A mailed personalised self-management plan improves attendance and increases patients' understanding of asthma

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Abstract

Aims: To evaluate postal prompts to increase patients' understanding and use of self-management plans (SMP).

Methods: A single-blinded randomised controlled trial in 545 adults with asthma prescribed an inhaled corticosteroid. The control group were mailed an invitation for a medical review. The second and third groups were mailed invitations with a blank or a personalised written action plan respectively. Outcomes were whether patients had a review, felt they knew how to use SMP, and the self reported 'Royal College of Physicians three questions' score of current morbidity ('RCP score').

Results: Compared to the control group, prompts with a personalised written action plan resulted in more patients having a review of their care (odds ratio 2.33, 95% CI 1.37 to 3.93) and understanding how to use their SMP (odds ratio 2.20, 95% CI 1.13 to 4.30). Prompts with a blank written action plan resulted in more reviews (odds ratio 1.92, 95% CI 1.18 to 3.11) but no difference in understanding how to use their SMP (odds ratio 1.28 95% CI 0.66 to 2.45).
Reviews carried out: 70% vs 82% vs 84% for groups 1, 2 and 3 respectively; understanding how to use a SMP: 40% vs 46% vs 59% for groups 1, 2 and 3 respectively. There was no difference in reported 'RCP scores' between the three groups.

Conclusions: Personalised prompts increased frequency of review and patients understanding of SMPs but SMPs remain underused.

Key words: Asthma, Randomised-Controlled-Trials, Self-Care, Education, Family-Practice

Introduction

Asthma self-management education reduces both morbidity and resource use.[1,2] If a better educational intervention (in the form of a mailed prompt with a personalised written action plan) improves patients understanding and use of self-management these patients will have less ill health from asthma.

Methods

This single-blinded randomised controlled trial compares the effect of different prompts in improving patients' self-management of asthma. It is a pragmatic study of all eligible patients labelled asthmatic in one general practice.

Nine GPs with personal lists, and five practice nurses provided asthma care in this UK urban general practice with a practice population of 13,443 patients. Asthma prevalence (11.3%) was similar to other studies.[3] Practice health records are 'paperless' with EMIS software. Asthma care included recording clinical terms annually in a template that structured the process of care in consultations.

Health records were searched and 1,209 patients (of 10,673 age 16) aged 16 and over were identified, recorded as asthma, without Chronic Obstructive Pulmonary Disease (see Flow chart Figure 1). Another search found 1,008 patients on asthma medication. All 1,008 were already labelled as asthmatic.

The 1,209 patients (using a list of the patients and a two digit number chart) were randomised to one of the three groups (Groups 1:417; 2:393; 3:399). Patients were excluded if the GP thought inclusion was inappropriate or if patients had not used an inhaled corticosteroid in the previous 12 months. Established users of inhaled corticosteroids should benefit most from written action plans.
Of the 1,008 on medication, 588 used inhaled corticosteroids. Of the 1,209 patients labelled asthmatic, 703 did, and 506 did not have a follow-up date for review of asthma management recorded. Checks of the 506 health records showed that 214 patients had consultations or medications for their asthma within the two previous years. These 214

