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The Effect of Educational Intervention Based on the Health Promotion Model in Prevention and Caring for Children with Acute Respiratory Infection Among Rural Mothers in Vietnam: A Random Control Trial

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ABSTRACT

Purpose: The goal of this study was to assess the effect of an educational intervention based on the Health Promotion Model (HPM) among rural mothers living in Vu Ban district, Nam Dinh province, Vietnam.

Methodology: A random control trial study was conducted at the rural areas in Vu Ban district, Nam Dinh province, Vietnam from September 2020 to June 2022. Among 204 mothers participating in the study, they were allocated randomly into an experimental group (n=102) and a control group (n=102). An educational intervention was developed based on the Health Promotion Model.

Findings: At baseline, there were no differences between the two groups about general characteristics and mothers' knowledge, attitude and practices before intervention with p > 0.05. After 12 months of the intervention, the percentage of satisfactory knowledge, attitude and practices about prevention and caring for children with acute respiratory infection in the experimental group were higher than those of the control group (p < 0.05). Research results indicated that an educational program based on the Health Promotion Model can improve the behavior in prevention and caring for children with acute respiratory infection among rural mothers. Therefore, the educational intervention program based on the Health Promotion Model should be expanded to mothers living in other rural areas of Vietnam.

Keyword: Acute respiratory infection, Health promotion model, Educational interventions, Rural mothers

INTRODUCTION

Acute respiratory infection is a common syndrome in children under 5 years old who the leading position in morbidity and mortality in the world [1]. Pneumonia is the leading cause of death in children [2]. The study of author Gyawali M and et al in 2016 showed that mothers are the primary caregivers for under-five children. Thus, any deviations in health of children are recognized firstly by mothers. Mothers with better educational level have better knowledge about ARI. Therefore, programs improve knowledge using appropriate interventions such as radio and television are necessary to increase mothers' knowledge levels [3]. Mothers' knowledge, attitude and practices in caring for children play an important prevention measure that contributes to reduce morbidity and mortality due to ARI in children [4]. However, some studies indicated that mothers' knowledge, attitude and practices about ARI were remain low [4,5]. The study of Prasanna K. L, Sharma N. K revealed that majority of mothers had inadequate knowledge

about ARI, and prevention of ARI; Different teaching strategies would help the mothers to updates with necessary knowledge about prevention of ARI. Mothers should be encouraged to enhance their knowledge regarding prevention of ARI for proper care, support and timely management to prevent complication of children [6]. The study of Lalisa C.G and Sheka S.S, there was significant proportion of the mothers had poor practice about ARI (42.85%) [7]. In general behavior of members in both

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nuclear and extended family types impact on the prevention of ARI among the children. This suggests need to support mothers or caregivers [8]. Therefore, it is necessary to have intervention programs in the community that applies Pender's "Health Promotion Model" to guide nursing interventions to improve mothers' behavior in caring for children with ARI [9].

Applying Health Promotion Model in research:

Research applying the theory: Health Promotion Model (HPM) by Nola Pender (1996). The model focuses on explaining behaviors in health promotion. According to the model, perceived barriers and benefits in improve caring practices will lead to motivate behavior promoting health. A good assessment of health behaviors is the foundation for adjusting the health promotion and prevention plan in children. Assessment provides a basis for making clinical assessments, health problems, nursing diagnoses, desired health or behavioral outcomes, and measures intervention may be effective [9]. In this study, the theory has provided methods to evaluate mothers' health-promoting behaviors and guide nursing interventions to improve mothers' behaviors in caring for children

Sample: Mothers who fulfill the inclusion criteria

Sampling criteria

Inclusion criteria:

Mothers who:

- Have children under 5 years old
- Were present in the selected community
- Were willing to participate in the study
- Were living in a rural area from October 2020 to December 2021.

Exclusion criteria: Mothers are unable to write or communicate.

Sampling technique: The simple random technique used to select the samples based on inclusion and exclusion criteria. Mothers in each commune by own number in the list. Use Excel software to randomly select mothers. Mothers who do not agree to participate in the study or do not meet the selection criteria will be eliminated and replaced with another random number, ensuring that subjects participate meet the inclusion and exclusion criterias. In the end, the actual number of mothers participating was a total of 204 mothers include 102 mothers in the experimental group and 102 mothers in the control group. The questionnaire was based on the WHO guidelines [10]. The tool was validated by 5 pediatric experts with CVI = 0.98. And then, the questionnaire was tested for structural validity and reliability by testing on 130 mothers with children under 5 years old in rural areas in Viet Nam (these 130 mothers didn't participate

in the later survey). The result of reliability with Cronbach's Alpha value was greater than 0.70 for the total scale of the knowledge, attitude and practices. Evaluating the structural validity of the questionnaire by analyzing the exploratory factor (EFA) with the KMO coefficient (Kaiser-Meyer-Olkin) was 0.57. Therefore, this questionnaire meets the standards used in this study. The questionnaire contains 34 items, including 8 items about the general information characteristics of mothers and 26 items to assess the knowledge, attitude, and practices; 3 checklists about practical skills of mothers in the prevention and caring for children with ARI. It is divided into 2 sections.

