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ORIGINAL ARTICLE

Using Orem's self-care model for asthmatic adolescents

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Abstract

Purpose. The aim of the study was to determine the effect of Orem's self-care model on the self-care of adolescents with asthma.

Design and Methods. In this experimental design, adolescents with asthma (N = 80) received home visits and individualized care based on theory-guided nursing diagnoses. Patients in the experimental group were visited in their homes eight times, and those in the control group were visited two times.

Results. The five self-care skills of medicine usage, peak expiratory flow meter usage, applying an asthma action plan, keeping a daily follow-up schedule, and protecting against triggering factors differed significantly between the first and last visits in the experimental group, whereas the self-care skills of adolescents in the control group did not change.

Practice Implications. Applying Orem's self-care model increased the self-care skills of adolescents with asthma.

ASSESSMENT OF NURSING APPROACHES TO THE CARE OF *ADOLESCENTS* WITH ASTHMA ACCORDING TO OREM'S SELF-CARE MODEL

Asthma is a critical health problem among adolescents, and the increase in asthma mortality among adolescents over the last 20 years is twice that among younger children (Akinbami & Schoendorf, 2002; Hines, 2011; Iglesias, Jara, Remon, & Molero, 2003). Adolescents undergo many psychological, physical, and social changes, and those with a chronic illness often have problems managing their illness (Burgess-Dowdell, Posner, & Katherine-Hutchinson, 2011; Çavuşoğlu, 2011; Kyngas, 2000; Rosina, Crisp, & Steinbeck, 2003).

As an adolescent gains more independence and spends more time with peers, many problems arise in relation to assuming responsibility for the treatment and management of an illness (Couriel, 2003; Peterson-Sweeney, McMullen, Yoos, & Kitzman, 2003). Individuals during adolescence are capable of assuming responsibility for their own self-care physically and developmentally, but the increased peer pressure, independence, and risk-taking behaviors that characterize this period can inhibit self-care activities. Thus, adolescents with asthma may find it difficult to make the necessary adaptive changes in their lifestyles. These changes can affect psychological and social functions, induce high stress, and result in deficiencies in self-care (Rhee, Belyea, Ciurzynski, & Brasch, 2009; Rhee, Belyea, & Elward, 2008; Rosina et al., 2003).

Kyngas (1999) reported that 90% of adolescents with asthma stated that it was impossible to fully comply with self-care programs, and 31% stated that they told doctors and nurses that they performed adequate self-care when in actuality their self-care was inadequate. The rate of hospitalization is higher for adolescents with asthma with inadequate self-care (Buston & Wood, 2000; Hines, 2011).

Several studies have indicated that self-care practices among adolescents with asthma are not adequate (Buston & Wood, 2000; Couriel, 2003). Developing self-care skills related to the illness forms a basis for nursing related to the care of adolescents with asthma. Adolescents with asthma require supportive and educational nursing approaches and guidance. In the present study, we used Orem's self-care model as the basis for educational and

consulting services to enhance the development of self-care skills of adolescents with asthma.

PURPOSE

This study was performed to determine the effect of nursing interventions based on Orem's self-care model on the development of self-care activities of adolescents with asthma. The hypothesis was that nursing interventions performed according to Orem's self-care model would increase an adolescent's self-care skills in illness management.

DESIGN AND METHODS

This two-group experimental design randomized subjects to experimental and control groups. Approximately 100 patients between the ages of 12 and 18 years observed in the Child Allergy and Asthma outpatient clinic of Hacettepe University Hospital with a diagnosis of asthma lived within the boundaries of the Ankara Metropolitan Municipality in Turkey. Of these, 80 patients were included in the study. Only patients diagnosed with asthma at least 1 year ago, who were using at least one long-term medicine and who had also been advised to carry their quick relief medicine with them, who had no chronic illness other than asthma, and who agreed, with parent approval, to participate in the study were included.

