



## REDUCTIONS IN HOSPITAL USE FROM SELF MANAGEMENT TRAINING FOR CHRONIC ASTHMATICS

C. S. GHOSH,<sup>1</sup>\* P. RAVINDRAN,<sup>1</sup> M. JOSHI<sup>1</sup> and SALLY C. STEARNS<sup>2</sup>

<sup>1</sup>Department of Respiratory Medicine, Medical College P.O., T.C. XIII/1469, Kamalassree, Kumarapuram, Thiruvananthapuram, 695 011, India and <sup>2</sup>Department of Health Policy and Administration, University of North Carolina, Chapel Hill, U.S.A.

**Abstract**—The purpose of this study was to assess the impact of asthma Self Management Training on the health status and resource use of patients with chronic asthma. The study consisted of a randomized control design of chronic asthmatic patients in a tertiary care center in India. The intervention group (153 patients) received four training sessions in addition to the regular care provided to the control group (150 patients). Health status and resource use were measured at baseline and over a one year follow-up period. The intervention group had significantly better health status (measured by breathing ability), fewer productive days lost, and lower resource use (hospitalizations and emergency room visits) than the control group. Total annual costs (direct and indirect) were also lower, though physician costs were not included in the assessment. Therefore, incorporation of asthma Self Management Training as part of clinical management of asthma can result in improvements in health status and reductions in hospital use. © 1998 Elsevier Science Ltd. All rights reserved

*Key words*—chronic bronchial asthma, randomized trial, cost effectiveness analysis

### INTRODUCTION

Asthma is a chronic condition of increasing prevalence and high cost to patients, their families, and society. Reports from countries around the world have indicated a rising trend in the morbidity and mortality of asthmatics at various points in time (Jackson *et al.*, 1982; Mitchell, 1983; Burnley, 1986; Robin, 1988; Littlejohns *et al.*, 1989; Weiss and Budetti, 1993; Udawadia, 1993; Jain, 1994). Furthermore, even though asthma can be well-controlled with available medications, lack of insurance coverage for such treatment in the United States or fragmented health systems in developing countries may result in numerous episodes of asthma attacks. Unlike many other chronic diseases where there is a slow downhill course, asthma has a variable impact on a patient's life depending on the frequency and severity of acute attacks. The health status of asthma patients is generally characterized by relatively normal levels of health with periods of acute exacerbation that range in severity from mild to life-threatening acute attacks. The burden of the disease is mainly reflected from the frequency and severity of acute exacerbations, which often occur in chronic asthmatics.

Thus, asthmatics form a population of high health care service users as the medical management of these episodes requires either hospitalization or emergency room treatment (Hargreave *et al.*, 1990). These services are resource-intensive and may

require administration of oxygen, intravenous fluids, nebulized and parenteral bronchodilators, steroids, and continuous drug therapy. Chronic asthmatics suffer not only from ill health but economic loss due to loss of productivity and treatment-related expenditure. The study described in this paper was undertaken to evaluate the impact of a randomized educational intervention oriented towards self management of care on the health status and health care use of chronic asthma patients.

### *The economic burden of asthma*

The overall prevalence of asthma and resulting morbidity and mortality in the developing countries of the world is comparable with that reported from industrialized countries. In developed countries the reported prevalence rates varies from 7% to 25% for children and 1.1% to 9.9% for adults. For developing countries in the tropics or sub-tropics, the reported prevalence rate varies from 0 to 7.8% (Turner *et al.*, 1986). The reported prevalence of asthma in India ranges from 8 to 16% (Krishnan, 1991; All India Coordinated Project on Aerobiology and Allergy, 1996).

It is estimated that between 4% and 6% of all emergency room visits in the United States are related to episodes of acute asthma (Buist, 1988). This figure can be as high as 15 to 19% in inner city hospitals. About 10 to 25% of acute attack patients seen in the emergency room will have asthma of sufficient severity to warrant hospitalization (Karetzky, 1977).

\*Author for correspondence.