Section A: This section deals with the general information characteristics of mothers: The information about the age, educational level, occupation, residence and number of children of mothers. This section includes 8 items.

Section B: Including 3 parts:

Part 1: This section deals with the knowledge about the ARI disease including 2 main contents: Signs and symptoms; Prevention and caring for children with acute respiratory infections including 2 main contents: Nutrition and nasal hygiene for children. This section includes 8 multiple-choice questions. The different levels of knowledge are categorized as follows:

Satisfactory knowledge $\geq 70\%$

Unsatisfactory knowledge < 70%

Part 2: This section deals with the attitude of mothers about ARI including 3 main contents: Mother's attitude about the disease, care, and prevention of ARI. This section includes 10 items using a five-point Likert scale with answers in 5 levels corresponding to the score 1, 2, 3, 4, 5: Strongly disagree, disagree, neutral, agree, strongly agree. The items score was added to calculate the total scores, where a higher score indicates a better attitude. The total score of the attitude divides by 10 (items). Satisfactory level of attitude from 4-5 points (the answer: strongly agree, agree). In contradiction, an unsatisfactory level of attitude is less than 4 points (the answer: strongly disagree, neutral, disagree).

Part 3: This section deals with the practices of mothers in caring for children with ARI including 4 main contents: Practice taking children to go to the doctor, giving them water to drink, relieving cough, cleaning the nose; About prevention of ARI including 4 main contents: Avoid to cigarette smoke, dust and animal hair, breastfeed, vaccinated fully according to regulations. This section includes 8 multiple-choice questions and 3 checklists about practical skills. The different levels of practice are categorized as follows:

Satisfactory practices $\geq 70\%$

Unsatisfactory practices < 70%

The different levels of knowledge, attitude and practices (KAP) are categorized as follows:

Satisfactory knowledge, attitude and practices $\geq 70\%$

Unsatisfactory knowledge, attitude and practices < 70%

INTERVENTION

The educational intervention program includes theoretical lectures with PowerPoint presentations, short videos, folded pictures/leaflets and instructions for practices in caring and prevention of ARI for mothers. Interventional activities in many forms:

Large group: Each educational session was conducted within 90 min by pediatric experts/ health workers. The remaining time was for the practice group, the research team divided all members of the experimental group into small groups of 5-10 mothers/group to discuss and practices in caring for children with ARI.

Direct consultation for mothers at the commune health station and at mothers' home

Indirect consultation via commune media, mobile phone, Zalo network, sending documents via email or social media.

Evaluating after intervention about caring and prevention of ARI after 12 months of intervention (**Figure 1**).



Figure 1. Health education activities apply of health promotion model.

Research ethics: This study was approved by the Ethical Review Committee of Nam Dinh University of Nursing (no.2359/GCN-HDDD), and permission for data collection from the authorities of the community. Participants were informed verbally and in writing about the study's aim and their role. All participants reviewed and signed the study informed consent form as their agreement to participate. Research respondents participated voluntarily and were free to withdraw from the study without consequence. During the post-intervention monitoring and evaluation period, the control group did not receive any form of intervention from us. However, after the end of the intervention period, we conducted health educational intervention for the control group.

Statistical analysis: All variables entered into the regression models were coded or transformed into categorical measurements. Collected data were coded and tabulated using a personal computer. Using an SPSS 25.0 program for Windows. Descriptive statistical analysis (Frequency, Percentage) and inferential statistical analysis (Chi square test) was used to analyze the data. In addition, the McNemar's test, and Chi-square test also were used to compare 2 proportions in evaluating intervention effectiveness. The result was projected with appropriate figure and tables.

