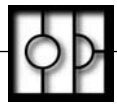

Research Article

A Comparison of an Individually Tailored and a Standardized Asthma Self-Management Education

Judy Shackelford and Jean H. Bachman

ABSTRACT

Background: *Asthma is one of the most prevalent chronic diseases in the United States and can be life-threatening. There are a rising number of adults with asthma that cannot be prevented or cured but may be controlled. Self-management education is essential for long-term asthma control; however, the most effective type of education is unknown.* ***Purpose:*** *The study examined and compared effects of an individually tailored (n = 44) and a standardized (n = 44) asthma self-management program on adult asthma control. The individually tailored education utilized an andragogical framework.* ***Methods:*** *A comparative, pretest-posttest design was used. Education curricula were based on National Asthma Education Prevention Program guidelines. Asthma Control Test (ACT) and Peak Expiratory Flow readings were pre and post-test measures. Independent t-test, chi-square, and repeated measure general linear model compared groups.* ***Results:*** *A significant difference in ACT scores between pre and post-test (F = 4.43, p = 0.038) and a decrease in mean number episodes of shortness of breath (F =6.22, p = 0.015), regardless of asthma teaching method was found. Over 50% of participants reported not receiving previous asthma education. Physicians were the primary source of education reported.* ***Discussion:*** *Asthma education is needed. Both the standardized and individually tailored education may improve asthma control.* ***Translation to Health Education Practice:*** *Health educators must take an active role in providing asthma education based on the rising number of adults with asthma and reports of those receiving no education. Practitioners can determine the type of education based on the setting and learner needs.*

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BACKGROUND

Asthma is one of the most prevalent chronic diseases and can be life-threatening despite the existence of effective treatment. Despite the existence of effective treatments there is often a lack of effective self-management by adults with asthma. Whereas many studies focus on children, there are a rising number of adults with asthma who do not outgrow childhood asthma. Consequently, there is a growing need to be responsive to health care needs of adults with asthma. Currently, more than 30 million people have diagnosed asthma. There are 23 million adults compared to 9 million children.[1] Although asthma mortality is not as high as heart disease, stroke, or cancer, it impacts more people and has a greater incidence and prevalence than diabetes, heart disease, stroke, or cancer.

In the United States, there are greater than 4,000 deaths reported annually from asthma, and the majority of these deaths are adults with 1.4 deaths per 100,000 adults compared to 0.3 deaths per 100,000 children.[1,2] With the increase in prevalence among children and the aging population,[2] it is evident that the number of adults impacted by asthma

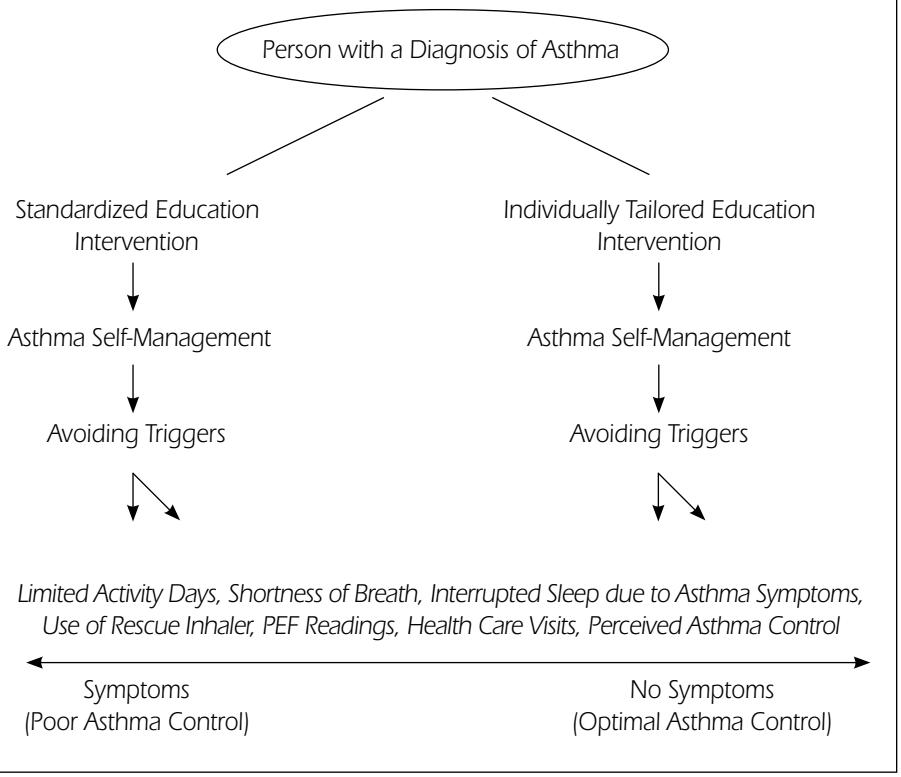
Judy Shackelford is an assistant professor in the Department of Nursing, St. John's College, Springfield, IL 62702; E-mail: judy.shackelford@st-johns.org. Jean H. Bachman is an assistant professor in the College of Nursing, University of Missouri, St. Louis, St. Louis, MO 63121-4400.

will continue to rise.

