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Effect of Asthma Management Education Program on Stress and Compliance of Patients with Allergic Asthma to House Dust Mite

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Purpose. This study was designed to examine the effect of asthma management education program applied to allergic asthma patients receiving immunotherapy due to house dust mite on their stress and compliance with health care regimens.

Methods. A quasi experimental design with non-equivalent control group and non-synchronized design was used. The subjects of this study were 61 patients who were receiving immunotherapy at intervals of a week after their symptoms were diagnosed as house dust mite allergic asthma at the pulmonary department of a university hospital in Seoul. They were divided into an experimental group of 29 patients who received asthma management education and a control group of 32 patients. The asthma management education program was composed of group education (once) and reinforcement education (three times) with environmental therapy and immunotherapy to house dust mite.

Results. Stress significantly decreased in the experimental group compared to that in the control group. Compliance with health care regimens significantly increased in the experimental group compared to that in the control group.

Conclusions. The results suggested that the asthma management education program is effective for the management of stress and the improvement of compliance in patients with allergic asthma to house dust mite.

Key Words : Asthma, Education, Stress, Compliance

INTRODUCTION

Allergic diseases are common throughout the world and are increasing due to an abundance of allergens by rapid economic development, industrialization, environmental pollution and changes in modern daily life. In particular, asthma is a chronic inflammatory disease characterized by inflammatory response and hypersensitivity in airway. Asthma patients suffer from unpredictable onset and recurrence of paroxysmal respiratory symptoms (Shim, Kim, Cho, Min & Hong, 2000). In Korea, patients with clinical asthma who need to be treated are 2% of those below 40, 3.8% of those between 40-54, 7.7% of those between 55~64 and 12.7% of those over 65 (Bahn, 2003).

Meanwhile, 84% of asthmatic patients experience limitations in daily life as well as exhaustion, sleep distur-

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bance and fatigue when the symptoms are expressed while getting stressed because of withdrawal from social activities, depression, uncertainty, confusion and anger (Park et al., 2000). Stress as a negative emotional experience not only aggravates the disease but also deteriorates general quality of life. Thus, it is necessary for the patients to cope with stress effectively through education for understanding and managing the disease.

In Korea, 40-90% of adult patients with respiratory allergy are considered to be sensitized by house dust mite (Choi, 1996). A method of preventing and treating allergic asthma to house dust mite is avoiding the allergen but it is almost unrealistic. Instead, the symptoms and clinical findings of asthma can be improved through managing household environment effectively, reducing the number of house dust mites and having drug therapy. When the patients do not respond to drug therapy or show severe side effects by the drugs, immunotherapy can inhibit the symptoms by antigen and reduce inflammation and allergic reactions in bronchus but the therapy is costly and time-consuming and the effect may be dependent on the patient's compliance (Bousquet, 2001). Therefore, in order to enhance compliance with health care regimens by inducing essential changes in asthma management for immunotherapy, it is necessary to support the understanding of the patients and the family members on the disease and its treatment process through continuous education (Lim, Chung & Choung, 2000). Such education, as a major factor of asthma management, promotes self-management ability, reduces admission rate, and induces the patients to control the disease and to learn knowledge related to the management of the disease (Abdulwadud et al., 1999; Choy et al., 1999; Peterson, Strommer-Pace & Dayton, 2001).

However, most studies on adult asthmatic patients in Korea have been epidemiological survey or focused on immunological factors or medical therapies from the physiological aspect (Kim, 1999), and there have been few researches on education programs for patients with allergic asthma to house dust mite.

The purpose of this study, therefore, was to investigate the effect of asthma management education program on stress and compliance with health care regimens of patients with allergic asthma to house dust mite.

METHODS

Research design

A quasi experimental design with non-equivalent control group and non-synchronized design was used.

