

ORIGINAL ARTICLES

The role of the asthma nurse in treatment compliance and self-management following hospital admission

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Abstract Effective self-management and treatment compliance is important in achieving good symptom control in asthma. The aim of this study was to determine whether asthma nurse intervention during hospital admission could increase knowledge and improve self-management and whether this would influence the number of emergency call-out visits by General Practitioners (GPs) and hospital re-admissions. Patients with acute asthma ($n=80$) were assessed by the asthma nurse within 24 h of admission using a British Thoracic Society (BTS) guideline-based questionnaire. Main outcome measures were: knowledge of inhalers, self-management plans, peak flow monitoring, recognition of worsening symptoms and appropriate emergency action. Following randomization, half received nurse intervention during hospitalization. All received a follow-up questionnaire 6 weeks post-discharge and again at 6 months (response rates 86% and 81% respectively). GPs were contacted by postal questionnaire after 4 months. Questionnaire responses indicated an increase in knowledge in the intervention group, along with an ability to identify appropriate action on worsening symptoms. Emergency GP call-outs were more frequent in the control group in the 4 months post-discharge. Hospital re-admission rates were similar in both groups. Asthma nurse intervention appeared to increase knowledge of asthma management, maintained throughout the study period, but had no significant impact on reducing re-admissions to hospital. © 2001 Harcourt Publishers Ltd

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INTRODUCTION

The mortality and morbidity from asthma in the U.K. remains disappointingly high (1,2), with inadequate self-management implicated as a contributing factor. The publication of national guidelines in 1990 (3) was aimed at standardizing care for both acute and chronic asthma, with emphasis on prophylactic rather than symptomatic treatment; the overall goal being good control of asthma symptoms through a combination of appropriate medical treatment and effective self-management.

Whilst asthma education is considered to be a vital element of overall care, it is not necessarily an easily

attainable goal. It requires provision of sufficient knowledge to enable the asthmatic patient to understand treatment, to make accurate assessment of worsening symptoms and to take appropriate action. Moreover, the asthmatic patient has to recognize the importance of self-management in order to be motivated to comply with treatments. Previous studies have shown the value of asthma education programmes in increasing patient knowledge (4–6). However, Kolbe *et al.* (7) demonstrated, through hypothetical scenarios, that provision of knowledge alone is not necessarily sufficient to ensure good self-management. Thus it is likely that education has to be aimed at changing individual behaviour if it is to have any significant impact on asthma morbidity.

The advent of written management plans, used in conjunction with home peak flow monitoring, has been seen as a positive step towards effective self-management, enabling patients to take some control of their asthma. However, their overall usefulness is dependent upon

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identifying and targeting those asthmatics most at risk. Recent studies have shown the success of self-management programmes in the paediatric population with regard to reduction in use of emergency services (8) and the reduction of hospital re-admissions (9).

Whilst many studies have been published using asthma education programmes in adults, a recent review (10) has suggested that programmes can vary widely, with differences in practice impeding replication. We therefore used a structured programme based directly on national guidelines. We hypothesized that intervention from a hospital-based asthma nurse, offering consistent information based on national guidelines, could significantly increase knowledge of asthma, identify and correct existing poor practices and formulate realistic self-management plans with the patient to improve health outcomes following hospital admission. The aim of the study was to determine primarily whether nurse intervention could change behaviour in adult asthmatics and whether this was reflected in the number of emergency visits/call-outs to General Practitioners (GPs) and re-admission to hospital with asthma-related problems following discharge throughout the study period.

METHODS

A group of 80 patients (53 women), with an age range of 16–72 years (mean 36.1 years), who had been admitted on the general medical take to a large teaching hospital with a documented primary diagnosis of acute asthma were recruited for the study. Patients were not permitted to participate if they: (1) had underlying chronic obstructive pulmonary disease; (2) had previously participated in an educational programme from a hospital-based asthma nurse; (3) were unable or unwilling to complete a series of follow-up questionnaires. None of the patients eligible for recruitment refused to participate. Recruitment took place over an 18 month period and subjects gave verbal consent to participate, although written consent was obtained for release of medical details from GPs. Ethics committee approval was obtained.