Whereas current evidence establishes the need for education to support asthma self-management,[3] there is a paucity of evidence to suggest the appropriate amount of time, setting, and content to optimize asthma outcomes. There is a lack of theory-based evidence regarding asthma education specifically for adult populations. Incorporating theory is essential to support, guide, and validate the effectiveness of asthma education practices.

The study contributes to the body of knowledge regarding the effects of two educational methods on asthma control. The study also contributes to theory-based knowledge specifically with regard to educating adults with asthma. It applies and lends support to implementation of National Asthma Education Prevention Program (NAEPP) guidelines.

Figure 1. Adult Asthma Self-Management Education and Asthma Control Model



Model

The Adult Asthma Self-Management Education and Asthma Control Model (Figure 1) guided the study and illustrated the relationship among variables and components in the current study: person with asthma, education intervention, asthma self-management, triggers, symptoms, and asthma control.

The model begins with the person diagnosed with asthma who is in need of asthma self-management education to manage his or her disease condition.[2,3,15] Both education interventions utilize a curriculum created by the Asthma and Allergy Foundation of America Expert Panel which reflects the National Asthma Education Prevention Program's (NAEPP) Expert Panel Report II: *Guidelines for the Diagnosis and Management of Asthma*.[16] The curriculum is based on empirical evidence of topics necessary to facilitate and support asthma self-management.[3,16] The individually tailored education intervention differs from the formal delivery of the standardized program in that it implements andragogical principles as a framework for delivery of the curriculum. Andragogy implies that educational practices need to be adult-appropriate to facilitate learning. Andragogy addresses the uniqueness of the individual. The model seeks to determine if there is a difference in asthma control for individuals who receive a standardized education versus individuals who receive an individually tailored education program.

An important aspect of asthma management is educating individuals to identify triggers that precipitate their asthma symptoms.[17] These symptoms include limited activity days, shortness of breath, interrupted sleep due to asthma symptoms, use of a rescue inhaler, peak expiratory meter (PEF) readings, health care visits, and perceived asthma control.[19]

Asthma

Asthma is a chronic inflammatory disease of the airways characterized by episodes of wheezing, chest tightness, shortness of breath, and coughing.[15] While asthma cannot be prevented or cured, it may be controlled to improve quality of life.[2] A factor attributed to increased asthma morbidity and mortality is an individual's limited knowledge about asthma management.[15] While managing asthma is complex, effective asthma management should include: individual education, behavior changes, avoidance of triggers, medication regimens, routine medical follow up, and at a minimum, self-management skills.[3]

The NAEPP guidelines have been established to increase awareness of asthma, ensure proper identification of asthma symptoms, and ensure effective control of asthma through patient/health professional partnerships, treatment, and education.[15] These guidelines are research based and provide information on treatment of asthma using clinical and self-management strategies.

Klein et al.[19] defined self-management as behaviors based on knowledge of asthma and its triggers, medication compliance, self-monitoring of the disease state, proper inhalant use, and use of PEF. The state of the

science regarding asthma self-management education does not indicate the type of education intervention or how intense an education intervention should be.[3,9,15]

Adult Education

Review of adult education literature establishes that education is a structured learning process, and meeting learner needs is essential to adult learning.[11-14] Adult learner education is viewed holistically, more than a cognitive process. The learner has experiences, emotions, and needs.[13] The learning process deals with the nature of the learner, goals, social and physical milieu, and teaching learning techniques.[13] Support for adult learners is provided by a learning environment that meets both physiological and psychological needs.

