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Limited (information only) patient education programs for adults with asthma (Review)

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[Intervention Review]

Limited (information only) patient education programs for adults with asthma

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ABSTRACT

Background

A key component of many asthma management guidelines is the recommendation for patient education and regular medical review. A number of controlled trials have been conducted to measure the effectiveness of asthma education programmes. These programmes improve patient knowledge, but their impact on health outcomes is less well established. At its simplest level, education is limited to the transfer of information about asthma, its causes and its treatment. This review focused on the effects of limited asthma education.

Objectives

The objective of this review was to assess the effects of limited (i.e. information only) asthma education on health outcomes in adults with asthma.

Search methods

We searched the Cochrane Airways Group trials register and reference lists of articles.

Selection criteria

Randomised and controlled trials of individual asthma education involving information transfer only in adults over 16 years of age.

Data collection and analysis

Trial quality was assessed and two reviewers extracted data independently. Study authors were contacted for missing information.

Main results

Twelve trials were included. They were of variable quality. Limited asthma education did not reduce hospitalisation for asthma (weighted mean difference -0.03 average hospitalisations per person per year, 95% confidence interval -0.09 to 0.03). There was no significant effect on doctor visits, lung function and medication use. The effects on asthma symptoms were variable. There was no reduction in days lost from normal activity, but in two studies, perceived asthma symptoms did improve after limited asthma education (odds ratio 0.44,

95% confidence interval 0.26 to 0.74). In one study, limited asthma education was associated with reduced emergency department visits (reduction of -2.76 average visits per person per year, 95% confidence interval -4.34 to 1.18).

Authors' conclusions

Use of limited asthma education as it has been practiced does not appear to improve health outcomes in adults with asthma although perceived symptoms may improve. Provision of information in the emergency department may be effective, but this needs to be confirmed.

PLAIN LANGUAGE SUMMARY

Limited (information only) patient education programs for adults with asthma

Using a systematic approach, the medical literature was searched thoroughly to find reliable studies that looked at the effects of improving patients' knowledge about asthma, but which did not attempt to improve practical self-management skills. The results of the studies were combined to see if patient education designed to improve patient knowledge about their condition made a difference to their asthma. Improving patient knowledge alone does not seem to reduce hospitalisations, doctor visits or medication use for asthma, but may play a role in improving patients perceptions of their symptoms. However, education programmes designed to improve knowledge alone may reduce Emergency Room visits in high-risk adults.

BACKGROUND

The burden of illness from asthma is high and increasing (Peat 1994). There are problems with the delivery of care that include, under treatment with corticosteroids, limited knowledge and poor asthma management skills amongst patients with severe asthma (Bauman 1987, Bauman 1992; Gibson 1993a). Much of the preventable morbidity and mortality from asthma is believed to be due to factors such as patient delay, denial, and sub-optimal management. Each of these components is amenable to asthma education. Asthma management guidelines have been developed in many countries to assist in the application of standardised, high quality medical care (Woolcock 1989). These guidelines rely on expert opinion with variable reporting of their evidence base (Gibson 1993b).

A key component of many asthma management guidelines is the recommendation for patient education and regular medical review. Patient Education has been defined as "a planned learning experience using a combination of methods such as teaching, counselling, and behaviour modification techniques which influence patients' knowledge and health behaviour ... (and) involves an interactive process which assists patients to participate actively in their health care" (Bauman 1987; Bartlett 1985). Education is considered to be necessary "to help patients gain the motivation, skills and confidence to control their asthma" (Anonymous 1996). A narrative review of asthma education has emphasised the need for asthma education and suggested successful strategies (Clark 1993).

A number of controlled trials have been conducted to identify the effectiveness of asthma education programmes. Whilst there is general agreement that these programmes improve patient knowledge, the impact that they may have on health outcomes is less well established. For example, a review of paediatric education programmes failed to identify a positive benefit on asthma admissions, doctor visits or school absenteeism (Bernard-Bonnin 1995). Similarly, the influence of programme characteristics on health outcomes has not been examined in adults. This review is being conducted to address these issues.

