

Educational Program for Prevention of Rheumatic Fever among Children with Recurrence Streptococcal Infection

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Abstract: Aim of the present study was to assess the mother's knowledge and attitude regarding streptococcal infection. **Research design:** A quasi experimental design was utilized for conducting the study. **Settings:** the study was conducted in outpatient clinic of pediatric Ain Shams University Hospital. **Subjects:** A purposive sample includes 92 mothers coupled with their children those selected from the previously mentioned setting those had eligible criteria. **Tools of data collection:** An interview questionnaire sheet was used pre/ post education program, The attitude rating scale sheet was used pre/ post education program.

Results: this study revealed that, there was a highly statistical significant difference between mothers' knowledge, practice and attitude regarding GAS pharyngitis pre/ post educational programme. **Conclusion:** This study concluded that, mother's knowledge and attitude was significantly increased after educational programme. **Recommendation:** Raise public awareness on rheumatic fever and importance of adequate treatment of GAS pharyngitis.

Keywords: Rheumatic fever, GAS pharyngitis, educational programme.

1. INTRODUCTION

Rheumatic Fever is a multisystem auto-immune disease affecting primarily the heart, joints, brain and skin that is triggered by infection with group A beta-hemolytic streptococcal pharyngitis (GABHS) (Jaine *et al.*, 2008). Rheumatic fever disease of childhood that may develop two or three weeks after untreated properly pharyngitis, commonly appears in children between the ages of 5 and 15 years (Stollerman, 2011).

Although the incidence of ARF has declined in the United states and Western Europe, it has remained high in developing countries and represent a huge public health burden 60% of all ARF cases will on to develop RHD squelae of ARF each year (World Heart Federation, 2015). In Egypt the incidence rate of RF is 563/100.000 persons in children (WHO, 2014).

According to World Heart Federation the annual number of ARF cases in children aged 5-14 years to be more than 336.000, 95% of cases come from less developed countries (World Heart Federation, 2015).

GAS is the most common bacterial etiology, accounts for 15-30% of cases of acute pharyngitis in children (Somro and Rehman, 2011). GAS infection can range from a mild infection or a sore throat to sever, life threatening conditions. More than 10 million mild infections occur every year. Among school- aged children, the incidences of acute sore throat, swab positive GABHS are 33.13 per 100 child-years, respectively. Thus, about one in four children with acute sore throat has serologically confirmed GABHS pharyngitis. Winter and early spring are peak GABHS infection's (World Heart Federation, 2015).

The world Health Organization conducted an implementation plan for the primary prevention of rheumatic fever and rheumatic heart disease, interventions to improve health literacy/ heart education reduced the incidence of Group A streptococcal infection and rheumatic fever. Primary prevention strategies of RF focus on the early diagnosis and timely treatment. One component of the programme was health education directed towards improving health literacy of individuals/ families and communities about their health and how to improve it through skill and knowledge development (WHO, 2011).

Public education is the most important component for primordial prevention requires preventing the development of risk factors in the community to prevent the disease in the population and thus protect individuals. Measures for primordial prevention in relation to ARF; raise awareness of RF and RF prevention, reduce the spread of Group A streptococcal throat infections by promoting good hygienic hand washing practices, prevention of malnutrition, prevention of overcrowding, improvement in socio economic status (World Heart Federation, 2014 & WHO, 2011).

WHO recommends about the importance of public health nurses role in the implementation of primary prevention programmes. Community health nurse can play a vital role in educating individuals, communities regarding knowledge, skills and behavior which will positively affect their life style to increase awareness and promote optimum health of individuals and the community (WHO, 2015).

