 min)	Knowledge of ARI includes the definition, signs and symptoms, complications, self-care for prevention and treatment of ARI	Helping method: teaching; guiding and directing; providing physical and psychological support; providing and maintaining the environment **Activities:** 1. Establish a relationship of trust 2. Teach and educate using comic books "Colds are Easy to Prevent" by PI explained additional content for clear and let the sample group read the book simultaneously

Table 1 Schedule, content, helping method and activities of ARI Prevention Program, experimental group (Cont.)

Time schedule	Contents	Helping method / Activities
		3. Provide opportunities for interaction and communication with PI and themselves 4. Supporting by giving a compliment and encouragement 5. Give a comic book to read at home 6. Distributed a telephone follow-up record form. Explain how to make notes to remember
Week 2 (50 min)	- Self-care for prevention and treatment of ARI. - ARI prevention and treatment for practice	Helping method: teaching; guiding and directing; providing physical and psychological support; providing and maintaining the environment **Activities:** 1. Teach and educate while using comic books "Colds are Easy to Prevent" by review the content by giving the sample group to read comic books 2. Teach and demonstration by PI, after that return demonstration in each individual about the health deviation from ARI, consisting of advice on the use of masks, hand hygiene in healthcare, tepid sponge, and nasal irrigation 3. Provide opportunities for interaction and communication with PI and themselves 4. Supporting by giving a compliment and encouragement 5. Give self-care supplies to use at home
Week 3-11 (5-10 min/ week)	Counseling and monitor self-care by interview and record	Helping method: guiding and directing; providing physical and psychological support; providing and maintaining the environment **Activities:** Phone follow-up 1. Assess the self-care agency at home 2. Monitor and stimulate the self-care behaviors for preventing ARI continuously 4. Provide opportunities for interaction and communication with PI
Week 12 (30 min)	Knowledge of prevention and treatment ARI based on each family context	Helping method: teaching; guiding and directing; providing physical and psychological support; providing and maintaining the environment **Activities:** Home visit 1. Assess self-care agency and health outcomes after receiving intervention 2. Provide opportunities for interaction and communication with PI and family 3. Provide an environment to promote the child self-care agency by following home visits 4. Inform the end of the study

Routine care: Routine care refers to the regular health education by the teachers at school and by the parents at home for children with tonsil enlargement.

Data Collection: This was conducted between February 2020 to May 2020, after receiving permission from the school's director. The PI approached the parents and children through the school nurse or the officer who worked in the infirm unit in each school to make an appointment and provide a private room. Before beginning the intervention, the PI collected demographic characteristics, self-care agency, the number of respiratory infections during the last three months, and tonsil enlargement of the control and experimental groups as baseline data (week 1), then implemented the intervention over 11 weeks. One week later (week 12), the PI collected the data regarding self-care agency, the number of respiratory infections during the last three months, and tonsil enlargement of both groups.

Data Analysis: This was conducted using the eSPSS program version 26. The statistical significance level was determined at 0.05. Descriptive statistics were used to describe the demographic data. The independent t-test was used to describe the statistical difference of the mean scores of self-care agency, and Mann-Whitney U test to test the difference of the mean scores of the number of respiratory infections during the last three months and tonsil enlargement between the two groups. A paired t-test was used to describe the statistical difference of self-care agency. Wilcoxon Signed Ranks Test was used to test the difference in respiratory infections during the last three months and tonsil enlargement in the experimental group between pre-and post-intervention

Results

More than half of the participants in both groups had never received any information about preventing respiratory tract infection (67.70% in the control and 71.00% in the experimental group). 54.80% and 45.20% had tonsil enlargement in grade 1 and grade 2, respectively, in both groups. There were no significant differences in participants' demographic data, as shown in **Table 2**.