Study design

All recruited patients were seen by the asthma nurse as single interviewer within 48 h of admission to hospital. The instruments of measurement were a series of questionnaires based upon the British Thoracic Society (BTS) guidelines. The domains were: knowledge of treatments, frequency of inhaler use as an indicator of compliance, home monitoring e.g. peak flows, awareness of asthma symptoms, ability to recognize worsening symptoms and knowledge of appropriate action on exacerbation of symptoms. Each patient underwent the same assessment, which comprised observation of inhaler technique

with device used prior to admission, peak flow measurement and completion of the nurse-led questionnaire to assess level of asthma knowledge. The subjects were then randomized into two groups: one receiving subsequent visits from the asthma nurse until discharge from hospital (women=62.5%) and a control group which received 'routine care' from medical and nursing staff but no further intervention from the asthma nurse (women=67.5%). There was no significant difference between the two groups in prior use of inhaled steroids (47.5% in each group prescribed 1 mg or more daily) or in educational background, with 47.5% of the study group and 37.5% of the control group claiming to visit their community asthma clinic a minimum of once yearly.

The targets for the intervention group were that prior to discharge each patient would have: (1) peak flow meter to take home, with good technique and knowledge of optimum peak flow and acceptable variations; (2) good inhaler technique and an understanding of the difference between 'reliever' and 'preventer' inhalers; (3) a basic understanding of the mechanisms of asthma; (4) recognition of signs of worsening asthma and ability to take appropriate action, as determined by written management plan; (4) the opportunity to discuss any fears or anxieties relating to their asthma or its treatment.

Education programme

The education programme took place over a minimum of two separate sessions, lasting on average 30 min each and was carried out on an individual basis. The first session involved discussion on the basic mechanisms of asthma, including common triggers and an explanation of the changes which occur to the airways resulting in the symptoms experienced by the patient. This was supported by illustrations in the 'Regular Therapy with Asthma' booklet (11) which was given to each intervention group patient. Lifestyle influences, such as occupation and leisure activities were discussed where appropriate to the individual. The need for 'preventer' and 'reliever' medication was also emphasized during this session. Patients were encouraged to actively participate in the session and relatives were included at the patients' request.

The second session took place on the following day. Previously given information was briefly summarized with input from the patient as a means of checking understanding. An agreed individualized self-management plan was determined, with written instructions using the 'Sheffield Asthma Card'. This also contained a telephone contact number. Each patient was given a peak flow meter to take home and instructions on monitoring, with documentation of predicted peak flow measurement and parameters for altering treatment, as well as clear written guidelines on when to seek emergency care. Home intervention was based upon a combi-

nation of symptoms and peak flow recordings and all guidance offered throughout the educational programme was based on the BTS guidelines for the management of asthma in adults (3). A final visit was made to each patient where possible prior to discharge at which they were encouraged to express any fears or anxieties relating to their home management.

Patients from both groups received a follow-up postal questionnaire at 6 weeks post-discharge (response rate 97.5% of study group and 77.5% of control group) and again at 6 months (response rate 87.5% and 75% respectively). Individual GPs were contacted at 4 months following discharge for assessment of current asthma symptoms, the number of emergency and routine visits and current treatments (response rate 74%). The number of hospital re-admissions was recorded for each patient for the duration of the 18-month study period.

Statistical analysis

The results are expressed as the percentage of patients responding to questions in the control or intervention group after correction for loss at follow-up. Comparison of groups was by Fisher's exact test.

RESULTS

Knowledge of inhalers was good in both groups initially, with 85% and 67.5% of the control and intervention group respectively recognizing their blue inhaler as a 'reliever', although they were less sure (77.5% and 57.5% respectively) when identifying their steroid inhaler as a 'preventer'.