Significance of the study:

In Egypt, rheumatic fever is still affecting children with 10% of cases having their first attack before 15 years of age. It represents a serious health problem, as it affected 8-9 per 10.000 of children between 6 to 15 years (Salah et al., 2018). Impacts of RF problems are many like health burden on, psychological, social and financial burden and schooling achievement; this is because poor health generally imposes cost on the society and individuals in terms of reduced ability to enjoy life, earn a living or to work effectively (Abd el fatah, 2015). Public education is the most important component for primordial prevention requires preventing the development of risk factors in the community to prevent the disease in the population and thus protect individuals. Measures for primordial prevention in relation to ARF; raise awareness of RF and RF prevention, reduce the spread of Group A streptococcal throat infections by promoting good hygienic hand washing practices, prevention of malnutrition, prevention of overcrowding, improvement in socio economic status (World Heart Federation & WHO, 2014).

AIM OF THE STUDY

The study aims to prevention of Rheumatic fever among children with recurrence streptococcal infection through:

- Assess the mother's knowledge and attitude regarding streptococcal infection.
- Design and implement a health education program to improve knowledge and attitude of the mother's regarding streptococcal infection.
- Evaluate the impact of the health education program on the mother' knowledge and attitude.

Research hypotheses:

Are there significant differences in mother's knowledge and attitude regarding streptococcal infection.

2. SUBJECTS AND METHODS

Research design:

- A quasi-experimental design was utilized to meet the aim of the study.

Research Setting:

- The study was conducted at Outpatient Clinic of Pediatric Ain Shams University Hospital. Total attendance per month ranged from 480 to 550; the average number per day ranged from 20 to 25 children with acute and respiratory tract infections.

Research Subjects:

A purposeful sample included children that have been chosen according to the criteria. The average number of attendance was 25 child daily in an outpatient clinic of pediatric Ain Shams University Hospital, out of them 5 or 7 selected randomly according to the study criteria, total number of sample included in the study was (92) mothers and their children with upper respiratory tract infection (pharyngitis, tonsillitis). Under the following criteria: child's age ranged from 5- 15 years old, complain from upper respiratory tract infection (pharyngitis, tonsillitis), both sexes, children having history for recurrent pharyngitis or tonsillitis 3 times or more last winter, different educational levels of mothers, different socio-economic standards, excluding children have any other health problems as chronic diseases, blood diseases or congenital diseases.

Tools validity and reliability:

Content validity was done to identify the degree to which the used tools measure what was supposed to be measured. Tools developed by the investigator were examined by experts to determine whether the included items clearly and adequately cover the domain of content addressed.

Administrative design and ethical considerations:

An official permission was granted by submission of formal letter issued from the administrators of Faculty of Nursing, Ain Shams University, in which the study was planned and then an official permission was obtained from the director of the studied hospitals, as well as a permission from responsible nurses in the outpatient clinic to allocate a proper place to meet with the mothers number. Prior to the study, a permission from mothers to conduct the study has to be taken. Before mothers become a subject of the study, the aims, methods, anticipated benefits and absence of potential hazards have to be explained to assure mothers about the safety of the study and to let them obtain real participation in the research process and to inform them about their rights to terminate the session at any time.

Statistical design:

Data were revised, coded, analyzed and tabulated using the number and percentage distribution and carried out in the computer.

The following statistical techniques were used:

Percentages mean value, standard Deviation, chi-square (X^2), proportion probability (p-value) and percentage of improvement.

Significance of results

When $P > 0.05$ it is statistically insignificant difference.

When $P < 0.05$ it is statistically significant difference.

When $P < 0.01$ or $P < 0.001$ it is high statistically significant difference.

Tools of data collection:**1: An interviewing Questionnaire:**

- An Arabic interviewing questionnaire sheet constructed by the investigator after reviewing related literatures and the content validated by the supervisor. It comprised the following parts:

(a) Socio- demographic data for mothers and their children, sex of the child, child's ranking, age of the child and their mothers, marital status, educational level of mother and father, occupation of mother and father, number of children and residence.

(b) Mothers' knowledge about acute pharyngitis as regards concept of causes of acute pharyngitis, risk factors, mode of transmission, signs and symptoms and complications.