Subjects

Participants were recruited from the allergy clinic of a university hospital in Seoul, Korea. The subjects' symptoms were diagnosed as allergic asthma to house dust mite and were treated by immunotherapy at intervals of a week between April and July 2002. A total of 63 patients met the criteria and agreed to participate. The participants were assigned to either an experimental (n=31) or a control (n=32) group based on their wishes. But two of the experimental group members were excluded as they gave up immunotherapy because of their jobs.

Procedures

Eligible subjects were approached by a trained nurse educator, who informed them of the study and invited them to participate. Written consent for participation was obtained from the subjects who agreed to participate, and face-to-face baseline interviews were scheduled. The participants were assigned to either the experimental group or the control group based on their wishes. In order to prevent the effect of the experiment from being diffused, the experimental group was selected after baseline interviews were made with the control group was collected. The baseline interview included items on general characteristics, disease-related characteristics, stress and compliance with health care regimens. Subjects in the control group received the usual care (visiting the physician every week after brief education using a leaflet).

Asthma management education program was provided to the experimental group by one of the researchers, a PhD prepared nurse who has 18-year experience teaching in nursing college. The intervention consisted of four sessions: an initial session (organizing three groups with a maximum of 10 subjects per group) of 40 minutes and three reinforced education sessions (individual) of 10 mimutes each. As indicated in Figure 1, all sessions took place within 3 weeks. Each patient was instructed about the booklet by a researcher. The booklet was 30 pages in length and was given to experimental group participants free of charge. The contents of the education included

the definitions of asthma and allergic diseases, the prevention of asthma, environmental control, exercise, immunotherapy (indications, methods, side effects, cautions, period and termination, relation to pregnancy) and the medical insurance on the agents on the basis of literature review (Korean Academy of Tuberculosis and Respiratory Disease supported, 2000; Korean Society of Allergology, 1998; Platts-Mills, Vervloet, Thomas, Aalberse & Chapman, 1997). The stress and compliance with health care regimens were measured again after 3 weeks.

Measurements

Stress

Stress was measured using a self-reported questionnaire developed by the researcher. There were 15 items on a 4-point Likert-type scale. The face validity of the questionnaire was verified by a professor at a nursing college, three specialists on pulmonology and five nurses (MSN or PhD) who have worked with asthma patients. Cronbach's α in the study was 0.86.

Compliance

Compliance was measured using the Asthma Management Questionnaire developed by the researcher based on relevant literatures (Kim, 1998; Kim, 2001). There were 15 items on a 4-point Likert-type scale. The face validity of the questionnaire was verified by a professor at a nursing college, three specialists on pulmonology and five nurses (MSN or PhD) who have worked with asthma patients. The scale had a total of 15 items including 5 items on asthma management (regular health check - 1; management of aggravating factor - 3; and treatment - 1), 7 items on immunotherapy (performance of the therapy - 3; management of side effects - 2; and caution - 2), and 3 items on environmental manage-

Table 1. General Characteristics of the Subjects

	Exp.(n=29)	Cont. (n=32)	x^2/t	p
Age (years)	33.34±13.41	34.78±15.34	0.39	.700
Gender				
Male	14 (48.3)	15 (46.9)	0.01	.913
Female	15 (51.7)	17 (53.1)		
Religion*				
Buddhism	3 (10.4)	3 (9.4)		.256
Christianity	6 (20.7)	14 (43.7)		
Catholicism	11 (37.9)	7 (21.9)		
None	9 (31.0)	8 (25.0)		
Occupation				
Yes	16 (55.2)	14 (43.7)	0.60	.438
No	13 (44.8)	18 (56.3)		
Educational level*				
≥ College	19 (65.5)	16 (50.0)		.392
High school	8 (27.6)	14 (43.8)		
≤ Middle school	2 (6.9)	2 (6.2)		
Marital status				
Married/partnered	13 (44.8)	14 (56.3)	0.01	.933
Unpartnered	16 (55.2)	18 (43.7)		
Residence				
House	8 (27.6)	5 (15.6)	1.30	.255
Apartment	21 (72.4)	27 (84.4)		
Duration of asthma (month)	22.72±35.24	26.28±33.19	0.41	.686
Stress (score)	37.48±6.55	34.53±7.30	1.66	.103
Compliance (score)	42.90±5.00	43.47±5.73	0.41	.681

