

How do attitudes to illness and treatment compare with self-reported behaviour in predicting inhaler use in asthma

Christopher H Hand, Malcolm Adam

Abstract

Aim To compare attitudes to illness and treatment with self-reported behaviour in predicting inhaler use in asthmatic patients

Method : In five practices, 45 patients had their β_2 -agonist and steroid inhaler. They completed the Illness Perception Questionnaire, the Attitude to Treatment for Asthma Questionnaire, and a self-report questionnaire at entry, after one month's run-in, and at three months. A nurse counted the number of doses used. Univariate analysis was performed with Accuhaler use over three months as the dependent

variable. Independent variables included the questionnaire sub-scales and morbidity. Significant variables were entered into multiple linear regression

Results The self-report questionnaire explained 40% of the variance of steroid use. The ATAQ relief sub-scale and morbidity explained 29% of the variance of β_2 -agonist use

Conclusions Steroid inhaler use can be partly predicted by self-reported behaviour and β_2 -agonist use by attitudes to inhaled treatment. These findings have implications for patient education

Introduction

Despite the apparent success of some educational programmes for people with asthma, morbidity from asthma remains unacceptable.¹ Poor compliance with asthma treatment is one of the most important factors.² Although the concept of compliance has evolved from one of blaming patients to one of mutual agreement between patients and professionals (concordance) education is still the main approach to help people cope with their asthma.³

Beliefs and attitudes influence behaviour, and some theoretical models can explain up to 30% of health behaviour.⁴ This study compares how attitudes to illness caused by asthma and attitudes to inhaled treatment for asthma compare with self-reported behaviour in predicting inhaler use in asthmatic patients

Methods

A stratified random sample, by asthma severity, sex (equal numbers), and age (from 18 to 55), of 45 people with asthma was recruited by letter from five general practices in Norfolk and Suffolk. All patients taking a combination of a short acting β_2 -agonist (salbutamol) and a steroid inhaler (either beclomethasone or fluticasone) were included in the sampling process. The sample size gives 80% power to detect a correlation of 0.4 using a two-tailed, 5% significance level.⁵ The participants saw a practice nurse who explained the study and, after obtaining consent, exchanged their pressurised inhalers for Ventoli (salbutamol) and Flixotide (fluticasone) Accuhalers™. Accuhalers were chosen as the number of doses used can be counted and "dumping" (multiple actuations of the inhaler device before attending the surgery) is more difficult

The participants completed three questionnaires: the Illness Perception Questionnaire (IPQ), the Attitudes to Treatment for Asthma Questionnaire (ATAQ), and a questionnaire containing four self-reported behaviour

relating to inhaler use.⁶ Three questions about current morbidity from asthma were also included.¹ The IPQ has three sections: the first contains selection of symptoms and their relation to asthma, the second has 50 items relating to beliefs about illness (eight sub-scales), and the final section lists possible causes of asthma. The results from the second section are presented in this study (table 1). The ATAQ has three sub-scales (table 1) and is available from the authors. The questions relate to beliefs about the use of inhalers for the prevention and relief (eight items each) of asthma, and the problems and concerns that patients have with inhalers in general (10 items). Both the IPQ and ATAQ have 5-point Likert scales: each sub-scale score is calculated by adding the scores. The four self-reported behaviour items are answered either yes (scored 1) or no (scored 0) and the scores of the items added

The participants were seen at entry to the study, after one month's run-in on the Accuhalers to familiarise themselves with their use, and finally after a further three months. At each attendance, the nurse performed her usual asthma check-up and asked the participant about problems with the new treatments as well as problems with their asthma. She counted the number of doses used of each Accuhaler and replaced the old Accuhalers with new ones. At the end of the study the nurse returned the original medication to the participants

Univariate analysis was performed using either salbutamol or Flixotide Accuhaler™ use over three months as the dependent (Y) variable. The following were selected as the independent (X) variables: age, gender, current morbidity, the sub-scales scores of the ATAQ and the self-reported behaviour scale. Independent variables with a significant relationship ($p < 0.05$) with either of the two dependent variables were included in backward multiple linear regression. Transformation of the dependent variables was not considered necessary as plots of the residual values showed no apparent systematic features. Comparison between variables that were not normally distributed