Asthma education may take many forms. At its simplest level, education is limited to the transfer of information about asthma, its causes and its treatment. This review will focus on the effects of limited asthma education. Specifically, the aims are to identify whether health outcomes in adults with asthma are influenced by limited asthma education interventions that promote an increase in patient knowledge alone.

More complex interventions have been described which are designed to develop self-management skills, or to alter attitudes and/or behaviours concerning asthma, and to improve medical management. These will be analysed in a separate review concerning the impact of self-management programmes on adults with asthma.

The overall objective of these reviews is to evaluate the literature supporting the education component of Step 6 of the Australian Asthma Management Plan (AAMP), "Educate and Review Regularly".

OBJECTIVES

Specific questions asked were:

1. Does limited (information only) asthma education lead to improved health outcomes in adults with asthma?
2. What are the characteristics of those education programmes which lead to measurable changes in health outcomes?

METHODS

Criteria for considering studies for this review

Types of studies

Randomised controlled trials (RCTs) and controlled clinical trials (CCTs) which studied the effects of limited asthma education on health outcomes in adults with asthma, were included.

Types of participants

Adults (>16 years old) with asthma that was defined by doctors diagnosis or objective criteria.

Types of interventions

Asthma education programmes that were delivered to a person (or group of people) with asthma (and not their doctor) were included. A nurse, pharmacist, health educator or medical practitioner who did not change therapy could deliver the intervention.

The intervention may have transferred information about:
pathophysiology of asthma,
management of trigger factors, and
action and side effects of medication.

Studies were excluded from this review of limited asthma education if the intervention required:
peak expiratory flow monitoring and diary recording,
provision of a written action plan which was defined as an individualised written plan informing participants about when and how to modify medications in response to worsening asthma and how to access the medical system (Garrett, 1994), or
assessment and or modification of medical therapy.

Limited educational interventions were classified as:
1. Interactive - an education session or sessions whereby an individualised response could be made to learner stimuli. The format may be group or one to one education.
2. Non-interactive - education material (print, audio, video, electronic) which was non-responsive to learner stimuli.
3. Combined interactive and non-interactive.

Types of outcome measures

Any of asthma admissions, emergency room visits, unscheduled doctor visits, lung function, oral corticosteroids, use of rescue medication, absence from work or school, restricted activity, symptomatic days, perceived disability or knowledge.

Search methods for identification of studies

Studies were identified from the following sources:
Cochrane Airways Group's register was searched using the following terms: (Asthma OR wheez*) AND (education* OR self management OR self-management). The titles, abstracts and key

words of these articles were obtained and screened for relevance. Full text versions of relevant papers were obtained and their reference lists were hand searched for additional articles.

Data collection and analysis

Selection of studies

Potentially relevant articles were identified for retrieval if the title or abstract stated the word "controlled" or "randomised" and "adults" and "asthma" and "education". The full text version of these articles were obtained for assessment of relevance.

Data extraction and management

Two independent reviewers established whether each study met the inclusion criteria as a RCT/CCT of an asthma education programme for adults. The percentage agreement for inclusion/exclusion of studies was 91.6%. There were 3 disagreements, which were resolved by discussion. Two independent reviewers then assessed the content of the educational interventions in order to identify those studies which reported limited (information only) education programmes. The percentage agreement was 91%. Disagreement about 1 study was resolved by discussion.

Information about the studies was collected in the following fashion.

i) Demographics: age, gender, ethnicity, socio-economic level.

ii) Type of control: several different types of control intervention may be used. These include an "intervention" of low efficacy (e.g. written material only), usual medical care and a waiting list control.

iii) Type of intervention:
- interactive. Sessions which provided individualised feedback (group or individual education sessions, interactive computer sessions).
- non-interactive. Sessions which did not provide individualised feedback. (written material, video, non-interactive computer, audio-cassette).

iv) Setting of intervention: primary care vs hospital based. The severity of patients differs in these settings that may influence the ability to detect a change in outcome measures. For example: in a hospital based setting, the greater number of events (e.g. re-admission) could make it easier to detect differences in this outcome than in primary care.

v) Duration of intervention: number of sessions, hours of teaching.

vi) Sample size.

vii) Asthma severity.

viii) Intermediate outcome: asthma knowledge.