(c) Mothers' knowledge about acute rheumatic fever as regards concept of acute rheumatic fever causes, risk factors, mode of transmission, signs and symptoms and complications.

(d) Mothers' practical knowledge about medications as regards their importance, medication administration, and caring of a child with fever.

The scoring system:

In part of questions about the mother's knowledge about acute pharyngitis and rheumatic fever were given scores (two marks) to the correct answer, (one mark) to the incomplete answer and (zero) to the incorrect answer.

For practical knowledge about care of child suffering pharyngitis using three scale (rarely=0, sometimes=1, and always=2) the total score of practice was 11 point. Scoring level was always=23-33, sometimes=12-22, rarely=0-11.

According to answers, their knowledge was categorized into satisfactory knowledge $\geq 50\%$ and unsatisfactory knowledge scored $<50\%$.

2- The attitude rating scale sheet:

The attitude rating scale. This tool was developed by the investigator. It is a five-point rating scale of twenty- three items assessing the mothers' attitudes regarding GAS pharyngitis with rating between strongly agree and strongly disagree. Items include attitude regarding GAS pharyngitis (e.g., being dangerous or fatal, its treatment and prognosis, how the mothers deal with her child if caught the disease, the way they think to prevent her child from infection).

The scoring system:

All questions related to assessing the mothers' attitudes regarding GAS infection designed to be answered with strongly agree, agree, don't know, disagree and strongly disagree with scores 1, 2, 3, 4, 5 respectively. The mother was considered as having adequate attitude whenever her score was equal to or exceeding 60%, otherwise the mother was considered as having inadequate attitude.

Operational design:

A. Pilot Study

A pilot study was carried out included five mothers from the Outpatient Clinic of Pediatric Ain Shams University Hospital to test applicability of the developed tools, in order to detect any ambiguity in the tools, clarity of the items, as well as, to determine the time consumed for data collection. Necessary modifications were carried out to suit the mothers' level and develop the final form of the tool. This number of pilot study is excluded from the total number of study sample.

B. Field work:

For work organization, the researcher allocated 3 days of the week for collection of data from mothers at selected setting. The study was carried out from 8 am to 1 pm until the desired number of study had completed. Prior to intervention the investigator obtained oral consent to collect the baseline data from patients. The field work was carried out within duration of 9 months starting from October 2016 to June 2018. First, the assessment phase was done for all the 92 mothers then program implementation and evaluation in outpatient clinic of pediatric Ain Shams University Hospital were carried out. Each study subject was interviewed and assessed individually using study tools. The health education program was carried out in 6 sessions for theory and practice including time for discussion.

Program construction:

The program was constructed in three phases: assessment, implementation, and evaluation.

1- Assessment phase:

The program was designed by the researcher based on results obtained from pre-assessment tools. It was revised and modified according to the related literature. Cultural and socio-demographic aspects of the study sample were designed to cover mothers' knowledge and practices.

3- Implementation phase:

- The program was implemented over a period of 9 months; it carried out in 6 sessions. The duration of each session was ranged from 35 minutes to 90 minutes.

- The program was implemented in groups from six mothers.
- At the beginning of each session the investigator started by a summary about what was given through the previous sessions and objectives of the new one, taking into consideration using simple and clear language to suit the level of patients. Detailed explanation for each item was also given considering the patient's educational level, cognitive abilities, and problems or obstacles that may face her for changing the behavior. Sufficient repetitions were done when needed.
- Teaching methods used to implement the program were small group discussions brain storming and demonstration. The teaching aids used were booklet, pictures, laptop screen show and real objects.
- At the end of each session the patients were informed about the content of the next session and its time.

4- Evaluation phase:

Evaluation was applied before and after the program, in order to identify differences, similarities, areas of improvement as well as to detect any defects. This was done through pre and post administration of an interviewing questionnaires and observation checklist for giving oral drugs administration, taking temperature, application of cold compresses, hand wash.