Christopher Hand
General Practitioner and
Honorary Senior
Lecturer

Malcolm Adam
Clinical Psychologist
and Honorary Senior
Lecturer

Correspondence to
School of Medicine
Health Policy and
Practice, University of
East Anglia, Norwich
NR4 7TJ, U

k.hand@uea.ac.uk

Date Submitted: 11/06/01
Revised: 08/11/01
Date Accepted: 15/02/02

Prim. Care Respir
2002 **11**(1) 9-1

were made using nonparametric tests. SPSS version 20.0 was used for all statistical tests

The Health Services Research and Development Sub-committee of the Anglia and Oxford region funded the study for which three local research ethics committees gave their approval

Results

Forty-five people were recruited and only one 18-year-old female did not attend her final appointment. Of the remaining 44 people (97.8%) who completed the study, 24 (54.5%) were male, the median age was 38 years (range 18 to 55), and 80% of them had suffered from asthma for over five years (median 19.5, range 0.5 to 43 years). Thirty were on step two of the British Thoracic Society Guidelines 14 on step three, and seven were on step four. Of those on step four, five were using inhaled long-acting β_2 -agonists, one inhaled ipratropium and on leukotriene antagonist tablets

At entry to the study, 17 (38.6%) had low self-reported morbidity, nine (20.5%) had medium morbidity and 18 (40.9%) had high morbidity. There was no statistically significant change in morbidity over time (Wilcoxon Signed Ranks Test, $Z=0$, two-tailed $p=1.00$). Patients used significantly less salbutamol (median 1.1 puffs per day, range 0 to 4.3

than Flixotide (1.9, 0.5 to 3.3) (Wilcoxon signed rank test, $Z=-2.83$, $p=0.005$). The use of both inhalers was relatively stable with no significant change in either inhaler in the run-in period compared to the three-month study period (Wilcoxon signed ranks tests salbutamol $Z=-0.4720$, $p=0.23$; Flixotide $Z=0.64$). None of the patients reported any problem with the Accuhalers

The median scores on the sub-scales of the IPQ and ATAQ at the three attendances are shown in table 1. These scores changed very little during the study. The responses to the self-report questions at the second attendance with their individual effects upon inhaler use are in table 2. More people admitted to behaviours that would lead to fewer doses being taken for steroids than for β_2 -agonists. The most behaviours admitted to, the less the patients used their steroid inhalers (one behaviour admitted, 2.0 puffs per day; two, 1.7; three, 1.4; four, 0.9). Table 3 shows the results of the univariate analyses and table 4 the multivariate analyses. Self-reported behaviour relating to steroid use significantly predicted use of

Table 3 Univariate analyses with steroid and short acting β_2 -agonist use as dependent variable

Independent variable	Dependent variable	
	Steroid inhaler	β_2 -agonist inhaler
Age	0.2	40.0
Gender	20.1	6.0
Morbidity	40.0	6.3 *
IPQ sub-scale		
Timelin	40.1	40.0
Consequence	50.0	0.2
Personal control	80.0	60.0
Treatment control	0.1	30.0
Coherence	30.1	8.1
Timecycle	50.0	0.2
Emotion	0.1	9.2
ATAQ sub-scale		
Preventing symptom	0.2	6.2
Relieving symptom	6.0	0.5 *
Problems with & concerns about inhaler	60.1	9.0
Self-reported behaviour	40.6 *	0.0

* $p < 0.05$ ** $p < 0.005$

Table 1 Responses to the Illness Perception Questionnaire (IPQ) and Attitudes to Treatment for Asthma Questionnaire (ATAQ) (n=44)

IPQ sub-scale	Entry	1 month	3 month
	Median (IQR)	Median (IQR)	Median (IQR)
Timelin	23.0 (5.0)	23.0 (4.5)	23.0 (2.8)
Consequence	15.0 (6.0)	14.0 (5.0)	15.0 (5.0)
Personal control	23.0 (4.0)	23.0 (3.0)	23.0 (3.0)
Treatment control	19.0 (3.0)	18.5 (3.0)	18.0 (3.0)
Illness coherence	11.0 (6.0)	10.0 (5.8)	10.0 (6.0)
Timeline cyclical	13.0 (3.0)	14.0 (2.8)	13.0 (4.0)
Emotional representation	13.0 (5.0)	13.0 (3.5)	12.0 (4.0)
ATAQ sub-scale			
Preventing asthma symptom	26.0 (4.0)	27.0 (4.8)	28.0 (5.0)
Relieving asthma symptom	22.0 (10.8)	22.0 (9.0)	22.0 (8.8)
Problems with and concern about inhaler	22.0 (9.0)	20.0 (7.0)	20.5 (7.8)