Forty adolescents comprised each group (experimental and control). The groups were matched with respect to age and sex. The first patient to visit the outpatient clinic who fulfilled the research criteria was placed in the experimental group; the next patient with the same characteristics was placed in the control group, and so on.

Experimental intervention and control

The intervention comprised nursing interventions carried out according to the nursing care plans that were given in eight home visits.

The study was explained to adolescents in the experimental group at the outpatient clinic. If they agreed to participate, they were first visited at their homes, then again 2 weeks later, weekly for 2 weeks, and monthly for 4 months, for a total of eight home visits. A total of eight visits to the experimental group took place over the course of 5 months.

In the first visit, the demographic data form and self-care data form were administered to the experimental group. A nursing care plan was developed that was directed at the problems of adolescents related to self-care according to the data obtained from the self-care data form at the end of the first home visit. The nursing care plan was developed according to the individual self-care problems of each adolescent. Nursing interventions were then carried out on visits 2–7 according to the nursing care plans. These interventions are listed in Table 1. The self-care data form was administered again at the end of the study (visit 8).

Two home visits were made to the control group. The demographic data form and self-care data form were administered at the first visit. Problems in self-care were identified at the end of the first visit. The second visit was made 5 months later, and the self-care data form was administered again. The problems of the adolescents were reassessed by using the self-care data form to identify any changes that may have occurred after the first visit. There were no particular nursing interventions or home visits; only the routine follow-up performed by nurses in the outpatient clinic was done for the control group.

The investigator, who has a master's degree in pediatric nursing, made the home visits. Home visits were made at times suitable for the adolescents and their families. The first home visit lasted 60–75 min on average and the others lasted 60 min. Nursing interventions were carried out either in a separate room or together with their families according to each adolescent's wishes.

Educational booklets were given to the experimental group during home visits in order to further support the education of the adolescents in matters of self-care. The educational booklet comprised two sections, including basic information about asthma and information related to self-care.

Ethical aspects of the study

Written approval for the study was obtained from the university ethics committee. After explaining the intent of the study, written approval was obtained from the adolescents included in the study and their parents. The nurse's telephone number was given to adolescents in both groups at the first home visit, and they were given 24-hr notice before each visit.

Data collection forms

A demographic data form and self-care data form were used in this study. In addition, nursing care

Table 1. Frequency of Nursing Interventions Related to Nursing Diagnosis

	Home visits[a]						
	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	Visit 7	Total
Nursing diagnosis 1: Deficiency in self-care related to use of medicines	*N*	*N*	*N*	*N*	*N*	*N*	*N*
Nursing interventions							
1. Support the adolescent for taking responsibility for his/her treatment	40	19	—	—	—	—	59
2. Give information about medication effects/side effects	38	21	—	—	—	—	59
3. Give information on the use of inhaled drugs	40	24	16	—	—	—	80
4. Teach the technique of using inhaled drugs (demonstration method)	38	29	5	1	—	—	73
5. During repeated visits, let the adolescent use inhaled drugs and watch the technique used	—	25	38	23	6	1	93
6. Discuss the importance of carrying the drugs anytime/anywhere (home, school, car), and decide how and where to carry the medication	39	32	9	1	1	1	83
7. Explain the importance of using medication	38	28	9	1	1	1	78
Total	233	178	77	26	8	3	525
Nursing diagnosis 2: Deficiency in self-care related to use of a PEF[a] meter	*N*	*N*	*N*	*N*	*N*	*N*	*N*
Nursing interventions							
1. Describe the benefits of using a PEF meter for asthma management	40	31	27	9	9	9	125
2. Teach the adolescent how to use a PEF meter	40	31	8	2	—	—	81
3. Teach the adolescent how to evaluate the results of PEF meter readings	31	29	10	2	—	—	72
4. Teach the adolescent to record the results of PEF meter readings on a daily follow-up schedule	31	30	11	2	—	—	73
5. Observe the adolescent when he/she uses the PEF meter and reteach if necessary	—	10	30	27	8	2	77
6. Teach guidelines for cleaning the PEF meter	29	28	5	2	—	—	64
Total	171	159	91	44	17	11	492
Nursing diagnosis 3: Deficiency in self-care related to application of an asthma action plan	*N*	*N*	*N*	*N*	*N*	*N*	*N*
Nursing interventions							
1. Explain the importance of the asthma action plan	40	36	7	7	—	—	90
2. Teach use of the asthma action plan	39	37	12	2	1	1	92
Total	79	73	9	9	1	1	182
Nursing diagnosis 4: Deficiency in self-care related to keeping a daily follow-up schedule	*N*	*N*	*N*	*N*	*N*	*N*	*N*
Nursing interventions							
1. Explain the importance of keeping a daily follow-up schedule	40	36	7	7	—	—	90
2. Teach how to make the asthma follow-up chart	39	37	12	2	1	1	92
3. Check whether the daily follow-up schedule is being completed	2	13	36	28	7	1	87
4. Teach how to use the daily follow-up schedule information	36	36	12	4	—	—	88
Total	117	122	67	41	8	2	357
Nursing diagnosis 5: Deficiency in self-care related to protection against factors triggering an asthma attack	*N*	*N*	*N*	*N*	*N*	*N*	*N*
Nursing interventions							
1. Teach about environmental controls to reduce triggers (house, room, school, etc.)	39	38	36	23	9	9	145
2. With the adolescent, assess necessary changes to protect against triggers	40	39	36	25	10	—	150
3. Assess protection from triggers at school and determine prevention strategies	40	39	37	23	11	—	150
Total	119	116	109	71	30	9	445