3. RESULTS

Table (1): Percentage distribution of mothers in relation to their socio-demographic character (N=92)

	N	%
Mothers age		
28- 34	64	69.56
>35- 45	28	30.44
Mean ± SD 33.16± 2.84		
Mothers education		
Read and write	44	47.83
Preparatory school	6	6.52
Secondary school	36	39.13
High education	6	6.52
Mothers occupation		
House wife	76	82.61
Work	16	17.39
Marital status		
Married	79	85.87
Divorced	13	14.13
Family monthly income		
Insufficient	84	91.30
Sufficient	8	8.70
Crowding index		
>3	2	2.17
≤3	90	97.83

Table (1) shows that 47.8% of mothers' education read and write. 82.6% house wife, 85.8% mothers were married, 91.3% of family monthly income was insufficient and 97.8% had crowding index equal three.

Table (2): Percentage distribution of children in relation to socio demographic characteristics (N=92)

	N	%
Child age		
5 – 8	69	75
9 - 12	23	25
Mean ± SD 6.84 ± 1.14		
Child sex		
Male	57	61.96
Female	35	38.04

Child rank		
1	38	41.30
2	33	35.86
≥ 3	21	22.82
Residence		
Rural	6	6.52
Urban	32	34.78
Slum	54	58.69

Table (2) stats that 75% of the children their age ranged from five to eight years old. 61.9% of the child's sex was male, 41.30% of the children were the first rank. 58.69% were in slum areas.

Table (3): The mean score of mother’s knowledge regarding Group A Streptococcus infection pre/post health education program (N=92)

Mother's knowledge regarding pharyngitis	Pre						Post 1						Post 2 (3 months)						Chi-square			
	Incorrect		Incomplete		Complete		Incorrect		Incomplete		Complete		Incorrect		Incomplete		Complete		Pre & Post 1		Post 1 & Post 2	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	X ²	P-value	X ²	P-value
Pharyngitis definition	5	5.4	0	0.0	87	94.6	0	0.0	0	0.0	92	100.0	0	0.0	0	0.0	92	100.0	5.140	0.023*	0.000	1.000
Pharyngitis causes	92	100.0	0	0.0	0	0.0	0	0.0	0	0.0	92	100.0	0	0.0	0	0.0	92	100.0	184.000	<0.001**	0.000	1.000
Pharyngitis factors	81	88.0	11	12.0	0	0.0	0	0.0	0	0.0	92	100.0	0	0.0	0	0.0	92	100.0	184.000	<0.001**	0.000	1.000
Pharyngitis symptoms	2	2.2	71	77.2	19	20.7	0	0.0	0	0.0	92	100.0	0	0.0	0	0.0	92	100.0	121.009	<0.001**	0.000	1.000
Pharyngitis transmission	83	90.2	7	7.6	2	2.2	0	0.0	0	0.0	92	100.0	0	0.0	0	0.0	92	100.0	176.170	<0.001**	0.000	1.000
Protection from pharyngitis	53	57.6	37	40.2	2	2.2	0	0.0	62	67.4	30	32.6	0	0.0	49	53.3	43	46.7	83.813	<0.001**	3.838	0.050*
Pharyngitis complication	82	89.1	0	0.0	10	10.9	0	0.0	0	0.0	92	100.0	0	0.0	0	0.0	92	100.0	147.922	<0.001**	0.000	1.000

Table (3) shows that, 20.7%, 10.9%, 2.2% of mothers had a correct knowledge about pharyngitis symptoms, pharyngitis complications and methods of transmission respectively in pre- program improved to 100%, 100%, 100% in post program. Also revealed that 2.2% of them had a correct knowledge about protection from pharyngitis in pre- program improved to 32.6% complete knowledge and 67.4% incomplete knowledge in post program. While none of them had correct knowledge about causes of pharyngitis and factors increase infection in pre- program advanced to 100%, 100% in post program. There was a highly statistical significant difference between pre and post the program (post 1 and post 2) at p-value = 0.001*.