Figure 1: Flow diagram of patient randomisation

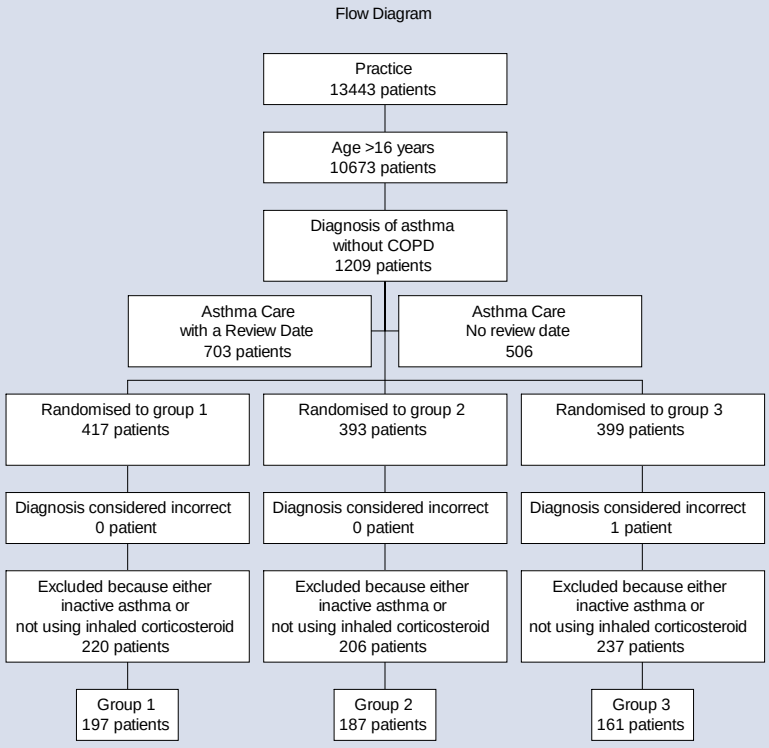

Table 1 Baseline Demographic and Clinical characteristics of each group

Variable		Group		
		1 (n=197)	2 (n=187)	3 (n=161)
Age	Median	38	44	43
	IQR	25 - 53	30 - 62	28 - 60
	Range	16 - 89	17 - 93	16 - 91
Gender	Female	115 (58%)	113 (60%)	90 (56%)
Postcode	BS7	165 (84%)	161 (86%)	131 (81%)
	BS10	18 (9%)	15 (8%)	13 (8%)
	Other	14 (7%)	11 (6%)	17 (11%)
Registered GP	Male 1	33 (17%)	30 (16%)	28 (17%)
	Male 2	27 (14%)	19 (10%)	25 (16%)
	Male 3	17 (9%)	26 (14%)	16 (10%)
	Female 4	17 (9%)	11 (6%)	11 (7%)
	Male 5	12 (6%)	17 (9%)	16 (10%)
	Female 6	17 (9%)	27 (14%)	15 (9%)
	Female 7	25 (13%)	18 (10%)	10 (6%)
	Female 8	9 (5%)	11 (6%)	14 (9%)
	Male 9	40 (20%)	28 (15%)	26 (16%
PEF/Expected PEF ratio at the start of the study	N	192	182	157
	Median	0.81	0.79	0.81
	IQR	0.66 - 0.93	0.63 - 0.90	0.64 - 0.90
	Range	0.14 - 1.15	0.21 - 1.14	0.25 - 1.20
Smoking Status	Current	66 (34%)	46 (25%)	42 (26%)
	Never	43 (22%)	38 (20%)	45 (28%)

IQR: Interquartile range

asthmatics were set a date for review one year after the issue of their last inhaled corticosteroid. The remaining 292 were assumed dormant asthmatics and repeat prescriptions for corticosteroid inhalers cancelled.

545 patients (Group 1:197; Group 2:187; Group 3:161) prescribed inhaled corticosteroids remained in the study. The baseline demographic and clinical characteristics of each group are shown in Table 1. The control was an intervention of low efficacy.[1] The controls, Group 1, were mailed an invitation to attend for a medical review of symptoms, signs, management, and written action plans. The invitation included information on evidence-based management and the aims of treatment. Group 2 were mailed the invitation plus a written action plan that could be completed at their annual review. Group 3 were mailed the invitation plus a partially completed and personalised action plan for completion at the review. The handwritten personalised information included the patient's name, age, predicted peak flow, best recorded peak flow, last recorded peak flow and peak flows levels to start changes in self management. In the 12 months starting October 1999 participants were mailed invitations for a review of their asthma care.

Box 1 Patient based measurement tool for morbidity

RCP three questions on current morbidity[14]

In the last week/month

1. have you had difficulty sleeping because of your asthma symptoms (including cough)?
2. Have you had your usual asthma symptoms during the day (cough, wheeze, chest tightness or breathlessness)?
3. Has your asthma interfered with your usual activities (e.g. housework, work/school, etc.)?

Each of the above questions should be answerable by simple yes/no

Twelve months after the intervention, health records were checked for encounters with primary care or hospitals, use of medications, and use of SMP. In addition, patients were mailed a questionnaire to assess symptoms and knowledge about self-management plans. Data collection ended in October 2001.