Note: [a]No nursing intervention was performed at visit 1. PEF, peak expiratory flow; —, zero.

plans were developed according to Orem's self-care model and used for interventional purposes in the study.

The demographic data form included 16 questions regarding the sociodemographic characteristics and illness status of the adolescents with asthma and their families (age, sex, age at diagnosis, applied treatment, and triggers).

The self-care data form based on Orem's self-care model was developed by the authors according to the literature. Dorothea Orem's self-care model consists of three main groups (nursing system model, self-care deficit model, and self-care model). This study is based on the self-care deficit theory and model. This model explains why and when individuals need nursing care. The self-care deficit model defines the difference between what can be done and what should be done with regard to health functions of individuals. Five different methods are available in Orem's theory to help patients: (a) behaving or acting on behalf of the individual, (b) guiding or orienting the individual, (c) providing physical and psychological support, (d) developing the environment in which the individual's needs are supported and helping this environment to exist, and (e) training the individual. This study benefited from the last four of the earlier-stated methods for nursing interventions to assure the self-care of adolescents with asthma (Orem, 2001).

Our self-care data form consisted of five subscales related to self-care of adolescents with asthma: (a) self-care related to use of medicines (16 questions), (b) self-care related to use of a peak expiratory flow (PEF) meter (12 questions), (c) self-care related to application of an asthma action plan (two questions), (d) self-care related to keeping a daily follow-up schedule (two questions), and (e) self-care related to protecting themselves against factors that might trigger an asthma attack (42 questions). All questions in the self-care data form were dichotomous close-ended questions (answered by "yes" or "no").

The contents of this form were reviewed for validity by four professors of pediatric nursing and one professor of pediatric allergy (physician). The Cronbach's alpha value of this data form was determined to be 77.2%. The Cronbach's alpha values of the subscales were (a) self-care related to use of medicines (α = 93.8%), (b) self-care related to use of a PEF meter (α = 99.9%), (c) self-care related to application of an asthma action plan (α = 91.2%), (d) self-care related to keeping a daily follow-up schedule (α = 91.2%), and (e) self-care related to protection against factors triggering an asthma attack (α = 68.5%).