Table (4): The mean score of mother’s knowledge regarding rheumatic fever pre/post health education program (N=92)

Mother's knowledge regarding rheumatic fever	Pre						Post 1						Post 2 (3 months)						Chi-square			
	Incorrect		Incomplete		Complete		Incorrect		Incomplete		Complete		Incorrect		Incomplete		Complete		Pre & Post 1		Post 1 & Post 2	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	X ²	P-value	X ²	P-value
Rheumatic fever definition	79	85.9	0	0.0	13	14.1	0	0.0	0	0.0	92	100.0	0	0.0	0	0.0	92	100.0	138.438	<0.001**	0.000	1.000
Rheumatic fever causes	89	96.7	0	0.0	3	3.3	0	0.0	0	0.0	92	100.0	0	0.0	0	0.0	92	100.0	172.379	<0.001**	0.000	1.000
Rheumatic fever symptoms	84	91.3	8	8.7	0	0.0	0	0.0	92	100.0	0	0.0	0	0.0	63	68.5	29	31.5	154.560	<0.001**	34.426	<0.001**
Protection from rheumatic fever	61	66.3	31	33.7	0	0.0	0	0.0	0	0.0	92	100.0	0	0.0	0	0.0	92	100.0	184.000	<0.001**	0.000	1.000

Table (4) demonstrates that, 14.1% and 3.3% of mothers had a correct knowledge about definition of rheumatic fever and causes of rheumatic fever respectively in pre- program improved to 100%, 100% in post program. Also none of them had a correct knowledge about protection from rheumatic fever in pre- program improved to 100% in post program. While none of them had a correct knowledge about symptoms of rheumatic fever in pre- program improved to 100% incomplete knowledge in post program. There was a highly statistical significant between pre and post the program (post 1 and post 2) at p-value = 0.001*.

Figure (1): Comparison of total scores of mother's knowledge before, post 1 and post 2 of health education program (N=92)

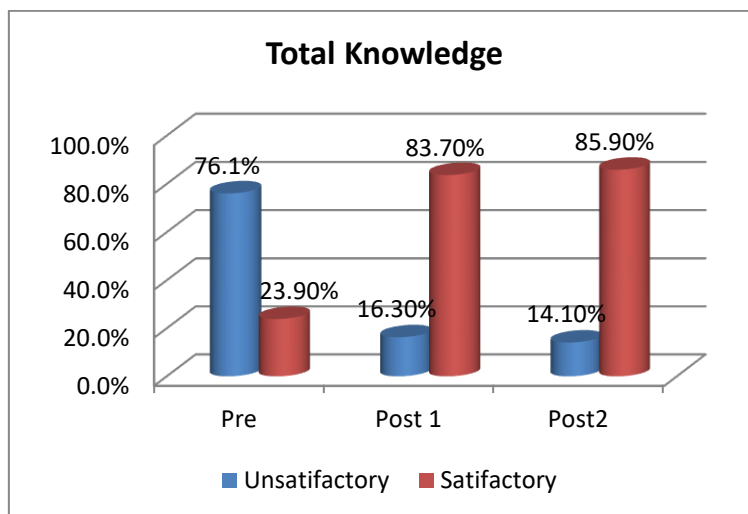


Figure (1) shows that statistically significant difference (X^2 tests were 66.144 and p-value = 0.001**) was found between total scores of mother's knowledge regarding GAS and RF before and after (post 1 and post 2) implementation of program. The total percent of improvement in post 1 (59.8%) and in post 2 (62%).