For the present review data were collected on interventions where the educational strategy involved information transfer only. No data were included from more intensive educational interventions designed to improve skills or change behaviours. This is examined in a separate review.

A standard questionnaire was sent to authors to obtain full details of the type of intervention, together with a request for missing data. Authors were sent a list of references and asked to identify additional studies. The authors also received a copy of the data extracted for their study and were asked to verify this, as well as the intervention classification.

The following health outcomes were identified for assessment:
Admission/readmission rate
Emergency room visits
Unscheduled doctor visits
Lung function: spirometry, measured as forced expiratory volume in 1 second (FEV1)
Use of 'rescue' (or reliever) medications
Quality of life, symptoms score
Economic data cost, days lost from college/work

Assessment of risk of bias in included studies

Two reviewers independently assessed the quality of the full text version of all included papers using the Cochrane system. Study quality was assessed according to the following variables:

i) CONCEALMENT OF ALLOCATION:
A: ADEQUATE if there was true randomisation
i.e. a central randomisation scheme
randomisation by external person or use of coded containers/envelopes
B: UNCLEAR
C: INADEQUATE if there was alternate allocation, reference to case record
number, date of birth, day of the week, or an open test or random numbers

ii) BLINDING OF INTERVENTIONS: It was not anticipated that studies would have used true blinding of the intervention, as it is quite difficult to achieve this in the asthma education setting.

iii) WITHDRAWALS/DROPOUTS: It was noted whether all randomised subjects were accounted for in the results.

BLINDING OF OUTCOME ASSESSMENT: It was noted whether a person who was blinded to the treatment allocation assessed the study outcomes.

Data synthesis

Outcomes were analysed as continuous or dichotomous outcomes, using standard statistical techniques.
i) For continuous outcomes, the weighted mean difference (WMD) and 95% confidence intervals were calculated.
ii) For dichotomous outcomes, the odds ratio was calculated with 95% confidence intervals by Peto's methods.

Where appropriate, data were entered as negative values to conform to the Cochrane convention whereby effects that favour the treatment under review move to the left.

Subgroup analysis and investigation of heterogeneity

i) Data concerning the intermediate outcome, asthma knowledge, were collected and intended for use as a stratification variable in a subgroup analysis to assess whether the treatment effect was different in studies which demonstrated an improvement in knowledge compared with those which did not.
ii) Type of control group: usual care (which may or may not involve a degree of education), waiting list control or lower intensity educational intervention.

iii) Type of intervention: interventions were grouped into 2 major categories: interactive and non-interactive. The hypothesis that the effect of interactive education is superior to non-interactive education was tested.
iv) Type of setting: Primary care compared with hospital setting

RESULTS

Description of studies

Results of the search

The search identified 86 potentially relevant studies of asthma education in adults. Full text versions of these papers were obtained, and independently assessed by 2 reviewers who agreed that 12 papers met the inclusion criteria for this review.

Included studies

This review reports the results of 12 RCTs of limited asthma education (information only) in adults with asthma. An attempt was made to contact all authors for verification of methodological quality, classification of the intervention(s) and of outcomes data. Three authors responded (Thapar 1994; Jenkinson 1988; and Green L with regards to the Maiman 1979 trial). Correspondence sent to Snyder and Moldofsky was returned to sender.

Full details of individual studies are given in Characteristics of included studies.