While no one theory or model explains all that is known about adult learners, two key components of adult education are andragogy and self-directed learning (SDL).[13] Andragogy is the art and science of helping adults learn and establishes applicable generalizations for adult learners.[13,20-23] The concepts of self-directed learning are fundamental to andragogy.[24]

Andragogy is based on the five following assumptions:

1. The adult learner has an independent self-concept and has a need to be self-directed.
2. The adult learner brings a lived experience to the learning situation that is a valuable resource.
3. Adults learn more effectively when the information is relevant to their lives.
4. Adult learning is problem-centered, and adult learners like immediate application of knowledge.
5. For the adult, learning is internally motivated rather than externally. Thus, each person is unique and brings individual goals.[21]

These assumptions describe the adult learner and serve as a program-planning model for designing, implementing, and evaluating education experiences for adults.[13,20,23] Andragogy principles serve as a framework to individualize education.[12,13,20,22,23] Andragogy has been applied in numerous settings and educational situations, yet experimental support is limited.[25]

There is a growing need for education if individuals are to deal with the intricacies of managing chronic illness. Past studies show that asthma control improves with asthma self-management education and self-management.[4-10] In addition, education needs to accommodate for uniqueness of individual adults in order to be effective.[11-14]

PURPOSE

The purpose of this study was to examine and compare the effects of two asthma self-management education programs on adult asthma control. The study was designed to answer the following questions: (1) What are the effects of asthma education for adults with an individually tailored asthma self-management education program versus adults with a standardized asthma self-management education program as measured by scores on the Asthma Control Test (ACT)?; (2) What are the effects of asthma education for adults with an individually tailored education versus the standardized education based on selected outcomes?; and (3) Are selected demographic variables differentially associated with asthma control for adults with the individually tailored versus adults with a standardized education program?

METHODS

The study utilized a comparative, pretest-posttest design to examine and compare the effects of the standardized and individually tailored self-management education programs on adult asthma control. The education curriculum for both groups was based on NAEPP Guidelines.[15] The ACT and PEF reading were utilized as pre- and posttests. To maintain a power of 80%, a sample size of 44 was utilized for both groups.

Sample

The sample consisted of 88 adults age 18 and older, diagnosed with asthma (with no other chronic respiratory conditions aside from allergies and sinusitis), and able to read and speak English. Participants were recruited from the Central Illinois Allergy and Respiratory Clinic in Springfield, Illinois and by word of mouth by the researcher and individuals aware of the study. Participants were randomly assigned into one of two education groups.

Instrumentation

The ACT and PEF meter readings were used to measure outcomes. ACT is a validated instrument with internal consistency reliability of .84 and content validity with agreement between ACT and specialists' rating ranging from 71% to 78% given cut points used.[26] Research supports that ACT detects clinically meaningful changes in asthma control.[27]

The PEF meter is a simple to use instrument that measures how fast an individual can exhale after a maximum inhalation.[28] The PEF meter has strong face validity and a 90 to 95% interrater reliability of readings.[29-31] NAEPP guidelines recommend PEF meters being accurate within ten liters per minute of each reading.[30] An Omron PEF meter, which meets NAEPP guidelines, was used for the study.

Data Collection

Approval for the study was obtained from the University of Missouri at St. Louis Institutional Review Board. Each participant signed an informed consent. Prior to the start of the education, participants completed a demographic form which inquired about previous asthma education, an ACT, and a PEF reading. Four weeks after completion of the education program, participants completed another ACT and PEF reading, and reported the results via telephone or e-mail. An evaluation form with open-ended questions allowed participants to write comments about the asthma education program. Education sessions for both groups were 90 minutes, and scheduled based on participant preference. While curriculum content was the same for both groups, the process for each group differed.

Standardized Education Program

The standardized education program was content driven and scripted with a formal delivery. Group size varied from two to eight. The researcher directed the education activities and maintained the role of content

expert. The role of the learner was active listening and questioning. The meeting room was lecture style and comfortable.

Individually Tailored Education Program

The individually tailored education program was informal, semi-structured, and applied andragogical principles. Group size varied from one to six. The researcher's role was content resource, facilitator, and manager of education activities that facilitated learning. Participants shared their lived experience with asthma and learning goals for the education activity. The role of the learner was participatory. Seating arrangement was conducive to group sharing. The meeting room was quiet and aesthetic with comfortable seating. A climate of *mutual respect* and *support* was established that promoted sharing of stories among participants and acceptance of participant situations and goals. A climate of *pleasure* and *humanness* was created by expanding on points of interest and treating participants with value and respect. Refreshments were provided.