Figure (2): Comparison of total scores of mother's reported health practices before, post 1 and post 2 of health education program (N=92)

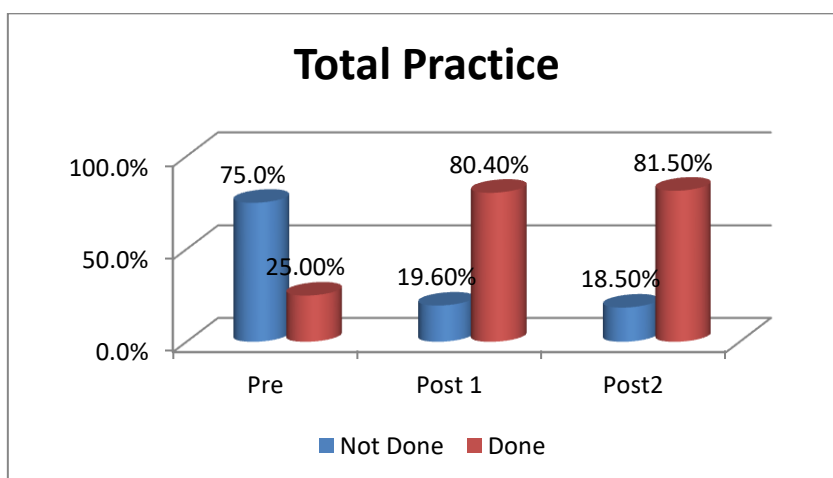


Figure (2) shows that statistically significant difference (X^2 tests were 56.711 and p-value = 0.001**) was found between total scores of students' reported health practices regarding GAS before and after (post 1 and post 2) implementation of program. The total percent of improvement in post 1 (55.4%) and in post 2 (56.5%).

Table (5): Distribution of total mother's attitude regarding Group A Streptococcus infection in pre and post program (N=92)

Mother's attitude regarding GAS (pre)	Strongly agree		agree		Don't know		disagree		strongly disagree	
	N	%	N	%	N	%	N	%	N	%
Pre	2	2.2	20	21.7	35	38.0	30	32.6	5	5.4
Post 1	5	5.4	27	29.3	0	0.0	44	47.8	16	17.4
Post 2	5	5.4	27	29.3	0	0.0	40	43.5	20	21.7

Table (5) shows that most of mothers have negative attitude regarding pharyngitis in preprogram improved to positive attitude in post program.

Table (6): Comparison of total scores of mother's attitude before, post 1 and post 2 of health education program (N=92)

		Total attitude			
		Pre	Post 1	Post 2	Total
Inadequate	N	65	19	18	102
	%	70.7	20.7	19.6	37.0
Adequate	N	27	73	74	174
	%	29.3	79.3	80.4	63.0
Total	N	92	92	92	276
	%	100.0	100.0	100.0	100.0
Chi-square	X ²		46.350	0.034	
	P-value		<0.001**	0.854	

Table (6) shows that statistically significant difference (X² tests were 46.350 and p-value = 0.001**) was found between total scores of mother's attitude regarding GAS before and after (post 1 and post 2) implementation of program.

4. DISCUSSION

According to parent's socio-demographic characteristics, the findings of the present study revealed in (table 1) that about mother's and father's education (table 2) one third of both had intermediate education.

Such finding was supported by *El-Araby, (2002)* who mentioned that mothers are playing vital role to facilitate the recovery and coping with child's illness, in addition to teaching, guiding the mothers to carry out care activities. The result of this study revealed in (table 1) that about one quarter of mothers are working mothers. Also, (table 1) revealed that more than three quarters of families have insufficient monthly income. Such finding was in accordance with (*Hassan, 2007*) who showed that for more than half of the sample their family income per month were belonging low income. In this respect, *WHO, (2004)* stated that income determinants play a significant role in quantitative and qualitative adequacies of the consumed diet and consequently, on nutritional and health status of children. Risk factors of insufficient income are known to be associated with increased mortality, child maltreatment and developmental problems due to unresponsive mothers, though mothers with financially stable families were responsive to child's needs.

The result of this study revealed in (table 2) that more than half of child's rank was 1-2 children's. This finding was supported by (*El-Shereef et al., 2004*) who said that most of children were in the second to third birth order. (*WHO, 2007*) which illustrated that the first and second child's had more care than third child's birth order, while mothers' knowledge had improved with the experience of the second child's.