A nursing care plan for adolescents with asthma in the experimental group was developed based on Orem's self-care model. The nursing care plan included nursing diagnoses and nursing interventions related to facilitating the self-care of adolescents with asthma. The nursing diagnoses related to Orem's self-care model addressed (a) deficiency in self-care related to use of medicines, (b) deficiency in self-care related to use of a PEF meter, (c) deficiency in self-care related to application of an asthma action plan, (d) deficiency in self-care related to keeping a daily follow-up schedule, and (e) deficiency in self-care related to protection against factors triggering an asthma attack. The nursing diagnoses of the experimental group were formed using the data collected from the self-care data form in the first visit, and the nursing care plans for the experimental group were developed and put into action starting from the second visit.

Pilot testing

To assess the clarity and suitability of the data forms, the forms were given to at least 15 adolescents with asthma coming to the outpatient clinic. Based on the results of this preliminary application, changes were made to the data forms as necessary.

Data analysis

Data were analyzed using the Statistical Package for Social Sciences for Windows 11.5 (SPSS Inc., Chicago, IL, USA). Percentage and testing mean differences (McNemar's test) were used for dependent samples, and testing mean differences as well as Cochran's *Q*-test, Levene's test, and reliability tests were used for independent samples. When evaluating the self-care data form, (a) medication administration self-care was accepted as adequate for subjects who had answered all 16 questions correctly in the data form related to the use of medicines section; (b) PEF administration self-care was accepted as adequate for subjects who had correctly answered all 12 questions in the data form related to use of a PEF meter; (c) asthma action plan self-care was accepted as adequate for subjects who had correctly answered both questions in the data form related to application of an asthma action plan; (d) keeping a daily follow-up schedule of self-care was accepted as adequate for subjects who had correctly answered both questions in the data form related to keeping a

Table 2. Group Differences for Treatment Responsibility

	Group								
	Experimental				Control				
	First visit		Last visit		First visit		Last visit		
Who does the treatment	*N*	%	*N*	%	*N*	%	*N*	%	*p*
Adolescent	2	5.0	30	75.0	5	12.5	5	12.5	**< .001**
Adolescent with parental reminder	3	7.5	3	7.5	4	10.0	5	12.5	[a]
Adolescent or parents	7	7.5	3	7.5	6	15.5	6	15.0	[a]
Parents	28	70.0	4	10.0	25	62.5	24	60.0	**.002**
Total	40	100.0	40	100.0	40	100.0	40	100.0	

Note: [a]Test was not done.

daily follow-up schedule; and (e) protecting themselves against trigger factors self-care was accepted as adequate for subjects who had correctly answered all 42 questions in the data form related to protection against factors triggering an asthma attack.

RESULTS

Demographic results

A homogeneity assay test (Levene's test) was done to ascertain whether there were any differences in demographic parameters between the experimental and control groups. There were no statistically significant differences between the groups when age ($F < .001$, $p > .05$) and gender ($F < .01$, $p > .05$) were compared. Moreover, there were no other statistically significant differences between the groups when parameters such as the age of the patients at time of diagnosis ($F = .159$), time passed since diagnosis ($F = .523$), therapy of choice ($F = .538$), or identified precipitating factors ($F = .680$) were compared ($p > .05$).

The majority (67.5%) of the adolescents in the experimental and control groups were between 12 and 14 years of age, and 72.5% were male. The average age of the adolescents diagnosed with asthma was 8.12 years in the experimental group and 7.05 years in the control group. The number of the adolescents who had been living with asthma for 1–5 years was 21 (52.5%) in the experimental group and 13 (32.5%) in the control group. Long-term control medicine was used by 65% of the patients in the experimental group and 52.5% of patients in the control group. Substances triggering an asthma attack were mainly cigarette smoke, pollen, and house dust.

Taking responsibility for their own care

At the last visit, the number of adolescents in the experimental group assuming responsibility for their own treatments had significantly increased, and the number of adolescents whose parents assumed responsibility for their treatment had significantly decreased compared with the first visit ($\chi^2 = 29.36$, $p < .05$). No significant change was detected in the control group ($\chi^2 = 1.68$, $p > .05$; Table 2).