Table 2 Comparison of demographic characteristics between the control group and the experimental group

Characteristics	Control group (n = 31)	Experimental group (n = 31)	p-value
Age (year), (Mean ± SD)	10.77±0.72	10.65±0.61	.45 [a]
Gender, n (%)			1.00 [b]
Male	18(58.10)	18(58.10)	
Female	13(41.90)	13(41.90)	
Underlying disease, n (%)			1.00 [b]
No	30(96.80)	31(100)	
Yes	1(3.20)	-	
Type of family, n (%)			.27 [b]
Single family	7(22.60)	12(38.70)	
Extended family	24(77.40)	19(61.30)	
History of household smokers, n (%)			.61 [b]
No	12(38.70)	15(48.40)	
Yes	19(61.30)	16(51.60)	
Taught about colds, n (%)			1.00 [b]
Never	21(67.70)	22(71.00)	
Ever	10(32.30)	9(29.00)	

Table 2 Comparison of demographic characteristics between the control group and the experimental group (Cont.)

Characteristics	Control group (n = 31)	Experimental group (n = 31)	p-value
The number of respiratory infections during the last 3 months, n (%)			1.00[b]
Never	2(6.40)		
1-2 times	11(35.50)	12(38.70)	
≥ 3 times	18(58.10)	19(61.30)	
Tonsil enlargement, n (%)			1.00[b]
Grade 1	17(54.80)	17(54.80)	
Grade 2	14(45.20)	14(45.20)	

Note: a = Independent t-test; b = Chi-square test

Effect of ARI Prevention Program

The result revealed that mean scores of self-care agency, respiratory infections during the last three months, and tonsil enlargement measured at pre-test were not significantly different between the experiment and the control groups. However, when comparing the two groups after completion of the program (week 12), the mean self-care agency scores in the experimental group were significantly higher. In contrast, the number of respiratory infections during the last three months was significantly fewer, and tonsil enlargement was significantly smaller than the control group **(Table 3).**

From the results, the post-intervention (week 12) the post-test mean score of self-care agency of the experimental group was significantly higher than the pre-test means score ($p < .001$). In contrast, the number of respiratory infections during the last three months was significant and tonsil enlargement measured was significantly smaller than pre-intervention ($p < .001$) **(Table 3).** In summary, the ARI Prevention Program improved self-care agency and reduced respiratory infections and tonsil enlargement among children aged 10-12 years old with tonsil enlargement.

Table 3 Comparison pretest and posttest mean score of self-care agency, the numbers of respiratory infections during the last three months and tonsil enlargement between control group and experimental group

Variables	Control group (n = 31)	Experimental group (n = 31)	p-value
	Mean (SD)	Mean (SD)	
Self-care agency			
Pretest	70.84(9.65)	70.03(9.87)	.746[a]
Posttest	65.48(7.36)	94.55(6.50)	p<.001[a]
Specific health outcomes			
The numbers of respiratory infections during the last three months			
Pretest	2.52(0.63)	2.61(0.49)	.652[b]
Posttest	2.10(0.65)	1.13(0.43)	p<.001[b]
Tonsil enlargement			
Pretest	1.45(0.51)	1.45(0.51)	1[b]
Posttest	1.87(0.76)	0.61(0.72)	p<.001[b]

Note: a= t-test; b = Z- test

Discussion

According to the study, the effect of the ARI Prevention Program supported both hypotheses, explained that the program developed based on Orem's Theory using a supportive-educative nursing system could encourage children aged 10-12 years to increase self-care agency and reduce the frequency of ARI and tonsil enlargement.

The findings of previous studies are similar to this study.[26,27,29] Children in the experimental group were educated and followed up from weeks 1-12. Initially, a good relationship was established. Moreover, teaching was provided by lecture, demonstration, and return-demonstration so that children would gain knowledge and have self-care agency. A comic book was used as teaching material. According to the literature review, several studies that used comic books positively affected learning outcomes were attractive, easy, and promoted understanding and memory.[26,27] Children were encouraged to develop self-care agencies properly. There was a self-care handbook on the back of the comic book. Because children may not remember all the details, bringing comic books back home would allow the children to review and quickly gain more understanding.[27]