Table 2 Responses (percentages) to the self-reported behaviour questions in relation to steroid and short acting β_2 -agonist inhaler (n=44) with effects on inhaler use (mean doses per day and standard deviations)

Question	Steroid				β_2 -agonist			
	No (%)	Use (sd)	No (%)	Use (sd)	No (%)	Use (sd)	No (%)	Use (sd)
Over the last three months have you								
At times been careless about using your inhaler	27 (61.4)	2.1 (0.5)	17 (38.6)	1.3 (0.7)	36 (81.8)	1.2 (1.1)	8 (18.2)	1.5 (1.5)
Ever forgotten to use your inhaler	17 (38.6)	2.2 (0.6)	27 (61.4)	1.5 (0.7)	35 (79.5)	1.1 (1.1)	9 (20.5)	2.0 (1.3)
Ever stopped your inhaler because you felt better	34 (77.3)	1.9 (0.7)	10 (22.7)	1.2 (0.6)	33 (75.0)	1.4 (1.3)	11 (25.0)	1.0 (0.9)
Ever used your inhaler less than prescribed because you felt better	30 (68.2)	2.0 (0.6)	14 (31.8)	1.3 (0.6)	33 (75.0)	1.3 (1.2)	11 (25.0)	1.2 (1.1)

this inhaler and accounted for 40% of the variance. The ATAQ relief sub-scale and morbidity significantly predicted β -2-agonist use and these two variables explained 29% of the variance. Morbidity, however, only contributed an additional 4% to the explanatory model.

Discussion

Four self-reported behaviours explain nearly half the variance of steroid use. A model containing the ATAQ relief sub-scale and morbidity explains just under a third of the variance of short acting β -2-agonist use. Neither of the other two sub-scales of the ATAQ nor the sub-scales of the IPQ contribute significantly to either model. How can we explain these results?

General attitudes are poor predictors of specific behaviours and it is probably for this reason that the IPQ sub-scales did not predict inhaler use. The reason why self-reported behaviour predicted steroid use rather than β -2-agonist use can be understood by examining the individual items of this scale. Two of the four items reflect what may happen when using treatment that is taken regularly as opposed to one that is taken as required. In the development of this scale no consideration has been given as to whether medication was for prevention rather than relief.⁸

One explanation for the poor performance of the ATAQ sub-scales in predicting steroid use is that the sample who participated were atypical. They may be more likely to adhere to their inhaler regimen than most patients, resulting in less variation in their use of steroids. There is some evidence for this in that they used more steroid than short acting β -2-agonist whilst the reverse is true in the population from which the beliefs were selected. It is also possible that an attitude scale consisting of several beliefs, whilst having acceptable psychometric properties, is not as good at predicting behaviour as individual beliefs.

Once a specific behaviour is established, as it was in these participants, beliefs may play a relatively minor role in maintaining that behaviour. Clark *et al.* conclude that patients' beliefs about health issues are not useful indicators of likely compliance.⁹ However, much of the evidence quoted in the review is not related to asthma. The powerful influence of past behaviour is well demonstrated in the Medical Outcomes Study¹ where nonadherence at the beginning of the study is the strongest predictor of nonadherence two years later, although asthma is not one of the chronic diseases followed. Osman's view is that, for most patients, attitudes to asthma medication follow control of symptoms.² This means that in patients just diagnosed with asthma, their initial education and experience may be crucial if we want to influence their use of inhalers. For those with established asthma, education based on changing attitudes may be less effective than discussing the behaviour itself.

What are the methodological limitations of this study?

Table 4 Multivariate analyses with steroid and short acting β -2-agonist use as dependent variable

Dependent variable	Independent variable	Standardised β Coefficient	Significance
Steroid use	Self-reported behaviour	-0.64	0.00
	ATAQ relief sub-scale	0.4	0.00
β -2-agonist use	Morbidity	0.2	0.0
	ATAQ relief sub-scale		0.00
Adjusted R ² = 0.40**			
Adjusted R ² = 0.29**			
* <i>p</i> < 0.00			

First, inhaler use was only studied for three months. There is evidence from one trial that adherence starts to drop after three months.³ A longer period of observation might have produced different results. Accuhalers will only measure the number of doses used and not how and when they are taken. Although openness was encouraged in this study, one cannot be certain that the doses counted by the nurses were the doses taken by the participants.