Exp.: Experimental group, Cont.: Control group
Values are mean±SD or N (%), * Fisher's exact test

	0 week	1 week	2 week	3 week
Experimental group	**Education 1** (group, 40 min) content: - definitions of asthma & allergic disease - prevention of asthma, environment control - exercise - immunotherapy - medical insurance on the agents - Stress - Compliance	**Education 2** (individual, 10 min)	**Education 3** (individual, 10 min)	**Education 4** (individual, 10 min) - Stress - Compliance
Control group	**Usual care** - Stress - Compliance			- Stress - Compliance

Education 1- 4: Scheduled education sessions

Figure 1. Research design

ment. The range of the scale was between 15 and 60 points. The higher the score was the higher the level of compliance was. Cronbach's α in the study was 0.70.

Statistical analysis

Data were analyzed using SAS (version 8.1, SAS Institute, Cary, NC, USA). Chi-square test, t-test and Fisher's exact tests were used to determine homogeneity of general characteristics between the experimental group and the control group. Independent t-test was used to compare differences between the groups' outcomes from pre-test and those from post-test.

RESULTS

General characteristics of the subjects

The characteristics of the experimental and the control group are shown in Table 1.

The mean age of the experimental group was 33.34 years and that of the control group was 34.78 years. The majority of both groups were apartment residents: 78.7 % in the experimental group and 72.4 % in the control group. The mean duration of asthma was 22.72 months in the experimental group and 26.28 months in the control group. There was no significant difference in between two groups general characteristics, stress and compliance at pre-test.

Stress

Stress scores decreased significantly in the experimental group after intervention compared to the pre-test score. The control group also showed a slight reduction of stress scores after intervention compared to that on the pre-test but the difference was not statistical significant. In addition, significant differences were observed between the two groups (p=.047).

Table 2. Comparison of Stress Between the Experiment and Control Group

Item		Pre-test	Post-test	Difference*	t	p
1. Visiting the hospital every week to get an injection (transportation means, distance, time, etc.)	Exp.	2.97±0.63	2.86±0.64	-0.11±0.67	0.25	.806
	Cont.	2.91±0.95	2.75±1.05	-0.16±0.95		
2. High medical charge	Exp.	2.59±0.78	2.38±0.78	-0.21±0.73	0.27	.786
	Cont.	2.81±1.06	2.66±0.97	-0.15±0.72		
3. Lack of information on the disease and immunotherapy	Exp.	2.79±0.82	2.07±0.59	-0.72±0.92	2.62	.011
	Cont.	2.72±0.89	2.56±0.84	-0.16±0.77		
4. Long-lasting immunotherapy	Exp.	3.31±0.71	3.17±0.60	-0.14±0.69	1.01	.317
	Cont.	3.03±0.90	3.09±0.89	0.06±0.84		
5. Inconveniences in daily life such as school and social activities	Exp.	3.00±0.85	2.76±0.64	-0.24±0.74	1.40	.168
	Cont.	2.72±0.85	2.75±0.72	0.03±0.78		
6. Difficulties in controlling environment	Exp.	2.86±0.69	2.72±0.59	-0.14±0.83	0.06	.954
	Cont.	2.78±0.83	2.66±0.70	-0.12±0.91		
7. Feeling that allergy inoculation is not effective	Exp.	2.31±0.60	1.97±0.78	-0.34±0.86	2.37	.021
	Cont.	2.06±0.72	2.25±0.95	0.19±0.90		
8. Sores, swelling and turning red of injected parts	Exp.	1.93±0.65	1.83±0.66	-0.10±0.67	0.05	.964
	Cont.	1.88±0.98	1.78±0.87	-0.10±0.96		
9. Concern over side effects	Exp.	2.41±0.73	2.07±0.84	-0.34±1.11	1.35	.182
	Cont.	1.88±0.87	1.88±0.79	0.00±0.88		
10. Restriction in long-term travels	Exp.	2.69±0.85	2.59±0.95	-0.10±0.82	0.22	.825
	Cont.	2.41±1.10	2.25±0.92	-0.16±1.02		
11. Anxiety about pregnancy	Exp.	1.88±1.03	1.71±0.95	-0.17±0.63	0.42	.676
	Cont.	1.52±0.71	1.50±0.66	-0.02±0.77		
12. Distrust of medical service providers	Exp.	1.69±0.85	1.45±0.51	-0.24±0.87	0.84	.407
	Cont.	1.59±0.84	1.53±0.67	-0.06±0.80		
13. Wondering whether exercise is OK on the day of injection	Exp.	2.03±0.82	1.90±0.82	-0.13±1.09	0.44	.661
	Cont.	1.72±0.85	1.69±0.69	-0.03±0.78		
14. Large number of the kinds of drugs administered	Exp.	2.55±0.87	2.45±1.02	-0.10±0.72	1.01	.319
	Cont.	2.34±0.97	2.50±1.14	0.16±1.25		
15. Wondering whether asthma will be treated completely	Exp.	2.79±0.82	2.38±1.05	-0.41±0.87	1.73	.089
	Cont.	2.50±1.08	2.47±1.08	-0.03±0.86		
Overall stress	Exp.	37.48±6.55	34.00±6.52	-3.48±5.19	2.03	.047
	Cont.	34.53±7.30	33.94±6.86	-0.59±5.87		