In addition, this study also used learning methods by engaging children in learning activities (learning by doing) in compliance with children aged 10-12 years. According to Piaget's theory,[21] grown-up children have logical thinking, are in a concrete operational stage, and perform what they were taught via demonstration and return demonstration regarding hand hygiene, wearing a mask, nasal irrigation, and tepid sponge. This method helped enhance children's learning ability and recognition persistence, encouraging practice, self-learning, and promoting long-term memory, contributing to better self-care agency.[13] Giving guidance by giving more advice about unknown contents or incorrect practices to each individual and reviewing existing knowledge before providing the new related ability would promote better understanding and learning. This helps children realize the importance of taking deliberate action and performing goal-oriented behavior, promoting self-care agency following Orem's Theory.[13] In addition, telephone follow-up was implemented nine times during the implementation for 5-10 minutes each time and used a call log form for home visit tracking purposes. When children had a problem, they could record it in their book, and the researcher could provide accurate advice and guidance. This activity helped promote self-care agency in the phase of action.[26]

Providing support by giving encouragement and compliments when children could practice or answer questions correctly helped motivate children to be enthusiastic in performing self-care continuously. According to Orem's Theory, motivation is one of the ten power components that promote a better self-care agency.[13] Building an environment increased children's motivation to set appropriate goals and adjust to achieve their goals.[13] Follow-up home visits allowed the researcher to have opportunities to interact with children and their families, meet and see the natural environment around children's homes. This gave a chance to introduce knowledge suitable for the context of each family. Families were encouraged to involve in the adequate and continuous development of children's self-care agency. In past studies, families had a significant influence in promoting appropriate self-care agency of children.[29]

The ARI Prevention Program used in this study demonstrated to work well to prevent frequent ARI. As shown in **Table 3**, after the intervention, the post-test mean score of self-care agency in the experimental group increased significantly compared to before the intervention and compared with the control group. The self-care score was raised. It was shown that the mean scores of respiratory infections during three months of intervention and the tonsil enlargement among the experimental group decreased significantly. As mentioned in the guideline, to take care of ARI in children,[2,14] prevention is crucial for ARI treatment. Teaching children how to take care of themselves is efficient in preventing them from being infected with respiratory illness.

Firstly, everyday needs could keep them healthy by maintaining good hygiene, eating healthy food, drinking enough water, and sleeping at least 8 hours per day. Secondly, keep their developmental needs such as regular exercises, reading, watching movies, listening to music, helping parents with housework made them physically and mentally strong. Lastly the program taught the children how to prevent ARI, such as wearing the mask, hand hygiene, social distancing, caring for themselves when getting ill such as a tepid sponge, and nasal irrigation. These are known essential protocols to prevent children from all respiratory infections, which were transferred to one other via airborne and exposed with the secretion,[4,16,18,20,33] and when the number of respiratory infections decreased, good health outcomes were achieved. It was found that the size of tonsils in the experimental group decreased significantly **(Table 3)**.

Moreover, our findings support the benefit of the ARI Prevention Program and supports the validity of Orem's Theory as an supportive-educative nursing system.

Limitations

This study has limitations, both internal and external validity. The PI provided the intervention and data collection; thus, internal validity cannot be avoided. In addition, the study was conducted at Bangkok Metropolis schools, therefore, generalization is limited. The outcomes were measured one week after the program's completion, so sustainable self-care agency and specific health outcomes are questionable, and a longitudinal study over a longer period of time is warranted.

Conclusions and Implications for Nursing Practice

According to the study, children aged 10-12 years with tonsil enlargement who received ARI Prevention Program gained more self-care agency to prevent frequent acute respiratory infection and reduce the effects of their tonsil enlargement at the end of the study. Nurses can use this ARI Prevention Program for children aged 10-12 years with tonsil enlargement and may extend to grown-up children who could properly perform self-care to prevent acute respiratory infection. However, we recommend the program to be tested with other groups of adolescents over longer periods of time, such as six months or 12 months, to assess the sustainability of self-care agency among children with tonsil enlargement using RCT with a blinded study. In addition to developing teaching materials via the social network, online platforms, and an electronic handbook is needed for more accessibility.