Primary outcomes were whether the patient had a review recorded in the medical records, whether the patient knew how to use a SMP, and the 'Royal College of Physicians three questions' score of current morbidity (RCP score - see Box 1)[4] assessed by answering a postal questionnaire at 12 months. Other outcomes included whether an SMP was discussed, the number of prescriptions for inhaled bronchodilators, inhaled corticosteroids, oral corticosteroids, nebulised bronchodilator treatments, ratio of last recorded peak expiratory flow (PEF) to expected PEF at end of the data collection, encounters (including telephone, office or home encounters) by GP or Nurse when the health centre was open (i.e. office hours), encounters at other times (i.e. out of hours), hospital outpatient encounters, and hospital inpatient encounters.

Data was blinded until collection ended. The primary analysis was a comparison of three interventions, unadjusted for patient risk factors. Logistic and multinomial regression were used to compare binary outcomes and unordered multi-category variables respectively. Ordinal regression and the Kruskal Wallis test were used to compare ordered multi-category and continuous outcomes respectively. Poisson regression was used to compare encounter rates. Goodness of fit of the Poisson model was examined. Likelihood ratio tests were used to test the assumptions of a common odds ratio (multinomial model) and proportional odds (ordinal model). The Hosmer-Lemeshow test was used to assess model fit (logistic model).

The ancillary analysis was an assessment of influence of patient risk factors on different outcomes. In addition to the treatment group (1,2 or 3), the effect on the outcome of patient age, gender, postcode (grouped into 3 categories), registered GP, asthma review and the professional undertaking the review were assessed. The model building proceeded in stages following a scheme suggested by Collett.[5] Continuous predictor variables were tested for linearity and modelled appropriately. Treatment group was included in the model, regardless of statistical significance; otherwise a 10% level of

Table 2 - Primary outcomes by group, unadjusted for patient risk factors

		Group		
Primary Outcomes		**1**	**2**	**3**
Data from health records		N=197	N=187	N=161
Review undertaken&	Yes	138 (70%)	153 (82%)	136 (84%)
	No	59 (30%)	34 (18%)	25 (16%)
	Odds ratio	1.00	1.92 (1.18 to 3.11)	2.33 (1.37 to 3.93)
	p-value		0.002	
Data from questionnaire		N=75	N=84	N=82
Report understanding of how to use SMP+	Yes	27 (40%)	37 (46%)	45 (59%)
	No	41 (60%)	44 (54%)	31 (41%)
	Odds ratio	1.00 (95% CI)	1.28 (0.66 to 2.45)	2.20 (1.13 to 4.30)
	p-value		0.05	
Report usefulness of using SMP#	Yes	19 (63%)	33 (75%)	32 (82%)
	No	11 (37%)	11 (25%)	7 (18%)
	Odds ratio	1.00	1.74 (0.63 to 4.77)	2.65 (0.87 to 7.99)
	p-value		0.21	
Self report of the RCP 3 questions score*	0	11 (16%)	17 (21%)	16 (21%)
	1	33 (49%)	23 (29%)	22 (29%)
	2	13 (19%)	16 (20%)	16 (21%)
	3	11 (16%)	24 (30%)	23 (30%)
	Odds ratio	1.00	1.43 (0.80 to 2.56)	1.46 (0.81 to 2.61)
	p-value		0.35	

\+ data was missing for 7 cases in group 1, 3 cases in group 2 and 6 cases in group 3
\# data was missing for 45 cases in group 1, 41 cases in group 2, and 43 cases in group 3
* score was missing for 7 cases in group 1, 4 cases in group 2, 5 cases in group 3
& 57% of group 1 reviews were with a GP, compared with 60% of group 2 reviews and 72% of group 3 reviews

statistical significance was applied throughout. Potentially relevant interactions were examined using a 5% cut off for statistical significance.

Results

All participants were included in the analysis. Response rate for questionnaires was 241 (44%), comprising group 1, 75 (38%), group 2, 84 (45%) and group 3, 82 (51%).