The 12 studies examined the effects of limited asthma education (information only) on the following outcomes: hospitalisation for asthma, emergency room (ER) attendance for asthma, unscheduled visits to the doctor for the management of asthma (doctor visits), lung function, medication use and asthma symptoms. The number of studies contributing to these outcome data was:

Outcome No. Trials that mentioned this outcome (No. Trials with sufficient data for meta-analysis)

Hospitalisation 9 (3)
ER Visits 4 (1)
Doctor Visits 7 (5)
Lung Function 2 (1)
Medication Use 5 (3)
Symptoms 7 (5)

Excluded studies

Seventy one papers were excluded because: they were background reports of other papers under consideration (2); methodological criteria were not met (10); the outcome measured was not appropriate (2); the interventions were not patient education (2); the interventions did not include education (7); or was assessing inhaler technique only (3) or the interventions were not limited education but included elements of self-management or behavioural change (45). The latter form the basis of a second review. The two reviewers disagreed over the classification of the intervention in one paper, which upon discussion, was excluded on the basis that it was a psychological outcomes study (Maes 1988). One study is awaiting assessment and two are ongoing.

Risk of bias in included studies

All studies stated that treatment allocation was randomised. However, the methods used to generate random sequences, conceal allocation to groups and to blind outcome assessors were frequently not described. None of the interventions were double-blinded. Withdrawals were accounted for in 9 of the 12 studies.

Effects of interventions

Hospitalisation

Three trials (Aiolfi 1995, Bolton 1991, Osman 1994) reported data on hospitalisation rates for asthma from 906 subjects in sufficient detail for meta-analysis; 2 studies stated that data on hospitalisation were collected but did not present the findings (Hilton 1986, Thapar 1994); 3 studies stated that hospitalisation rates were not effected by the limited asthma education (information only) intervention (Moldofsky 1979, Wilson 1993,Sondergaard 1992) and one study recorded a reduction in the mean number of hospitalisations but did not publish standard deviations for the treatment and control groups (Ringsberg 1990). The three studies used for meta-analysis satisfied a test for homogeneity. The pooled results showed that limited asthma education (information only) did not significantly reduce hospitalisation for asthma over a 12-month period. The results of the meta-analysis are consistent with the narrative results reported in the 5 trials not included in the meta-analysis. Only one study reported a reduction in hospitalisations with limited asthma education, and data have been requested to include this in the meta-analysis.

ER Visits

ER visits were recorded in 4 papers which all reported a reduction in ER visits after limited asthma education (information only). One paper reported a mean reduction of 14% in the control group and 46% in the treatment group but did not report a standard deviation (Ringsberg 1990). Maiman 1979 reported a reduction in repeat visits within a six-week period but did not provide data for the control group. Hilton 1986 reported that fewer individuals from the treatment group visited the emergency room but did not report a standard deviation. Bolton 1991 provided a quantitative estimate of the effect of this intervention. After limited asthma education, ER visits were reduced by a mean of 2.8 per year (95% CI 1.18 to 4.34). The subjects in this study were recruited from the emergency room and were considered to have a high baseline risk for this outcome. The reduction in ER visits was likely to be clinically significant. Maiman 1979 and Ringsberg 1990 recruited subjects from the emergency room and hospital setting respectively. Hilton 1986 recruited subjects from the community.

Doctor Visits

Data were collected on doctor visits in 8 trials; Hilton 1986 and Jenkinson 1988 reported no effect. In a meta-analysis of the five trials that provided sufficient data (Aiolfi 1995, Bolton 1991, Moldofsky 1979, Osman 1994, Wilson 1993) (n=1114) limited asthma education (information only) was found to have no effect on unscheduled visits to the doctor for asthma. There was no significant heterogeneity (Chi squared 1.7; p>0.05).

Lung Function

Lung function was reported by Ringsberg 1990 and Moldofsky 1979. Moldovsky found no significant change in FEV1. Ringsberg reported a non-significant increase in mean FEV1 from 2.1 to 2.3 l/min and 2.2 to 2.5 l/min in the treatment and control groups respectively. This paper failed to provide standard deviations

and hence was excluded from the meta-analysis. Overall, limited asthma education (information only) did not appear to alter lung function.