Table 1. Categorical Demographics of the Sample in Individually Tailored Asthma Self-Management and Standardized Self-Management Programs

Demographic Variables	Standardized (n = 44) f(%)	Individually Tailored (n = 44) f(%)
Gender		
Male	11(25%)	9(20.5%)
Female	33(75%)	35(79.5%)
Marital Status		
Single	20(45.5%)	13(29.5%)
Married	22(50%)	29(65.9%)
Widowed	2(4.5%)	2(4.5%)
Range Household Income		
$0 to $19,000	8(18.2%)	2(4.5%)
$20 to $39,000	3(6.8%)	7(15.9%)
$40 to $59,000	7(15.9%)	7(15.9%)
$60 to $79,000	11(25%)	7(15.9%)
$80 to $99,000	15(34.1%)	17(38.6%)
> $99,000		3(6.8%)
Ethnicity		
American Indian	1(2.3%)	1(2.3%)
Black	1(2.3%)	2(4.5%)
Asian/Pacific/Islander	0(0%)	1(2.3%)
White	36(81.8%)	36(81.8%)
Other	4(9.1%)	3(6.8%)
Previous Asthma Education		
Yes	19(43.2%)	24(54.5%)
No	25(56.8%)	20(45.5%)

RESULTS

General Linear Model (GLM) repeated measures were used to assess between-group and within-subject effects simultaneously for research questions one and two. An independent t-test was used to examine numerical demographic variables and chi-square used to examine categorical demographic variables for research question three. Demographic variables for both groups are presented in Table 1 and 3. The majority of participants for both groups were female, married, and Caucasian.

Research Question 1: There was no significant mean difference in ACT scores between the standardized education group and the individually tailored group ($F = .85$, $p = 0.359$) (Table 2). There was a significant difference in the ACT scores between pre- and post-test regardless of asthma teaching methods as indicated by multivariate tests of within subject effects ($F = 4.43$, $p = 0.038$) (Table 2). Both education groups were effective in improving asthma control.

Research Question 2: There was a statistically significant decrease in mean number of episodes of shortness of breath ($F = 6.22$, $p = 0.015$) (Table 2) regardless of teaching methods. Participants reported a decrease in number of times shortness of breath was experienced. Whereas, more of the participants in the individually tailored education group reported a decrease in shortness of breath, no significant difference between methods was found ($p = 0.645$) (Table 2). No significant differences were found between-group and within-subject effects for limited activity days at work, school, or at home; asthma symptoms and interrupted sleep; frequency of use of rescue inhalers or nebulizer medication; perceived asthma control; and PEF readings (Table 2).

Research Question 3: There was a significant difference in mean scores for age of both groups (Table 3). The average age was higher ($M = 47.23$, $SD = 12.79$) in the individually tailored education group compared to the standardized education group ($M = 42.59$). The groups were randomly assigned, so distribution of the population between the two education methods was equalized. No significant differences in mean scores was found for number of asthma related health care visits and number of years diagnosed with asthma between groups (Table 3). No significant difference in gender, marital status, household income, ethnicity, and previous asthma education between groups was found (Table 1).

Previous Asthma Education: Only 19 (43.2%) (Table 1) participants from the standardized group reported receiving previous asthma education. The majority (16) reported receiving education from physicians. Insurance companies, pamphlets, nurses, school district, hospital, American Lung Association, Asthma Coalition, and video were other reported sources of asthma education. Some participants reported more than one source for receiving education. Of those reporting the type of content covered,

Table 2. Outcome Variables for Standardized and Individually Tailored Education Programs in General Linear Model Analysis

	Between-Group Effects Standardized versus Individually Tailored			Within-Subject Effects Pre-test versus Post-test		
	F	df	P -value	F	df	P-value
Asthma Control Test scores	.85	1	0.359	4.43	1	0.038 *
Limited activity days at work, school, or home related to asthma	.11	1	0.740	3.55	1	0.063
Shortness of breath	.21	1	0.645	6.22	1	0.015 *
Asthma symptoms	.23	1	0.631	.233	1	0.631
Frequency of rescue inhaler use, and	1.6	1	0.206	1.16	1	0.204
Perceived asthma control	3.58	1	0.062	3.58	1	0.062
Peak Expiratory Flow readings	.03	1	0.87	2.11	1	0.15

*$p \leq 0.05$

two reported peak flow and inhaler use; one reported what to do based on peak flow; one reported receiving education on asthma and allergies; and one reported avoiding triggers for prevention, and treating symptoms. Twenty five (56.8%) (Table 1) of the standardized group received no previous education.

Twenty four (54.5%) (Table 1) of the individually tailored group reported receiving previous asthma education with the majority of these (16) reported receiving education from physicians. Nurses, American Lung Association, Asthma Programs for children, and literature were other reported sources of education for the individually tailored group. Of those reporting the type of content covered in the education, two reported receiving information regarding triggers and how to control asthma; two received an overview of asthma and how allergies impact; one, their asthma treatment; and one received education on not smoking, taking medications, and the importance of taking care of oneself. Twenty (45.5%) (Table 1) of the individually tailored group received no previous education.

