

# Multimodal patient education program with stress management for childhood and adolescent asthma

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## Abstract

The present study aimed to evaluate a multimodal patient education program carried out during inpatient rehabilitation. The program included cognitive-behavioral stress management training as a main component. The efficacy was examined in comparison to an education program without stress management. In total  $N = 68$  patients aged between 8 and 16 years were included in the post-treatment and  $N = 46$  patients in the 6 months follow-up assessment. Short- and long-term intervention effects of the multimodal education program were observed in relation to patients' age. The experimental treatment elicited significant improvements in adaptive coping in adolescents aged from 14 to 16 years. In contrast, substantial effects were not yielded for the control treatment. The results suggest that the multimodal patient education training has beneficial effects on stress management in adolescents with asthma. Results are discussed with regard to predictive factors for rehabilitation outcome.

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## 1. Introduction

Asthma is a chronic inflammatory lung disease, characterized by airway obstruction, inflammation, and hyperresponsiveness to a variety of stimuli [1]. It is the most common chronic disease in childhood and adolescence. In Europe, the prevalence of childhood and adolescent asthma varies between 6 and 10% [2,3]. However, there is a growing body of evidence for increasing prevalence rates, hospitalizations, and mortality among children and adolescents during the last decade, particularly in Western industrial nations [1–3]. Although more research is needed to identify the causes, the significant role of an impaired life style is suggested, leading to non-adherence to medical regimens [4].

The etiology of asthma is multifaceted including hereditary, allergic, infectious, and psychologic factors [5]. Psychological factors, such as distress, seem to be of greater importance for the maintenance and exacerbation than for the onset of chronic diseases (e.g. [6]). In particular, chronically ill children and adolescents have to cope with disease-related stressors proven to have a significant impact on the

course of chronic conditions [7]. Coping with illness-related stressors in chronic diseases comprises four dimensions [8]: firstly, children and adolescents with asthma have to adhere to restrictive treatment regimens. LeFevre and Moussier [9] concluded that the high rise in mortality of adolescents with asthma is due to non-adherent behavior. Secondly, they have to deal with social isolation [10]. Thirdly, in spite of disparate findings some evidence suggests that they are characterized by an impaired self-concept and self-esteem [11,12]. Fourthly, they have to adjust to a variety of emotional responses. Although inconclusive, results suggest that asthmatic children and adolescents compared with healthy contemporaries tend to develop more emotional problems, especially internalizing behavior problems, such as anxiety disorders and depression [13,14]. Studies focused on variables which intervene between psychological adjustment and disease put emphasis on severity of disease and duration of illness [15]. Situational factors could also be determined referring to family factors, such as family interaction [11], family quality of life [15], and family rituals [16].

Additionally, individual factors were identified, such as illness uncertainty and attributional style [17]. These results are consistent with findings on the important role of children's and adolescents' capability to cope effectively with the chronic disease in the psychological adjustment (cf. [4,18]). Avoidant coping which was increased in asthmatic

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adolescents in comparison to diabetic contemporaries [9] has proven to be a significant risk factor for adolescent depression in non-clinical samples [19]. Some researchers emphasized the considerable increase in mortality of asthmatic adolescents presumably due to more pronounced depression which interferes with adherent behavior [5,9].

Taking into consideration that both factors, psychosocial stress and severity of disease, are interacting (cf. [6]) the relevance of intervention programs for the prevention of disease exacerbation becomes obvious. Diverse patient education programs were developed for children and adolescents with asthma (for review see [20]) focusing on information about illness and treatment as well as skills training including self-perception of asthma symptoms, self-care techniques, and social competence (cf. [4]). In sum, information about the disease led to significant improvements in children's asthma knowledge [21]. Moreover, effective changes were demonstrated with regard to the child-oriented rehabilitation in inpatient settings [22,23]. Programs carried out during outpatient rehabilitation were also effective [24,25]. By applying family-oriented interventions significant improvements in parental coping strategies [26], parents' and children's knowledge as well as morbidity were revealed [27]. Thereby, age-dependent treatment effects were shown, suggesting to clarify age differences in intervention effects [27]. Further studies pointed to the superiority of an intensive inpatient family management program in comparison to an outpatient day camp [28]. Thereby, some results indicated that the effects weakened over the time course [22,27], supporting the importance of booster sessions after rehabilitation.

However, implementation of stress management into education programs has been widely neglected. Thus, previous programs primarily included relaxation training and disease-related self-management techniques. Instead, improving individuals' capacities of coping with common stressors was ignored, and this important resource of dealing adaptively with those most frequently occurring and demanding stressors was not considered. Furthermore, recent studies have ignored to evaluate intervention effects on subjective measures of coping with stress. This could give a further hint to children's and adolescents' quality of life which is the central outcome measure in research on patient education [29].

The aim of the present study was to investigate the efficacy of a multimodal education program for children and adolescents with asthma which was modified from Lob-Corzilius and Petermann [30] and adjusted to an inpatient setting. Into a shortened version of this patient education program a cognitive-behavioral stress management training was implemented. Short- and long-lasting effects on subjective health status and coping with common stressors were evaluated in comparison to this shortened version of the standard patient education program from Lob-Corzilius and Petermann [30]. It was hypothesized that the experimental group (EG) would show short- and long-lasting

improvements in coping compared with the control group (CG). Moreover, it was expected that, 6 months after rehabilitation, the EG would gain significantly in subjective health status. A further goal of the present study was to examine age differences in the intervention effects. Given the scarce results in the literature, specific differences in rehabilitation outcome between age groups were not predicted.

## 2. Methods

### 2.1. Patients

Patients were recruited from the inpatient clinic for children and adolescents with chronic diseases, Fachklinik Sylt, Sylt/Westerland, Germany. Prior to rehabilitation, informed consent was obtained from each parent for their children's participation in the study. At the beginning of rehabilitation, the two treatment groups did not differ with regard to severity of asthma (48.5% had mild, 8.8% moderate, 27.9% severe, and 8.8% very severe asthma according to WHO standards; 5.9% were missing). Moreover, the medical measures forced expiratory volume/s (FEV<sub>1</sub>) and maximal forced expiratory flow at 50% of remaining maximal forced inspiratory volume (MEF<sub>50</sub>) were not different in both groups (FEV<sub>1</sub> (%):  $M = 95.98$ ,  $S.D. = 15.13$ ; MEF<sub>50</sub> (%):  $M = 78.91$ ,  $S.D. = 21.51$ ).

In total 69 children aged from 8 to 16 entered the study, none of the contacted patients refused to take part in the study. At the post-treatment assessment, one patient of the EG dropped out due to organizational reasons. Thus,  $N = 68$  patients were included, 33 patients were assigned to the EG and 35 patients to the CG (Table 1). The mean age of this total sample was 11.63 years ( $S.D.: 2.55$  years). Both treatment groups did not differ with regard to age. In both groups, gender distribution was not different, but, in the mean sample slightly more males than females were examined (42 male, 26 female;  $\chi^2$  (d.f. = 1) = 3.77,  $P = 0.052$ ). Data of 46 patients were available at the follow-up assessment, included 19 patients of the EG and 27 of the CG (Table 1). Thus, both groups showed a high drop-out rate, particularly amongst the younger patients. Inspection of the data did not support the assumption that patients with less severe asthma dropped out, but pointed to the importance of illness duration.

Table 1  
Sample sizes

Group	Sample point		
	Pre	Post	Follow-up
Experimental	34	33	19
Control	35	35	27
$\Sigma$	69	68	46

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