Medication Use

Information only education programs for asthma had no statistically or clinically significant effects on medication use. This outcome was examined in 5 studies. Two studies (Huss 1992; Jenkinson 1988) stated that there was no effect but the data was not reported. Osman et al (Osman 1994) found no reductions in the number of prescriptions for bronchodilators or corticosteroid courses over 1 year. Moldofsky 1979 reported no change in the proportion of bronchodilator users. Sondergaard 1992 reported an increase in bronchodilator and corticosteroid use. This was interpreted as an effect of improved compliance.

Asthma Symptoms

The effects of limited asthma education (information only) on asthma symptoms was examined in 6 studies and reported as the number of times absent from work or school (Hilton 1986), the number of 'lost days' from normal activity due to asthma (Moldofsky 1979), the number of days of limited activity due to asthma (Bolton 1991, Osman 1994), change in the number of symptomatic days and change in levels of physical activity (Wilson 1993). Subjects reported a reduction in perceived asthma symptoms (Jenkinson 1988, Wilson 1993); OR 0.44; 95% CI 0.26, 0.74. Overall, the studies showed no significant effect of limited asthma education (information only) on the more objective measures (days lost) but did find positive effects on perceived asthma symptoms.

Cost

Costs were measured in 2 studies. Bolton 1991 reported that the health improvements associated with limited asthma education in the emergency department setting were associated with an average saving in health care costs of US$1913 per person over a 12 month period. An information only education program reported by Sondergaard 1992 was unable to clarify any cost-effectiveness.

Knowledge

Of the 6 studies which measured knowledge, one reported a significant improvement from baseline to 4 months in two types of limited asthma education interventions without a control group (Thapar 1994). Three studies reported an improvement in the intervention group after a 12-month period (Aiolfi 1995; Jenkinson 1988; Ringsberg 1990). Two studies reported no difference (Hilton 1986; Moldofsky 1979) after 12 and 16 months respectively. Knowledge was assessed using different instruments in each study.

DISCUSSION

In this systematic review of 12 trials, limited asthma education programmes that only offer the opportunity to increase knowledge and make no attempt to influence self management skills, behaviours or attitudes for adult asthmatics do not reduce hospitalisation rates or visits to the doctor for asthma attacks. This limited style of asthma education involving only information transfer does not change medication usage for asthma or improve lung function. Similarly, there was no change in time lost at work or school due to asthma. There were however, some positive effects of limited asthma education (information only). Patients with asthma felt that their asthma symptoms had improved. In those subjects with a high attendance rate to the ER, limited asthma education was associated with a reduction in subsequent ER visits for asthma. These results are consistent with the theoretical proposition that limited education interventions, as they have been practiced, have little influence on health related behaviours and skills (Bauman 1987).

In order to identify relevant studies for this review we used several strategies: the Cochrane Airways Review Group database was searched using a sensitive search strategy; bibliographies of retrieved publications were reviewed, and advice was sought from experts. This procedure was felt to be a comprehensive attempt to identify the relevant published literature. Trials were excluded if they did not meet methodological requirements or did not pertain to asthma patient education in adults. Interventions were subsequently categorised into those which:
a) imparted information; and/or
b) used self-monitoring; and/or
c) assessed or modified medical therapy; and/or
d) developed an individualised action plan.

Studies were included if their intervention met the criteria for only (a) above (i.e. only imparted information). Studies were excluded if their interventions involved self-monitoring, changed medications or used individualised action plans. These studies will be the subject of a second review of the effects of more intensive asthma education programs for adults designed not only to increase knowledge but also to improve skills, change behaviours or modify therapy. In order to minimise selection bias, we used independent observers to select studies for inclusion and found good agreement between observers.

The methodological quality of the included studies was variable. The trials were conducted over a period spanning 20 years of development in health education during which time RCTs have become progressively more common. All trials were randomised, but the methods used to generate a random sequence and conceal allocation were not explicitly stated. Similarly, outcome assessment was usually not blinded. This presented an opportunity for bias. However, these biases usually favour treatment and as most outcomes in this review were not affected by the intervention, this substantiates further the lack of influence of this type of intervention. There was the potential for confounding of the results in one study. Osman (1994) employed a factorial design in which some of the intervention arms included people who had been given a peak flow meter. However, this study contributed only to meta-analyses in which no treatment effect was demonstrated.