DISCUSSION

The findings suggest that both types of education are effective in improving asthma control. Because this study found both education methods effective, it is important for health educators to determine the preferred method of education based on individual learning needs and circumstances. The andragogical framework used for the individually tailored education addresses the adult learner's individuality and values their lived experience. This study lends support for the use of an andragogical framework for adult asthma education. Through self-direction, it allows the learner to learn within her/his own tradition. According to the NHLBI,[15,16] the standardized education and curriculum support asthma self-management. Both types of education were effective in decreasing episodes of shortness of breath. The NHLBI[15] identifies preventing shortness of breath as a goal of asthma therapy. Only one evidence-based study reported a significant improvement regarding breathing.[4] This study found no significant improvement in the number of health care visits related to asthma. This finding is consistent with the Gibson et al.[32] review and Premaratne et al.[33] study which found that education alone does not significantly decrease use of health services.

Of 88 participants, the majority were white. This is reflective of the local population and is consistent with current literature. In this study, the primary source of previous education reported was physicians. Other reported sources in order of frequency were nurses, hospitals, insurance companies, American Lung Association, asthma programs for children, school district, literature, Asthma Coalition, and video. The type of previous education varied and was not entirely indicative of NAEPP guidelines. Also, individuals may be relying on education geared toward children rather than adults. NAEPP guidelines were easily implemented with both types of education and facilitated organization and completeness of content. An important finding of this study was that more than 50% of the total participants reported not receiving any previous asthma education, which suggests an area of need to health care providers. Only one previous study inquired about previous asthma education.[34] In the Perneger et al. study,[34] only 29% of 131 participants reported receiving previous asthma education.

TRANSLATION TO HEALTH EDUCATION PRACTICE

Although the sample size is small, the current study contributes to the quantitative body of scientific evidence supporting not only the standard method of education, but also the use of a theory based andragogical framework in adult asthma education. Crucial for health education practice is to not assume that adults with asthma have had asthma education. Important to health education practice is that the method of delivery for asthma education should be determined by the preferences and learning needs of the adult with asthma. Additionally, resources and facilities need to be taken

Table 3. Continuous Demographics of the Sample in Individually Tailored Asthma Self-Management and Standardized Self-Management Programs

Characteristics of Subjects in Between-Group Interventions				
	Standardized (n = 44)		Individually- Tailored (n = 44)	
Demographic Variable	Mean	SD	Mean	SD
Age	42.60	17.24	47.23	12.79
Asthma Health Visits	2.23	3.61	2.79	5.84
Years Diagnosed with Asthma	24.27	17.19	18.76	13.53

into account. In this investigation some challenges in scheduling education sessions were encountered when trying to coordinate room availability with participant preference for education times. Environment is an important variable for an effective andragogy approach. Because there were limited rooms appropriate to use for the individually tailored education group, early booking of rooms is essential. In this study, in order to avoid attrition, it was important to educate the participants as soon as possible after they agreed to participate to facilitate group size. The same may be true for health education practice; to offer asthma education at times that meets the needs of the adult with asthma.

Health educators must take an active role in providing asthma education based on the rising number of adults with asthma and reports of those receiving no education. Both the standardized and individually tailored education approaches are effective in improving asthma control as measured by the ACT and decreasing shortness of breath related to asthma. Health practitioners can determine the type of education based on the setting and learner needs. Providers of asthma education have been identified, such as physicians, nurses, American Lung Association, etc. Other avenues for education should be explored by health educators such as churches, pharmacies, community centers to allow for expanded and accessible education services. Future research needs to be done to establish the amount of time, setting, and if NAEPP guidelines are being implemented in education programs to optimize asthma control. Factors that support or facilitate long-term maintenance of asthma self-management and asthma control need to be determined.

There is a paucity of qualitative studies to establish patient perspectives and experience with asthma self-management education. More studies need to be done on lower socioeconomic groups and minorities in regards to asthma self-management.[1] Effective recruitment measures for lower socioeconomic groups and minorities needs to be determined. Incentives for participation and recruitment through local churches could be a possible means to utilize. In a cost-conscious health care system with multiple demands for health care dollars, studies that measure the cost effectiveness of asthma education programs are important. Further asthma education theory based research is needed to determine if different education models and curricular frameworks matter in regards to asthma control.

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