Self-care applications related to illness management

All of the adolescents experienced problems related to self-care. The identified nursing diagnoses related to the self-care of the adolescents in the experimental group began to decrease significantly after the third visit and again after the sixth visit ($Q = 82.47$, $p > .05$; Table 3).

The changes noted on the self-care applications related to asthma management based on the first and last visits are shown in Table 4. At the first visit, none of the adolescents fully carried out their own self-care in relation to using medications, using a PEF meter, applying an asthma action plan, keeping a daily follow-up schedule, or protecting against factors triggering an asthma attack (Table 4). Only one adolescent in the control group at the first and last visits was responsible for carrying out his self-care in relation to protecting himself against triggering factors. A significant increase was detected at the last visit in the self-care skills of the adolescents in the experimental group in all fields.

At the last visit, the rate of adolescents in the experimental group fully carrying out their self-care for medications increased. Adolescents in the experimental group used the appropriate dose of medicine at the appropriate time, and knew the effects and side effects of their medicine. At the last visit, the rate of adolescents in the experimental group appropriately using a PEF meter, applying an asthma action plan, and keeping a daily observation journal had all increased. The number of adolescents that protected themselves from factors triggering an

Table 3. Group Comparisons for Nursing Diagnoses Identified During Home Visits

	Home visits															
	Visit 1		Visit 2		Visit 3		Visit 4		Visit 5		Visit 6		Visit 7		Visit 8			
Nursing diagnosis	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*Q*	*p*
1. Deficiency in self-care related to use of medicines	40	100.0	40	100.0	32	80.0	16	40.0	16	40.0	2	5.0	2	5.0	2	5.0	82.474	< .001
2. Deficiency in self-care related to use of PEF meter	40	100.0	40	100.0	31	77.5	27	67.5	9	22.5	9	22.5	9	22.5	9	22.5	82.474	< .001
3. Deficiency in self-care related to application of an asthma action plan	40	100.0	40	100.0	37	92.5	36	90.0	28	70.0	7	17.5	7	17.5	7	17.5	82.474	< .001
4. Deficiency in self-care related to keeping a daily follow-up schedule	40	100.0	40	100.0	37	92.5	36	90.0	28	70.0	7	17.5	7	17.5	7	17.5	82.474	< .001
5. Deficiency in self-care related to protection against factors triggering an asthma attack	40	100.0	40	100.0	37	92.5	25	62.5	11	27.5	9	22.5	9	22.5	9	22.5	82.474	< .001

Note: PEF, peak expiratory flow.

asthma attack was very low in both the experimental (10%) and control (2.5%) groups (Table 4).

The five self-care skills (medicine usage, PEF meter use, daily follow-up schedule, applying an asthma action plan, and protecting against triggering factors) differed significantly between the first and last visits in the experimental group, and between the experimental group and the control group ($\chi^2 = 19.33$, $p < .05$; Table 4). Implementation of self-care in adolescents related to each of the five categories was nonrelated to age, sex, duration of illness, education level of parents, age of parents, or number of siblings.

Table 4. Within- and Between-Group Comparisons for Adolescent Self-Care Practices at the Last Visit

	Group						
	Experimental			Control			
Self-care skills	*N*	%	*p*	*N*	%	*p*	*P*
Using the medicine with proper technique							
Using	38	95.0	.001	—	—	.250	< .001
Not using	2	5.0		40	100.0		
Using PEF with proper technique							
Using	31	77.5	.001	—	—	[a]	< .001
Not using	9	22.5		40	100.0		
Keeping a daily follow-up schedule							
Keeping	40.0	100.0	< .001	—	—	[a]	< .001
Not keeping	—	—		40.0	100.0		
Applying the application of asthma action plan							
Applying	33	82.5	.001	—	—	[a]	< .001
Not applying	7	17.5		40.0	100.0		
Protection from triggers							
Protected	10	25.0	.002	1	2.5	< .001	.001
Not protected	30	75.0		39	97.5		
Total	40	100.0		40	100.0		

Note: [a]Test was not done. PEF, peak expiratory flow; —, zero.