It is also estimated that in 1985, there were 6.5 million patient visits to physician offices for the treatment of asthma in the U.S. (Koch and Knapp, 1987). The estimated health care expenditures for asthma care in the U.S. were \$4 billion in 1985 (USDHHS, 1988). More recent estimates range from \$6 billion (Weiss *et al.*, 1992) to \$11 billion (Ross, 1989). In the United States, where insurance coverage is quite incomplete relative to many European countries, families with asthmatic members may spend 6 to 18% of their total income on treatment (Marion *et al.*, 1985; Fishman, 1988). There are no reliable data regarding the cost of treatment in India, but the high prevalence of the disease, its expression at younger ages, and the reliance on a public health system that focuses on treatment rather than prevention point to significant medical expenditure for asthma. Thus, the disease exacts an enormous toll on patients, families, and the health care delivery system.

#### *The relevance of asthma self management training (SMT)*

The rising morbidity and mortality from asthma have been attributed to various factors. These factors include the failure of the patients to adhere to prescribed medications, an inability of patients to judge the severity of their asthma, and a lack of knowledge about the correct medication needed to tide over the crisis (Evans *et al.*, 1987; Bucknell *et al.*, 1988). The lack of patient information and poor patient compliance have been particularly critical (British Thoracic Association, 1982, American College of Chest Physicians, 1993).

To improve the situation, various patient information, education and communication programs have been formulated (USDHHS, 1991). Some of the popular structured programs are listed in Table 1. Numerous studies (Hindi-Alexander and Cropp, 1984; Hilton *et al.*, 1986; Clark *et al.*, 1986a,b; Robert, 1989; Clark, 1989; Worth, 1990; Bolton *et al.*, 1991) describe better outcomes with patient education. A number of studies in European countries showed that improvements in outcomes were accompanied by reductions in total cost (Deter, 1986; Sondergaard *et al.*, 1992; Trautner *et al.*, 1993; Taitel *et al.*, 1995). However, two of these studies used very small samples (Deter, 1986; Sondergaard *et al.*, 1992) and one did not use a

randomized controlled design. Also, the savings from Self Management Training in developing countries may be quite different from the savings in developed countries that have more structured and comprehensive health systems to begin with. Finally, although these studies used educational or psychosomatic interventions to improve asthma control, none of them used the technique of educating patients to adjust their drug dosage based on the Peak Expiratory Flow Rate (PEFR), as was done in this study.

To be effective, educational interventions must cause the patient to take clearly described steps rather than follow certain broad principles (Mazzuca, 1982). Asthma Self Management Training (SMT) is a systematic program for the control and management of asthma (Creer *et al.*, 1988, 1989). It is based on the social learning theory proposed by Bandura (Bandura, 1977). The important concepts include "Reciprocal Determinism" and "Learning Performance Dichotomy". Reciprocal determinism refers to a model of self-management in which personal and environmental factors operate as interlocking determinants of one another. The interactive system includes the cognitive and physiological factors of a person, along with his physical/social environment and overt behavior. Learning performance dichotomy is a basic assumption underlying learning theory. Learning refers to changes in a person due to some form of educational intervention. Performance means translation of learning into behavior. Educational strategies are thus designed to improve patient comprehension and recall of information at a later time.

Learning to synthesize actions in response to beneficial stimuli is the *sine qua non* of SMT. Training is given under supervision with the objective of maintaining function, slowing deterioration, preventing secondary problems, and minimizing impact of the disease and its treatment on the health status of the patients. Once the patient learns that it is the exposure to offending agents like dust that triggers the airflow obstruction and the resultant breathlessness, he may try to avoid such exposures or to treat them more promptly. The resulting preventive behavior and timely medication use can relieve air flow obstruction. As the patient experiences beneficial effects of self-management behavior, he will tend to perpetuate it to derive continuous benefit.

Table 1. Examples of patient information, education, and communication programs

Program	Place of origin	Evaluator
Living with asthma SMT for children	Denver National Asthma Center	Creer <i>et al.</i> , 1988, 1989
Asthma control therapy for kids	University of California	Lewis <i>et al.</i> , 1984
Super stuff	American Lung Association	Weiss, 1981
Open airways	Columbia University	Clark <i>et al.</i> , 1986a,b
Air wise and air power	Kaiser Permanente	Wilson-Pessano <i>et al.</i> , 1987

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