Compared to the control group, prompts with a personalised written action plan result in more patients having a review of their care (odds ratio 2.33, 95% CI 1.37 to 3.93) and understanding how to use their SMP (odds ratio 2.20, 95% CI 1.13 to 4.30). Prompts with a blank written action plan result in more reviews (odds ratio 1.92, 95% CI 1.18 to 3.11) but no difference in understanding how to use their SMP (odds ratio 1.28 95% CI 0.66 to 2.45). There was no difference in reported 'RCP scores' between the three groups (p=0.35).

Secondary outcomes are reported in Table 3. Irrespective of prompts most patients did not discuss SMPs with clinicians. There were no significant differences in the numbers who discussed an SMP in the 12 month study period or in the annual review, the numbers of office hours encounters with a GP or nurse, the ratio of last recorded peak expiratory flow (PEF) to expected PEF recorded at end of the data collection, the numbers who possessed a peak flow meter, or prescriptions for bronchodilators or oral steroids.

The ancillary analyses evaluated patient risk factors for different outcomes. Three variables (Table 4) independently associated with whether patients felt they knew how to use an SMP were the patient group (p=0.03), age (p=0.04), and whether they had a review and who gave it (p<0.01). Patient reports of knowing how to use a SMP were increased if the patient had the personalised invitation, had a review, and if a nurse had given the review. Nurses were more likely to discuss a SMP than the GPs.

Three variables independently associated with whether the patients had a GP review, nurse review or no review were the patient group (p<0.001), patient age (p<0.001) and the registered GP (p<0.04).

Table 4 - Know how to use an SMP, (data from 241 returned questionnaires n=225)

Influencing variable	**Odds ratio***	**95% confidence interval**
Group 1	1.00	-
Group 2	1.28	0.65 to 2.57
Group 3	2.58	1.24 to 5.36
GP review	1.00	-
Nurse review	2.22	1.19 to 4.15
No review	0.51	0.18 to 1.47

* adjusted for patient age and area of residence (postcode)

In addition to the treatment group (1,2 or 3), the effect on the outcome of patient age, gender, postcode (grouped into 3 categories), registered GP, asthma review and the professional undertaking the review were assessed.

Table 3 - Secondary outcomes by group, unadjusted for patient risk factors

		Group		
Secondary Outcomes		1	2	3
Data from health records		197	187	161
SMP discussed at	Yes	67 (34%)	67 (36%)	61 (38%)
any time in last	No	130 (66%)	120 (64%)	100 (62%)
12 months	Odds ratio	1.00	1.08	1.18
	(95% CI)		(0.71 to 1.65)	(0.76 to 1.83)
SMP discussed during the asthma	Yes	67 (49%)	67 (44%)	61 (45%)
review#	No	71 (51%)	86 (56%)	75 (55%)
	Odds ratio (95% CI)	1.00	0.83	0.86
			(0.52 to 1.31)	(0.53 to 1.39)
Inhaled BDs issued	0	53 (27%)	38 (20%)	33 (21%)
	1-2	39 (20%)	35 (19%)	40 (25%)
	3-4	29 (15%)	32 (17%)	20 (12%)
	5-9	31 (16%)	32 (17%)	29 (18%)
	10-19	29 (15%)	38 (20%)	27 (17%)
	20	16 (8%)	12 (6%)	12 (8%)
	Odds ratio	1.00	1.29	1.16
	(95% CI)		(0.90 to 1.84)	(0.80 to 1.68)
Inhaled CS issued	0	59 (30%)	40 (21%)	33 (21%)
	1-2	38 (19%)	35 (19%)	31 (19%)
	3-4	37 (19%)	44 (24%)	30 (19%)
	5-9	37 (19%)	47 (25%)	39 (24%)
	10	26 (13%)	21 (11%)	28 (17%)
	Odds ratio	1.00	1.31	1.54
	(95% CI)		(0.92 to 1.87)	(1.06 to 2.25)
Courses of oral rescue steroids	0	158 (80%)	162 (87%)	133 (83%)
	1	27(14%)	18 (10%)	19 (12%)
	>1	12 (6%)	7 (3%)	9 (5%)
	Odds ratio	1.00	0.62	0.86
	(95% CI)		(0.36 to 1.08)	(0.50 to 1.46)
Use of bronchodilator nebuliser-	None	197 (100%)	186 (99%)	157 (98%)
	1 or more	0 (0%)	1 (1%)	4 (2%)
	Total episodes recorded	0	1	7
Last PEF/ expected PEF ratio	N	192	182	156
recorded at end of study*	Median	0.81	0.81	0.79
	IQR	0.68 - 0.93	0.65 - 0.90	0.64 - 0.90
	Range	0.14 - 1.17	0.23 - 1.12	0.25 -1.23
Office hours encounter with GP or Nurse	None	52 (26%)	31 (17%)	21 (13%)
	1 or more	145 (74%)	156 (83%)	140 (87%)
	Total encounters recorded	304	253	249
	Rate per patient	1.34	1.30	1.47
	Rate ratio)	1.00	0.97	1.09
	(95% CI)		(0.81 to 1.16)	(0.91 to 1.31)
Out of hours encounter with GP	None	191 (97%)	183 (98%)	159 (99%)
	1 or more	6 (3%)	6 (2%)	2 (1%)
	Total encounters recorded	10	6	13
Hospital Outpatient	None	192 (97%)	183 (98%)	157 (98%)
	1 or more	5 (3%)	4 (2%)	4 (2%)
	Total encounters recorded	9	5	2
Hospital Inpatient	None	194 (98%)	187 (100%)	157 (98%)
	1 or more	3 (2%)	0 (0%)	4 (2%)
	Total episodes recorded	8	0	5
Possess Peak Flow Meter	Yes	55 (28%)	60 (32%)	56 (35%)
	No	142 (72%)	127 (68%)	105 (65%)
Questionnaire returned	Yes	75 (38%)	84 (45%)	82 (51%)
	No	122 (62%)	103 (55%)	79 (49%)
Died	N	1	2	2
Left Practice	N	23	17	13