On initial assessment, equal numbers of patients claimed to be in possession of peak flow meters at home (62.5%), although only 32.5% of the control group and 22.5% of the intervention group identified peak flow monitoring as an appropriate action on worsening of asthma symptoms. Contrary to national guidelines, only nine patients in total claimed to have any written management plan prior to their hospital admission. Patients from both study groups appeared to be able to recognize symptoms of asthma, with over 95% of each group correctly identifying shortness of breath and chest tightness.

Six weeks post-discharge 31 out of 40 patients in the control group returned questionnaires compared with 39 out of 40 in the intervention group. There was a significant difference in the number of patients claiming to have written management plans (10 compared with 87%, $P < 0.001$), and an increased number of patients in the intervention group with peak flow meters (77 compared with 100%, $P < 0.005$) and knowledge of peak flow rates (74 compared with 97%, $P < 0.01$). Correct identification of β -agonist inhaler as a 'reliever' was increased in both

groups, although 23% of the intervention group also identified their blue inhaler as a 'preventer'. Patients from both groups expressed greater anxieties concerning possible side-effects of inhaled steroids, yet only 38.8% of the control group claimed to have been given opportunity for discussion compared with 87% of the intervention group ($P < 0.001$). The groups also differed in their choice of action on worsening symptoms; with the control group choosing contact with GP as most popular response (93.7%), followed by an increase in their β -agonist inhaler (48.5%), with an increase in inhaled steroids being the least popular intervention (38.8%). This was in contrast to the intervention group who, whilst increasing their response of GP contact (79%), greatly increased their peak flow monitoring (74%) and their inhaled steroid (69%) usage.

At six months 30 of the control group and 35 of the intervention group responded to the questionnaire. There was still a significant difference between the two groups in the number of patients claiming to have a written management plan (17 compared with 86%, $P < 0.001$). Both groups still claimed regular compliance with treatments, although 70% of the control group claimed to be still using their β -agonist inhaler regularly every day compared with 43% of the intervention group ($P < 0.01$). Differences in choice of appropriate action on worsening symptoms was still evident. The intervention group seemed to choose self-management as a first line action, claiming increased use of inhaled steroids (77% compared with 57%) and peak flow monitoring (66% compared with 47%) whereas the control group identified GP contact as their preferred response (87% compared with 57%, all $P < 0.01$).

The number of hospital re-admissions throughout the 18 month study period was surprisingly high, totalling 11 control group patients on 15 occasions and 10 intervention group patients on 21 occasions (Table I). However, the number of emergency call-outs made by GPs in the 4 months post-discharge was five patients on nine occasions in total for the control group compared with only two patients on two occasions for those who received

TABLE I. Health care utilization

	Control group	Intervention group
GP urgent visits	9 patients on 14 occasions	11 patients on 18 occasions
GP call-outs	5 patients on 9 occasions	2 patients on 2 occasions
Accident and Emergency visits	0	2 patients on 2 occasions
Re-admissions	11 patients on 15 occasions	10 patients on 21 occasions

education in hospital. Thus there was no significant difference in the combined endpoint of hospital re-admissions plus emergency call-outs. There were 24 contacts in the control group compared with 23 contacts in the intervention group. There was, however, a highly significant ($P < 0.001$) difference in the proportion of patients presenting to hospital (62.5% in the control group compared to 91% in the intervention group).

DISCUSSION

This study suggests that the asthma nurse has an important role to play in patient education. Those patients who received nurse intervention in the form of a structured education programme did show an increase in their knowledge of asthma, its treatments and its manage-

ment post-discharge from hospital. This increased knowledge, illustrated through questionnaire responses, was evident at 6 weeks post-discharge and maintained after a 6-month interval (Fig. 1). Moreover, patients demonstrated that this knowledge enabled them to correctly identify signs of worsening asthma and make more appropriate responses than before nurse intervention.