The result of this study illustrated in (table 2) that more than three quarters child's age between The mean age of children was 25.27±5.50 .This observation support the fact that children are at the highest risk for developing RF, this is because group A Streptococcal commonly affects younger school aging children and schools are often overcrowded and badly ventilated increasing the spread of streptococcal infection.

As regards mothers' awareness, the present study reflected (in table 3) lack of mothers' knowledge in pre-test about definition of pharyngitis, etiology, risk factor, symptoms, mode of transmission, complications, protect their child's from pharyngitis, and pharyngitis complication. Meanwhile, in post-test there was statistically significant improvement that differs between pre and post health education. This finding was in correspondent with (*El-Araby, 2002*) who indicated that health education combined with instruction increase maternal knowledge. *American Nurses Association, (2001)* mentioned that any education program activities are intended to assist the mothers in acquiring, maintaining, and increasing competence in fulfilling the assigned responsibilities.

These findings were come in accordance with *Manase (2011)* who found lack of knowledge between the study subject about sore throat and rheumatic fever. Also in a study by *Arya et al. (2007)* to determine the awareness on sore throat, rheumatic fever and rheumatic heart disease in rural community India, before and after health education the study showed that there was significant increase in the knowledge on most of the symptoms, causes, consequences and preventive measures of sore throat, rheumatic fever.

Findings of the present study reflected (in table 4) lack of mothers' knowledge in pre-test regarding definition of rheumatic fever, etiology, symptoms, protect their child's from rheumatic fever. Meanwhile, in post-test there was statistically significant improvement that differs between pre and post health education. This finding was in correspondent with *Kasmaei, (2007)* on mothers' knowledge on different aspects of RF found low proportions of awareness among study subjects in most aspects of rheumatic fever.

These results also come in accordance with the educational programme done by *Manase (2011)* in two French Caribbean Islands to increase awareness and reduce incidence of RF, one year after implementing an educational campaign that consisted of widely distributed pamphlets and posters, television advertisements and educational videos, cases of RF increased by 10- 20%. This increase was entirely attributed to an increased awareness of the disease in the community. The study also found that over the course of ten years educational intervention, the incidence of RF progressively declined in both islands. These findings support the argument that a community- based educational programme aimed at raising awareness of RF is essential for case detection and may be a critical first step in a comprehensive plan for RF control.

Findings of the present study indicated (in table 5) lack of mothers' practical skills through observation with a check-list between pre and post implementation of the program which convey improvement of the mothers practices about practices of giving antibiotic preparations, auxiliary temperature measuring, cold compress and hand wash. These results may be due to that mothers were interested to receive the guidelines that can help them to give care for her children and prevent further complications, also because the techniques they learned and guidelines they received are very simple, feasible and not costly.

This is supported by *Sarkadi & Rosenquist, (1999)* who reported that the group settings promote learning through peer help and reduces isolation feeling through sharing experiences with others. They get at least one common characteristic which helps better understanding. In addition, *Jordan, (2000)* concluded that group teaching was as effective as individual teaching and that clients like the group environment as they learn from others.

5. CONCLUSION

Health education showed statistical significant associations in post-test for mothers' knowledge and practices. Group health education mean-score was higher for mothers' knowledge, and practices toward their children with pharyngitis.

6. RECOMMENDATIONS

- Raise public awareness on rheumatic fever and importance of adequate treatment of GAS pharyngitis by using recommended drugs.
- Raise public awareness on association between sore throat and rheumatic fever through the print and electronic mass media (radio, television, newsletters, and posters) and involve community leaders, nongovernmental organizations and community health educators.
- Camping emphasis on raising awareness on all aspects of RF prevention as it is in HIV/ AIDS control.
- Mass media such as (television, newspapers, pamphlets, posters, booklets and other communication channel) should be utilized and community organizations (both governmental and non-governmental) should be mobilized to disseminate correct and relevant information about mothers' role towards their children with acute upper respiratory tract infections.

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