RESULTS

General characteristics of participants (Table 1-5 & Figure 2)

Variables		The experimental group; N = 102		The control group; N = 102		m (w) toat)
		Ν	%	Ν	%	$p(\chi^2 - test)$
The age group	\leq 25 years	18	17.6	30	29.4	
	From 26 to 35 years	66	64.7	62	60.8	0.1
	> 35 years	18	17.7	10	9.8	
Educational level	High school or under	67	65.7	79	77.5	0.06
	Post-high school	35	34.3	23	22.5	
Occupation	Civil servants	15	14.7	13	12.7	0.2
	Workers	55	53.9	65	63.7	
	Farmers	5	4.9	5	4.9	
	Others	27	26.5	19	18.6	
Number of children	1 child	13	12.7	16	15.7	0.3
	\geq 2 children	89	87.3	86	84.3	

Table 1. Demographic characteristics of participants in 2 groups (N=204).

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Table 2. Characteristics of health educational information of research subjects in 2 groups before intervention (N=204).

Variables		The experimental group; N = 102		The control g	m (w? tost)	
		Ν	%	Ν	%	$p(\chi^2 - test)$
Receiving	Yes	56	54.9	62	60.8	0.4
information	No	46	45.1	40	39.2	0.4
Source of	Health workers	29	48.3	37	55.2	0.4
information	Others	31	51.7	30	44.8	0.4
Source of	Health workers	63	61.8	73	71.6	
desired information	Others	39	38.2	29	28.4	0.13

Table 3. The mother's knowledge in 2 groups before and after intervention.

Group Outcomes	Pre-	test	Post	p (χ2-test)	
	Ν	%	Ν	%	
The control group	13	12.7	15	14.7	0.68
The experimental group	11	10.8	54	52.9	0.000
p (χ2-test)	0.66		0.0		

Table 4. The mother's attitude in 2 groups before and after intervention.

Group Outcomes	Pre-	test	Post	p (χ2-test)	
	Ν	%	Ν	%	
The control group	60	58.8	65	63.7	0.47
The experimental group	51	50.0	96	94.1	0.000
p (χ2-test)	0.21		0.0		

Table 5. The mother's practices in 2 groups before and after intervention.

	Satisfac	p (χ2-test)			
Group Outcomes	Pre-test		Post-test		
	Ν	%	Ν	%	
The control groups	17	16.7	20	19.6	0.59
The experimental group	12	11.8	87	85.3	0.000
$p(\chi 2-test)$	0.32		0.000		



Figure 2. Changes in the knowledge, attitude and practices about acute respiratory infection among mothers in 2 groups (n=204).

KAP: Knowledge, Attitude and Practices

DISCUSSION

The result was no difference about the socio-demographic and educational health information characteristics of mothers between the experimental and the control group before the intervention. This difference was no statistically significant with p> 0.05. The proportion of mothers receiving health educational information about prevention and caring for children with ARI in the intervention group and the control group were 54.9% and 60.8%, respectively. A cross-sectional descriptive study on 132 mothers having children under 5 years old in Nepal about the knowledge and practice of managing ARI, the results showed that most of mothers had information about the disease (93%), including information sources from health workers accounted for 30%. The lack of knowledge about dangerous signs of the disease has led to a proposal for a community-based education program for mothers about ARI [11]. Therefore, it is necessary to strengthen and enhance the role of health workers in health education about ARI for mothers at the primary health level. Analysis results showed that mothers' knowledge about ARI in the experimental and control groups before intervention was not statistically significant with p > 0.05. After intervention, mothers' knowledge about ARI in the experimental group increased from 10.8% (before intervention) to 52.9% (after intervention). The difference was statistically significant with p < 0.05. The knowledge about ARI in the control group changed after intervention. The percentage of the satisfactory knowledge increased from 12.7% to 14.7%. However, the difference was not statistically significant with p> 0.05. The results reflect the effectiveness of the intervention that was similar to the study of author Raval B in 2015 about the intervention based on the structured training program with 45-min lectures for mothers with children under 5 years old, which improved knowledge compared to the results of 7 days after intervention. The study of Raval B and et al, indicated the mothers' knowledge was remain low: 52% mothers had poor knowledge, 48% mothers had average knowledge and no any mother had good knowledge. After the intervention, mothers' knowledge improved: good knowledge increased at 64%, fair knowledge increased at 36% and there were no any mother had poor knowledge [12]. The study of Bhatti Z.I and et al showed that the positive impact of educational interventions on knowledge of mothers regarding ARI and shows a prominent difference in pre and post knowledge scores of participants after an educational intervention [13]. The research of Tunny I.S in 2020 also showed the effectiveness of health educational intervention through leaflets to mothers, which can improve knowledge and increase awareness of ARI prevention for children [14]. The result was similar to the study of Mahalakshmi in 2023, the educational intervention program showed that the mothers' knowledge about ARI increased from 8.51 ± 4.59 (before intervention) to 19.31 ± 2.54 (after intervention) [15]. The percentage of satisfactory attitude of mothers about ARI was