The initial assessment indicated some misunderstandings between symptomatic and prophylactic treatments. Interestingly, this was evident on follow-up, with some of the intervention group identifying their β -agonist inhaler as a 'preventer' as well as a 'reliever'. However, the educational programme used in this study advised patients to use their β -agonist before strenuous activity or exercise and therefore their response may have been due to limitation of the vocabulary used in the question-

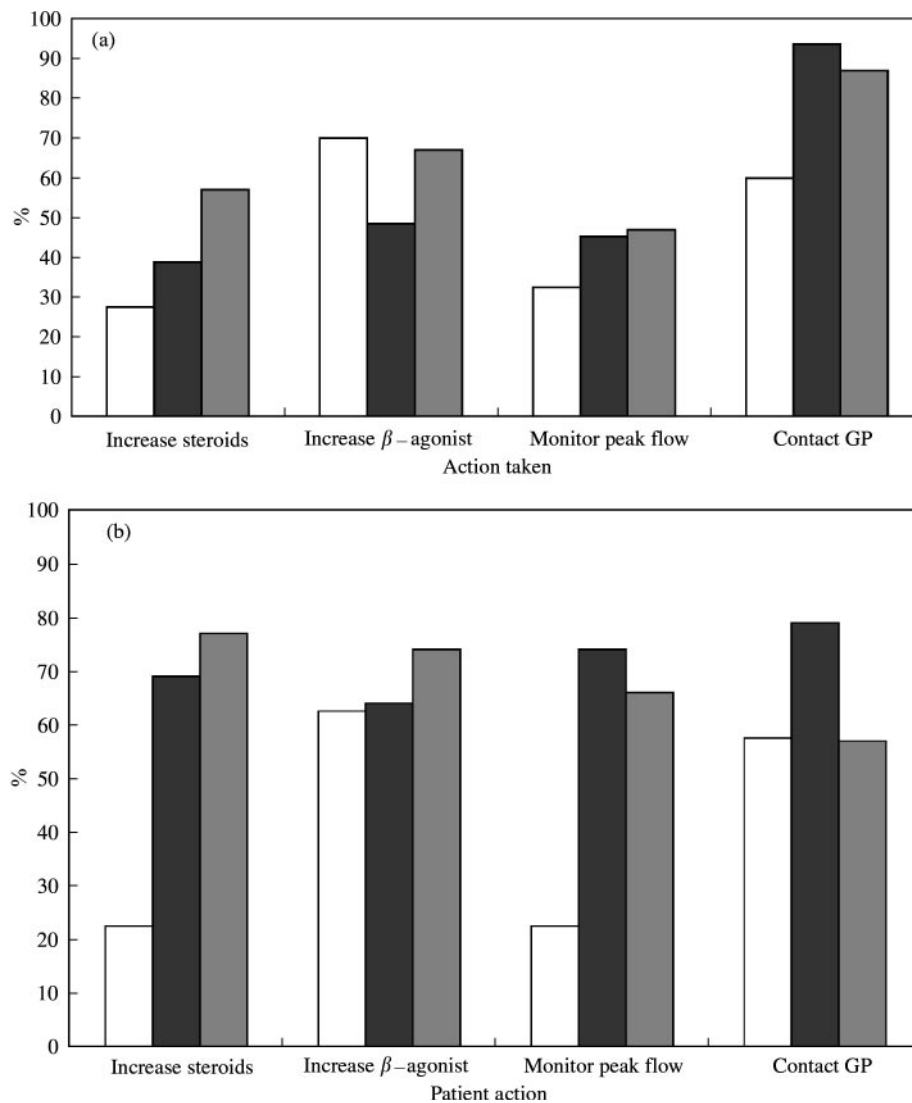


Fig. 1. Percentage of patients responding yes to questions asking whether the action was appropriate following a worsening of symptoms. (a) Control group, (b) intervention group at baseline (\square), after 6 weeks (\blacksquare) and after 6 months (\square).

naire rather than a misunderstanding of treatments. Despite all being given personalized written management plans, only 87% of the study group claimed to have one after 6 weeks, which was an interesting reflection of the remaining patients' perception of their discharge plan.