Exp.: Experimental group (n=29) Cont. : Control group (n=32), * Difference : post-test - pre-test, Values are mean±SD

As to stress by items, stress decreased significantly in the 2 items - 'lack of information on the disease and immunotherapy' (p=.011) and 'feeling that allergy inoculation is not effective' (p=.021) in the experimental group. The decrease was higher in the experimental group than in the control group (Table 2).

Compliance

Compliance increased significantly in the experimental group after intervention compared to the pre-test score. However, the control group showed no significant difference. In addition, significant differences were observed between the two groups (p=.000).

As to compliance by items, compliance increased significantly in 5 items: 'I visit the hospital for injection on a certain day of a week' (p=.021), 'I come home after 20 minutes-rest in the hospital after the injection' (p=.000), 'I do not use carpets or furniture covered by cloth' (p=.004), 'I maintain the humidity of my house under 40~50%' (p=.001), and 'I always try to feel easy' (p=.048) in the experimental group. The increase was higher in the experimental group than in the control group (Table 3).

DISCUSSION

Asthma is a common and chronic health problem, affecting patients of all ages. The prevalence of asthma is increasing, and so is the admission rate of adults with asthma. In order to prevent allergic asthma to house dust mite, which is considered to induce or aggravate allergic asthma, rhinitis and atopic dermatitis, it is necessary to avoid or control contact with and exposure to mites and to change lifestyle. Moreover, education on