remain low (50%). This result was similar to the study of Saeed and et al in 2020, found 146 mothers (48.7%) had a good attitude about ARI [16]. After the intervention, the mothers' attitude in the intervention group improved significantly. In the intervention group, the satisfactory attitude of mothers about ARI increased from 50.0% (before intervention) to 94.1% (after intervention). The difference was statistically significant with p < 0.05. After the intervention, the mothers' attitude about ARI in the control group changed. The proportion of the satisfactory attitude increased from 58.8% to 63.7%. However, this difference was not statistically significant with p > 0.05. Our study revealed the mothers' practices about ARI were low. After intervention, the satisfactory practices of mothers were improved significantly from 11.8% to 85.3% with p<0.001. The mothers' knowledge, attitude and practices in the intervention group and control group were remain low. The percentage of satisfactory knowledge, attitude and practices (KAP) achieved in the experimental and control groups before intervention were 15.7%. This result was also consistent with the study of Mutalik A and Raje V. V in 2017, assessing knowledge, attitude and practices about ARI of mothers in the rural areas of Maharashtra [5]. The research showed that mothers' knowledge, attitude and practices about ARI were remain low. The percentage of mothers with poor knowledge, attitude and practices about ARI were high at 68.9%, 74.3%, and 68.9%, respectively. The number of mothers with unsatisfactory knowledge, attitude and practices (poor knowledge, attitude and practices) accounted for a high percentage of 71.6%. The satisfactory knowledge, attitude and practices of mothers were 28.4%. The average knowledge, attitude and practices were 20.3%. The percentage of mothers with good knowledge, attitude and practices were remain low at only 8.1%. Therefore, it is necessary to improve mothers' knowledge, attitude and practices about ARI. Furthermore, mothers are the primary caregivers for children in society. Thus, mothers' knowledge, attitude and practices have a significant influence on the disease status and survival in children [5]. In our study, there was no statistically significant difference between mothers' knowledge, attitude and practices about ARI in the 2 groups before intervention with p > 0.05. After the intervention, the knowledge, attitude and practices of mothers in the intervention group improved significantly: the satisfactory knowledge, attitude and practices of mothers about ARI increased from 15.7% to 85.3% compared to the satisfactory knowledge, attitude and practices in the control group increased from 15.7% to 21.6%. The results showed that there was an improvement in knowledge, attitude and practices of mothers in the experimental and control groups between before and after the intervention. This result may be explained by the time of the research was the period of the Covid-19 pandemic that was not under the control. Health information and educational programs implemented in the community have an impact on assessment results. However, the impact of this error factor can be eliminated due to the research performed the intervention with the control group. The research results were clearly improved in the intervention group between before and after the intervention and compared to the control group. Therefore, nurses need to strengthen health educational information for mothers about prevention and caring for children with ARI to improve knowledge, attitude and practices of mothers, contribute to reduce the incidence of ARI as well as improving the condition of ARI in underfive children. According to Pender's health promotion model [9], mothers reduce difficulties in caring for children and aware of the benefits of improving knowledge, attitude and practices about prevention and caring for children with ARI that lead to health-promoting behavior. At the same time, mothers are supported in caring for children with ARI at home which also contributes to create the advantages to perform health-promoting behaviors. Therefore, it is necessary to improve caring practices for children with ARI and create a favorable environment for mothers to perform behaviors that are beneficial to children's health which lead to improve children's health.

CONCLUSION

The knowledge, attitude and practices of mothers in the intervention group improved significantly after the intervention. Satisfactory knowledge, attitude and practices of mothers about prevention and caring for children with ARI increased from 15.7% to 85.3% in the intervention group. While the satisfactory knowledge, attitude and practices in the control group increased from 15.7% to 21.6%. The satisfactory knowledge, attitude and practices increased significantly compared to before intervention and compared to the control group. This research results illustrated the effectiveness of educational intervention based on the Health Promotion Model.

RECOMMENTDATION

From the results of the study, there are some recommendations as follows:

Health workers need to strengthen consultation and health education for mothers about the disease and prevention and caring for children with ARI in many different forms and means: direct consultation, distribute leaflets, guiding books, and indirect advices through the media, mobile phones, and social networks. At the same time, providing support in caring for children with ARI at home for mothers having children under 5 years old. Propose solutions to integrate the programs with activities to improve children's health in the community to increase the effectiveness of interventional programs, reduce the rate of serious illness/complications of ARI in children under 5 years old.

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