DISCUSSION

Taking responsibility for their own care

The findings of the present study indicate that the rate of adolescents performing their own self-care increased among those in the experimental group who received more education and home visits, consistent with reports that the rate of adolescents requiring their parents' help decreased after education (Akçakaya, 2003; Iglesias et al., 2003). In the present study, the rate of adolescents requiring their parents' help was high in the control group, and no significant change was noted at the last visit.

The responsibility for treatment should be transferred from the parents to the child during adolescence, and parents should assist in this transfer. However, parents have difficulty turning over responsibility for the illness to an adolescent with a chronic illness. A study of asthmatic school-age children and their parents indicated that power struggles between children and parents are common regarding the responsibility for care (Peterson-Sweeney et al., 2003). The adolescent needs to be treated more like an adult and given increasing responsibility for his/her self-care. Based on this study, we recommend that nurses facilitate the transfer of control over the illness to the adolescent by including her/him in decisions related to the illness. Parents should support the

self-determination of their adolescents, allowing them to make decisions about their self-care.

In her self-care theory, Orem included roles for nurses related to training, guiding, and leading the patient (Orem, 2001). The adolescent with asthma has the physical capability to perform his/her own self-care. The nurse must ensure that adolescents have control over their disorder by including them in their self-care. Moreover, the parents should also support the adolescent's autonomy and let the adolescent take responsibility in the self-care process.

Self-care applications related to illness management

The self-care skills of adolescents in the experimental group had increased considerably between the first and the last visit. Adolescents may have the social, emotional, physical, and mental maturity to assume responsibility for their illness. Fluctuations in the physical and psychosocial development of the adolescent, however, may also affect the continuation of self-care. Continuous education and regular follow-up as well as intermittent home care visits by the nurse are very important for encouraging adolescents with asthma to maintain their self-care (Dosey & Schneider, 2007; Duff, 2001; Horner & Fouladi, 2003; Kyngas, 2001; Makinen, Suominen, & Lauri, 2000).

Study results showed that the education and demonstration techniques concerning proper use of medications employed according to Orem's self-care model during the home visits were effective. Similarly, Butz and colleagues (2005) in a randomized controlled study with children with asthma between the ages of 6 and 12, as well as their parents, found that the ratio of children who were using the inhaler properly was higher in the group who received education than in the group who were not educated. Burkhart and Rayens (2005) ascertained that children with asthma between the ages of 7 and 11 who had more knowledge of their illness were mostly using proper drug techniques.

Using the drugs properly and regularly is an important factor affecting the success of asthma treatment in asthmatic adolescents. Regular use of the drug helps bring the illness under control. In return, this allows the adolescent to gain control over his body, feel more independent, and boost self-esteem (Dosey & Schneider, 2007). Self-confident adolescents are more successful in managing their illness (Burkhart & Rayens, 2005). According to reports by Butz and colleagues (2005), Halterman and colleagues (2011), Riekert, Borrelli, Bilderback, and Rand (2011), and Zivkovic, Radic, Cerovic, and Vukasinovic (2008), the ratio of those who used drugs in the proper manner was higher in asthmatic individuals who had received education about the proper use of drugs.

At the final visit to adolescents in the experimental group, the rate of properly using a PEF meter had increased, consistent with findings from other studies (Huss, Winkelstein, Naumann, Sloand, & Huss, 2003; Wensley & Silverman, 2004). One of the best indicators of effective asthma self-care is using a PEF meter together with a daily follow-up chart (Akçakaya, 2003). Using a PEF meter increases effective management of the illness. PEF follow-up provides information about lung functions and the average amount of air passing through the respiratory tract. PEF measurement may also reveal the existence of bronchial constriction earlier so that the recommended treatment can be applied. This allows the adolescent to feel independent and strong in terms of managing the illness.