Table 3. Comparison of Compliance Between the Experiment and Control Group

Item		Pre-test	Post-test	Difference*	t	p
1. I visit the hospital on the appointed day on a regular basis.	Exp.	3.41±0.57	3.55±0.57	0.14±0.58	1.89	.063
	Cont.	3.31±0.64	3.16±0.72	-0.15±0.63		
2. I visit the hospital for injection on a certain day of a week.	Exp.	3.31±0.85	3.41±0.68	0.10±0.82	0.44	.021
	Cont.	3.22±0.87	2.88±0.94	-0.34±0.65		
3. I try to stop smoking, and avoid being exposed to cigarette smoke.	Exp.	3.03±1.02	3.03±0.91	0.00±0.85	2.37	.661
	Cont.	2.88±0.94	2.78±1.01	-0.10±0.82		
4. I come home after 20 minute-rest in the hospital after the injection.	Exp.	2.10±0.72	3.28±0.65	1.18±0.97	5.43	.000
	Cont.	2.38±0.94	2.06±0.80	-0.32±1.15		
5. I avoid excessive exercise before the injection.	Exp.	3.10±0.77	3.45±0.51	0.35±0.81	0.88	.380
	Cont.	3.03±0.90	3.19±0.78	0.16±0.85		
6. I keep regular administration of drugs while being injected.	Exp.	3.00±0.96	3.03±0.57	0.03±1.02	0.14	.887
	Cont.	2.81±0.86	2.81±0.79	0.00±0.86		
7. When the injection day is delayed, I consult with nurse for rearranging.	Exp.	3.17±0.80	3.24±0.58	0.07±0.59	2.97	.157
	Cont.	3.06±0.88	2.88±0.75	-0.18±0.78		
8. When I feel abnormal responses after returning home after the injection, I consult with doctors on the next injection day.	Exp.	2.90±0.82	3.14±0.69	0.24±0.83	3.37	.360
	Cont.	2.78±0.94	2.78±0.94	0.00±0.16		
9. I postpone the injection when asthmatic symptoms do not occur.	Exp.	2.90±0.72	3.41±0.78	0.51±0.87	1.61	.118
	Cont.	3.00±0.88	3.09±0.93	0.09±1.17		
10. I do not use carpets or furniture covered by cloth.	Exp.	2.41±0.73	2.93±0.80	0.52±0.69	2.02	.004
	Cont.	2.78±1.07	2.69±0.90	-0.09±0.89		
11. I maintain the humidity of my house under 40-50%.	Exp.	2.48±0.63	3.10±0.31	0.62±0.56	1.43	.001
	Cont.	2.59±0.84	2.53±0.76	-0.06±0.98		
12. I disinfect the bedding by sunning it and dust it on a regular basis.	Exp.	2.59±0.57	2.83±0.54	0.24±0.74	1.12	.060
	Cont.	2.72±0.63	2.59±0.71	-0.13±0.75		
13. I do not apply folk remedies (using radish or pear juice) carelessly.	Exp.	2.90±0.86	3.55±0.51	0.65±0.81	1.92	.112
	Cont.	3.03±0.93	3.28±0.81	0.25±1.11		
14. I do all I can in keeping warm and being careful of my health not to catch cold.	Exp.	2.86±0.64	3.00±0.53	0.14±0.58	0.92	.267
	Cont.	2.88±0.66	2.84±0.63	-0.04±0.59		
15. I always try to feel easy.	Exp.	2.72±0.75	3.07±0.65	0.35±0.81	1.59	.048
	Cont.	3.00±0.62	2.94±0.67	-0.06±0.76		
Overall compliance	Exp.	42.90±5.00	48.03±3.05	5.13±4.33	5.60	.000
	Cont.	43.47±5.73	42.55±4.86	-0.92±3.84		

Exp.: Experimental group (n=29) Cont. : Control group (n=32), * Difference : post-test - pre-test, Values are mean±SD

environmental control including the management of bedding and house interior is important because such control alleviates the symptoms of allergic asthma and reduces the dosage of agents and the hypersensitivity of bronchus (Tan, Weald, Strickland & Friedmann, 1996).

Allergic asthma is characterized by chronic course and unpredictable attack, and the patients can be limited in physical activity, daily living and social activities, and experience distress by the lowered quality of life (Rho et al., 2000). In addition, asthma as a chronic disease is treated for a long time and requires a high medical cost while causing inconveniences in daily life due to environmental control, drug therapy and immunotherapy, and stress from sleep disorder and fatigue (Confion-Cohen, Melamed & Goldberg, 1999).

It is necessary to avoid or reduce stimuli that may cause the acute aggravation of asthma and to apply appropriate drug administration in order to manage the disease effectively (Mathison & Koziol, 2000). Immunotherapy, applied when drug therapy is not inappropriate, requires the understanding of its principles, the frequency of injections, therapeutic period, symptoms of side effects and the importance of compliance with health care regimens (DuBuske, 2001).