Treatment compliance in asthma remains a problem (12,13) and initial questionnaire responses indicated inconsistent use of inhaled steroids, particularly by the intervention group. Although attempts to monitor compliance were made in this study through patient responses and retrospectively through frequency of GP prescriptions, providing definitive figures for compliance throughout the 18-month period proved to be a very difficult task. The fear of possible side-effects of medications has long been implicated as a contributing factor to treatment compliance (14) and yet the opportunity to discuss side-effects of treatments whilst in hospital was poorly recognized by the control group, despite expressing concerns in their initial assessment.

Successful self-management is ultimately dependant upon patients' ability to accurately assess severity of symptoms. The effectiveness of routine peak flow monitoring in all asthmatic patients as a means of improving health outcomes is questionable (15,16). Kendrick *et al.* (17) demonstrated through the use of coded peak flow meters that some patients can be poor discriminators of symptom severity whilst other studies emphasize that peak flow monitoring can be an important guide if carried out in conjunction with symptom assessment rather than in isolation (18). As all those recruited to our study had suffered an exacerbation severe enough to require hospitalization, peak flow monitoring on discharge was considered an appropriate intervention for the entire study group. Surprisingly, checks were not routinely made on the control group during hospitalization to ensure that all patients had means of peak flow monitoring following discharge, although all were capable of carrying out this intervention with appropriate education.

One of the most important end points of this study was to determine whether encouraging changes in behaviour in asthma self-management ultimately had any impact on the number of hospital re-admissions. Whilst some studies have demonstrated a reduction in hospitalization following asthma education in adults (19,20) others have found no significant difference between study and control groups in the number of hospital and emergency department visits (21,22).

Similarly, in General Practice, Jones and Mullee (23) concluded that long-term benefits to patients from asthma programmes was difficult to demonstrate, despite being a valued part of primary care. Our study indicated no difference between the two groups in the number of emergency contacts with the health service but a marked increase in the proportion of hospital

re-admissions, despite appropriate action being taken by those who received asthma nurse education. This suggests perhaps that the intervention taken, particularly in relation to the adjustment of drug therapies, was not effective in preventing severe exacerbation. In the absence of published trials to the contrary, current guidelines still recommend temporarily doubling the dose of inhaled steroid on worsening of symptoms (24).

Two recent studies (8,9) have demonstrated that in a paediatric setting reduction in hospital re-admissions may be achieved by educational programmes involving the family. Our study did not include outpatient asthma nurse intervention following discharge, nor did it objectively measure morbidity in the follow-up period. However, in devising home management plans for children, the needs and health beliefs of the whole family have to be considered. Therefore key to success or failure is likely to be the willingness of the parent to monitor treatment compliance and the ability to observe changes in symptoms in the child early and initiate appropriate action, particularly in the young child. The adult ultimately takes responsibility for his/her own health care, although clearly many factors influence behaviour in both age groups. These studies and our own confirm that education administered after an acute deterioration in asthma produces significant improvements in understanding of asthma. The conversion of this increased knowledge into important effects on health remains doubtful in the adult. It is important to note, however, that due to the size of our study sample, caution must be taken before these results can be related to all asthma education programmes.

In conclusion, successful management of asthma requires a combination of appropriate medical treatment which is assessed regularly, good self-management, ongoing advice available in primary care settings and prompt emergency treatment when necessary. Whether these goals can be achieved for all adult patients is arguable but those patients who received nurse intervention during this study demonstrated sufficient knowledge to effectively manage their asthma following discharge. Clearly the responsibility of the health carer is to ensure that the patient has the necessary knowledge to make autonomous decisions about their management and a nurse with skills in asthma care can be vital in opening channels of communication, targeting those with existing poor practices and providing motivation to those who need to change behaviours. This study suggests, however, that factors other than education affect long-term health outcomes in asthma. Demonstrating an ability to effectively self-manage did not have any significant impact on the frequency of acute asthma exacerbation requiring hospital re-admissions in our study group. Psychosocial and economic factors, along with individual health beliefs, influence treatment compliance and adherence to management plans in the

community, but addressing these issues in a way which is both cost-effective and which significantly affects the long-term outcomes of the adult asthmatic patient requires further research.

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