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การทดลองแบบสุ่มชนิดมีกลุ่มควบคุมผลของโปรแกรมป้องกันการติดเชื้อเฉียบพลันระบบหายใจในเด็กที่มีต่อมทอนซิลโต

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บทคัดย่อ: เด็กที่ติดเชื้อในระบบหายใจเฉียบพลันบ่อยครั้งมักมีต่อมทอนซิลโต ซึ่งส่งผลเสียต่อสุขภาพและพัฒนาการ การทดลองแบบสุ่มชนิดมีกลุ่มควบคุมนี้ มีวัตถุประสงค์เพื่อศึกษาผลของโปรแกรมป้องกันการติดเชื้อเฉียบพลันในระบบหายใจต่อความสามารถในการดูแลตนเองและผลลัพธ์ด้านสุขภาพจากการติดเชื้อเฉียบพลันในระบบหายใจและการโตของต่อมทอนซิลในเด็กอายุ 10-12 ปีที่มีต่อมทอนซิลโต กลุ่มตัวอย่างจำนวน 62 คนได้รับการสุ่มเลือกจาก 50 เขตของโรงเรียนทั้งหมดในสังกัดกรุงเทพมหานคร หลังจากนั้นจะถูกสุ่มให้เป็นกลุ่มทดลอง 31 คน และกลุ่มควบคุม 31 คน ตามลำดับ โดยกลุ่มทดลองได้รับโปรแกรมป้องกันการติดเชื้อเฉียบพลันในระบบหายใจควบคู่กับการดูแลแบบปกติ และกลุ่มควบคุมได้รับการดูแลแบบปกติ เครื่องมือที่ใช้ในการเก็บรวบรวมข้อมูล ได้แก่ แบบสัมภาษณ์ข้อมูลส่วนบุคคล แบบสัมภาษณ์ความสามารถในการดูแลตนเองของเด็กที่มีต่อมทอนซิลโต จำนวนครั้งของการติดเชื้อระบบหายใจในช่วงสามเดือนที่ผ่านมา และระบบเกรดของต่อมทอนซิล วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนา สถิติพาราเมตริก และสถิตินอนพาราเมตริก ได้แก่ สถิติการทดสอบสองกลุ่มแบบสัมพันธ์กัน และสถิติการทดสอบสองกลุ่มแบบเป็นอิสระกัน

ผลการศึกษาพบว่า กลุ่มทดลองที่ได้รับโปรแกรมป้องกันการติดเชื้อเฉียบพลันในระบบหายใจมีคะแนนเฉลี่ยความสามารถในการดูแลตนเองสูงกว่า มีจำนวนครั้งของการติดเชื้อระบบหายใจในช่วงสามเดือนที่ผ่านมาน้อยกว่า และมีเกรดของต่อมทอนซิลโตน้อยกว่ากลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติ นอกจากนี้กลุ่มทดลองยังมีคะแนนเฉลี่ยความสามารถในการดูแลตนเองสูงกว่า มีจำนวนครั้งของการติดเชื้อระบบหายใจในช่วงสามเดือนที่ผ่านมาน้อยกว่า และมีเกรดของต่อมทอนซิลโตน้อยกว่าก่อนได้รับโปรแกรมอย่างมีนัยสำคัญทางสถิติ โปรแกรมการป้องกันนี้สามารถใช้ประโยชน์เพื่อพัฒนาความสามารถในการดูแลตนเองและผลลัพธ์ด้านสุขภาพที่สำคัญในเด็กที่มีต่อมทอนซิลโต ผลการศึกษานี้ได้นำเสนอหลักฐานเชิงประจักษ์ในการส่งเสริมการดูแลของพยาบาลประจำโรงเรียนและครู เพื่อที่จะได้ศึกษาวิจัยเพิ่มเติมให้ผลลัพธ์ที่ถูกต้องก่อนนำไปปฏิบัติใช้จริงต่อไป

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คำสำคัญ: การติดเชื้อเฉียบพลันในระบบหายใจ เด็ก ผลลัพธ์ด้านสุขภาพ โปรแกรมป้องกัน การทดลองแบบสุ่มชนิดมีกลุ่มควบคุม ความสามารถในการดูแลตนเอง ต่อมทอนซิลโต

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