What are the implications for practice? Specifically asking patients about behaviours that reduce steroid inhaler use appears promising. Exploring belief about inhaler treatment may be more useful with β -2-agonists. It is possible that giving the patient the opportunity to ask questions and the opportunity to ask questions before the consultation may enable them to ask questions about their inhaler treatment. A health professional responding to questions from a patient is a crucial step in achieving concordance.³ ■

Acknowledgement

Our thanks to the patients, nurses and doctors in the SAND research consortium: Bacon Road, Drayton and Thorpe Wood Practices in Norwich, Fakenham Practice in Norfolk and Bottesdale Practice in Suffolk. Glaxo Wellcome generously provided the Ventolin and Flixotide AccuhalersTM. Professor John Weinman kindly gave permission for us to use the IPQ.

Reference

- Dickinson J, Hutton S, Atkin A, Jones K. Reducing asthma morbidity in the community: the effect of a targeted nurse-run clinic in an English general practice. *Respir Med* 1997; **91**: 636-40.
- Walsh LJ, Wong CA, Cooper S, et al. Morbidity from asthma in relation to regular treatment: a community based study. *Thorax* 1999; **54**: 296-300.
- Royal Pharmaceutical Society of Great Britain. From compliance to concordance: towards shared goals in medicine taking. London: RPS, 1997.
- Zimmerman RS, Vernberg D. Models of preventive health behaviour: comparison, critique and meta-analysis. *Adv Med Soc* 1994; **4**: 45-67.
- Kraemer HC, Thieman S. How many subjects? Statistical power analysis in research. Newbury Park: Sage, 1987.
- Hand CH, Morley S, Adams M. Developing a questionnaire to measure patients' beliefs about inhaler treatment for asthma: tests of validity and reliability.

Primary Care Respir 2000 **9**(1):13-16

7. Weinman J, Petrie KJ, Moss-Morris R, Horne R
The Illness Perception Questionnaire: a new method
for assessing cognitive representations of illness

Psychol Health 1996 **1**:431-45

8. Clark S, Vignati P. Patient

factors and compliance with asthma therapy. *Respi
Med* 1999 **9**:856-862

9. British Thoracic Society, National Asthma

Campaign, Royal College of Physicians et al. The

British Guidelines on Asthma Management 1995

Review and Position Statement. *Thora*

1997 **52**(5):S1-S32

10. Brooks CM, Richards JM, Kohler CL, et al

Assessing adherence to asthma medication and inhaled

regimens: a psychometric analysis of adult self-report
scales. *Med Care* 1994 **3**:298-307

11. Sherbourne CD, Hays RD, Ordway L, et al

Antecedents of adherence to medication

recommendations: results from the Medical Outcome

Study. *J Behav Med* 1992 **1**:447-468

12. Osman LM. How do patients' views about

medication affect their self-management of asthma

Pat Ed Course 1997 **2**:43-S49

13. Jónasson G, Carlsen K-H, Mowinckel P. Asthma

adherence in a long term clinical trial. *Arch Dis Child*

2000 **8**:330-3

GPIAG Registrar Audit Competition 200

Audit of Respiratory Care

**Open to GP Registrars and SHO's who are part of a GP training
scheme**

Prize

First Prize: £400.00

Two runners up will receive £100 each

**The winners will be invited to present their results
at a national meeting**

The audit

**The audit must clearly relate to an aspect of respiratory medicine of
importance to primary care.**

Must conform to the standard criteria for summative assessment

Must have been undertaken within the previous year

**Credit will be given for innovative ideas: innovative approaches to existing
problems or identification of a less well-known problem**

Where possible reference should be made to literature from primary care

Must be submitted by 31 May 2002

For application forms and further information contact the GPIAG secretariat

Edgbaston House, 3 Duchess Place, Edgbaston Birmingham B16 8NH

Tel: +44 (0)121 454 8219 Fax: +44 (0)121 454 1190 E-mail: info@gpiag.org