Stress is determined by individual perception, the self-assessment on the ability to cope with, and coping behaviors performed. Stress in asthmatic patients is related to personality traits. Particularly the asthmatic patients with intrinsic personality characteristics show childish personality and experience unstable emotions when the disease becomes chronic (Park, 1989). In addition, such patients experience stress because of the uncertainty of therapeutic process and suffer psychological pains such as depression induced by the immaturity of coping strategy (Kim, 2001; Oh, 1999). According to the study by Park et al. (2000), in which 459 asthmatic patients were selected as subjects according to their quality of life, many of the patients suffered not only physical pains but also stress from the disease itself and concerns over asthmatic attack. Therefore, intervention is necessary to reduce stress in the patients, to encourage them to participate in the therapeutic process actively and to cope with the development of the disease effectively.

Noncompliance with health care regimens by asthmatic patients is caused by lack of communication with practitioners, misperception or insufficient perception on the disease, drug therapy and therapeutic methods (Jones, Weinberg, Ehrlich & Roberts, 2000). Therefore, patients should understand the disease and the prescription before being treated in order to enhance their compliance with health care regimens. Education on how to manage asthma is important and effective to control the disease (Thoonen et al., 2002).

In this study, the authors performed an education program about environmental therapy and immunotherapy for patients with allergic asthma to house dust mite who began immunotherapy.

The results of this study showed that stress in the experimental group was significantly reduced compared to that in the control group. Such results were similar to those of a research by Blixen, Hammel, Murphy and Adult (2001), in which 28 asthmatic inpatients were provided with one-hour education on asthma management three times and then were followed up after three and six months, respectively, and depression was significantly reduced and the quality of life was improved in the experimental group compared to those in the control group. Therefore, it is concluded that the education program of this study helped the patients to understand the disease and to learn knowledge about it and consequently it was effective to reduce stress from the uncertainty of the disease.

In this study, compliance with health care regimens increased significantly in the experimental group compared to that in the control group after the experiment, and the result was similar to that of a research by Choy et al. (1999), in which the technique of using metered dose inhalers, knowledge on it, and the subjects' understanding of self-management for the disease were enhanced after the 192 asthmatic patients were educated for self-management by nurse specialists in respiratory disease. Considering the results of these studies and the study reported by Spector (2000), in which asthmatic patients and their supporters including families and friends were educated and prescriptions were simplified in order to increase compliance with health care regimens of drug therapy, these education programs were positively effective on the compliance. Despite the fact that immunotherapy is a safe and effective method to treat allergic asthma, patients' compliance with health care regimens is often low when the therapy is applied. According to More and Hagan (2002), inconvenience and systemic side effects induce noncompliance. Therefore, it is necessary to understand such factors and to support patients when immunotherapy is applied.

In the experimental group, compliance with health

care regimens by item increased significantly in five items after the experiment not in item 'I keep regular administration of drugs while being injected' after the intervention. Additional programs are required in order to emphasize the importance of drug therapy. Compliance with health care regimens can be positively affected when effective media are used in the programs and not only asthmatic patients but also their family members are included in the education.

Limitation of the study

Participants were recruited from the allergy clinic of a university hospital located in Seoul, Korea. It is unlikely for them to represent all Korean people with allergic asthma to house dust mite and this limits the generalization of the results. This study needs to be repeated using a larger group of patients sampled randomly from different populations. In addition, the use of self-reported questionnaire might lower the accuracy the measures of compliance compared to other methods such as monitoring physiologic parameters.

CONCLUSIONS

Asthma education is considered a crucial component of asthma management. In addition, it has been proved to be invaluable to reinforce asthma management education by nurses.

Findings from this study suggest that asthma management education programs are effective for managing stress and improving compliance in patients with allergic asthma to house dust mite.

Suggestions for future research

Further research is necessary to develop comprehensive programs to reduce stress and to foster compliance. Finally, appropriate timing and length of education for asthma patients should be researched.

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