138 group 1, 153 group 2 and 136 group 3 patients had a review

* 192 group 1, 182 group 2 and 156 group 3 patients had PEF data

Patients were more likely to have a review (and more likely to have the review undertaken by a GP) if they had received the personalised invitation (Group 2 Odds ratio 0.76, 95% CI 0.5-1.16, Group 3 Odds ratio 0.43, 95% CI 0.28-0.67).

Discussion

Our results suggest that personalised prompts result in more patients having a review of their care and understanding how to use their SMP. Despite this, most patients did not discuss SMPs with clinicians, did not understand how to use SMPs and had avoidable symptoms. The effect of prompts on asthma care is similar to the modest effect found by Feder *et al*[6] who found that prompts sent to patients and their GPs after hospital discharge following a coronary event improved risk factor recording but not prescribing.

Some methodological issues need clarification. The study population was not a sample but was based on all patients with asthma in one large practice. The ineligible patients were excluded after randomisation if they did not have an authorisation for a repeat prescription of inhaled corticosteroid (620 patients), if they had not been issued an inhaled corticosteroid within the previous two years (43 patients), or if their GP felt they should not be in the study (1 patient). Although this was a variation from the usual practice of excluding patients before randomisation, the process remained valid with the three groups comparable. The selection criteria did exclude patients who had not been issued with an inhaled corticosteroid in the two years before the study started. This could exclude patients with poor control among those who only used inhaled bronchodilators but it did not exclude patients not actively participating in review, infrequent users of inhaled corticosteroids, or those with poorly controlled asthma, so is unlikely to bias the study. The response to the postal questionnaire was 241/545 (44%); not enough to exclude response bias and provide robust outcome data about patients' use of SMP, and self reported RCP scores. This response rate could have been improved by posting a second questionnaire, telephoning or visiting the non-responders to complete the outcome survey.

Conventional structured care needs adults to attend on a regular basis and may suit only those adults who view asthma as a chronic disease.[7] Most adults manage their asthma as an intermittent acute disorder, and may have no desire for a regular review or SMP. Many of these patients will continue to have problems with their asthma.[8] There is a mismatch between what most clinicians offer and what many patients need. A better approach could be based on the principles of health behaviour change,[9] adult learning[10] and continuous quality improvement.[11] Personalised prompts can help, but many patients only respond to prompts and help when they realise they have a problem. The current guidelines on the management of asthma provide recommended treatments for differences in the severity of the disease but give little help for the management of differences in the behaviour of people with asthma. ■

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None declared

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