One of the most important elements for undertaking self-care is an asthma action plan. Every adolescent must have an individually prepared asthma action plan. An asthma action plan provides information about which medication to use, the dosage, and how and when to use emergency services when an asthma attack occurs. An asthma action plan increases self-reliance, decision-making, and the adolescents' skills in managing their illness (Douglass et al., 2002). Further, an asthma action plan decreases the rate of use of hospital or emergency services (Douglass et al., 2002; Zemek, Bhogal, & Ducharme, 2008).

An asthma action plan includes maintaining a daily follow-up chart, and recording asthma symptoms (cough, wheezing, difficulty in breathing, etc.) and PEF values. A daily follow-up chart provides information about the effectiveness of self-care by the adolescent. Some adolescents may pretend to carry out self-care in the outpatient clinic environment. For this reason, it is important to continue the follow-up and education of asthmatic adolescents through home visits at certain intervals. The adolescent should be educated about the asthma action plan, using a PEF meter, and maintaining a daily follow-up chart.

In the present study, at the first visit, none of the adolescents in either group stated that they protected against asthma triggers. Gabe, Bury, and Ramsay (2002) reported that very few adolescents with asthma consistently protected against asthma triggers because they did not wish to appear different

from their peers. Although the experimental group had increased their guard against triggers at the last visit, the increase was still not satisfactory. In similar studies, follow-up at home led to self-care to guard against asthma triggers (Bracken et al., 2009; Dixon, Fowler, & Harris, 2009; Knight, 2005). Iglesias and colleagues (2003) reported that educating children with asthma between the ages of 11 and 14 years increased the rate of adolescents actively protecting against triggers.

Protection against asthma triggers prevents asthma symptoms and ensures control of the illness. The desire not to differ from their peers, however, prevents adolescents from guarding against factors that trigger an asthma attack. Evaluating home conditions with the adolescent and educating the adolescent about the necessary regulations during home visits can facilitate their ability to guard against asthma triggers.

In the present study, the self-care skills had increased in the experimental group at the last visit for medication, PEF meter, maintaining a daily follow-up chart, applying an asthma action plan, and protection against triggers. These findings indicate that education and consultation services as well as intermittent home follow-up according to Orem's self-care model effectively facilitated an increase in the respective self-care skills of adolescents with asthma, consistent with the findings of other studies (Velsor-Friedrich, Pigott, & Louloudes, 2004; Velsor-Friedrich, Pigott, & Srof, 2005).

Limitations

There were several limitations to this study. As there was no classification of asthma according to severity (mild, moderate, or severe) in patients diagnosed with asthma in this clinic, no classification could be made with regard to severity in the adolescents included in the sample. Additional research is needed to better estimate the psychometric properties of the self-care data form. Future research with a larger sample will allow psychometric testing including factor analysis to explore integrity of the subscales.

CONCLUSION

The results of the study indicate that self-care practices were not efficient among adolescents with asthma, whereas nursing interventions in accordance with Orem's model were efficient. In the course of providing nursing care to adolescents with asthma according to Orem's self-care model, the specific ways in which adolescents have self-care deficits can be determined. This study found that adolescents were not efficient in using medicines, in using a PEF meter, in developing an asthma action plan, in keeping a daily follow-up schedule, or in guarding against triggers. Nursing interventions to eliminate self-care deficits (guiding, providing support, and training) were reported to be effective.

How might this information affect nursing practice?

The results of the study indicated that the use of Orem's self-care model in asthmatic adolescents was effective. We found that the self-care of adolescents related to their use of asthma drugs, a PEF meter, and an asthma action plan; keeping a daily schedule; and guarding against triggers were all inadequate at the beginning of the study. We determined that the use of counseling, support, and training was effective for nursing interventions aimed at eliminating inadequate self-care.

It is important to continuously monitor and evaluate the self-care of adolescents with asthma through home visits in addition to follow-up visits at outpatient clinics. We believe it may be possible to greatly reduce inadequate self-care with the counseling, support, and training provided during home visits.

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