A potential reason for the negative results of the studies in this review is that the limited educational interventions did not significantly improve asthma knowledge over an extended period. This intermediate variable was reported in a small number of studies and assessed using different questionnaires. As a result we were unable to assess whether knowledge improvement, duration of education, level and type of interaction or mode of delivery (personal/written/video/audio/computer) played a role in determining clinically significant health outcomes. The content of the educational material was generally the same and covered aspects of the disease process, asthma triggers, prevention, medications and in some cases, general information about management of symptomatic episodes. However, the span of 20

years over which the trials were conducted will have undoubtedly introduced changes to educational content and modes of delivery. There appeared to be no changes to effect size over time but was difficult to gauge across all outcome variables due to the limited number of trials and the level of heterogeneity in the manner of reporting outcomes.

The British Guidelines on Asthma Management suggest that verbal information alone does not alter behaviour and propose the use of written self management plans with written and audiovisual reinforcement of spoken messages (British Thoracic Society, 1997). Step 6 of the Australian Asthma Management Plan proposes that education and regular medical review are necessary to motivate and provide the skills and confidence for patients to control their asthma but does not suggest particular methods to educate patients (Anonymous 1996). Similarly, the Canadian Asthma Consensus Conference recommended patient education and regular follow-up as essential components of asthma management but did not prescribe any particular methods to educate patients except that patients should be given a list of materials and resources and that the education program should be designed to change behaviours (Ernst 1996). The American National Asthma Education Program proposes that the provision of information contributes to, but is not enough by itself to achieve adequate asthma knowledge and self management behaviours (Anonymous 1991).

Limited asthma education (information only) is appealing in several ways. It is generally easy to implement and can be adapted readily to several situations in a busy medical practice. In addition, it is cheaper than more intensive forms of intervention and superficially appears to satisfy the stated desires of patients for more information about their condition (Gibson 1995). Whilst information alone may not be enough to change health related behaviours (Bauman 1987) it may be informative to devise and test the efficacy of brief interventions which are based on health behavioural change theory (Mullen 1985). In particular, brief interventions could be designed to motivate help seeking behaviour, skills development and to enhance confidence (self-efficacy) for behavioural self-management.

The results of this systematic review generally concur with educational theory and with guideline recommendations that information alone is not enough to change behaviours. Limited asthma education (information only) was not found to influence hospitalisations, doctor visits, asthma therapy or time lost from work. There are two findings that deserve further consideration: changes in reported symptoms and ER attendances.

There was a gradation in the effects of limited asthma education (information only) on asthma symptoms. For the more severe degree of disruption such as days off work or school, there was no significant effect of the limited education intervention. However, patients reported that their perception of symptoms was reduced by limited asthma education (information only). It is not clear whether this was a true effect of the intervention on asthma symptoms or the result of anticipation /expectation bias. The interventions were administered in an unblinded fashion, and hence it is possible that knowledge of treatment allocation could have led to reduced reporting of asthma symptoms in the subjects receiving asthma education.

The effects of limited asthma education (information only) in the emergency department setting deserve more attention. Asthmatics attending the ER for asthma have a high risk for future ER visits and tend to have more severe asthma and poor asthma management skills (Gibson 1993a). As such, they represent an appropriate group to target for asthma education. We identified 2 studies that focused on these subjects (Maiman 1979, Bolton 1991). Both studies reported that limited asthma education (information only) could reduce future ER visits. Although the effect size was small, the low cost of limited asthma education makes this an appealing adjunct to therapy. It will be important to compare limited asthma education (information only) with self-management education in this setting to identify the relative costs and benefits of this intervention.

AUTHORS' CONCLUSIONS

Implications for practice

1. Limited asthma education programmes that provide information only do not significantly reduce hospitalisations, doctor visits or medication use in asthma but may play a role in improving patients perceptions of their symptoms.

2. Limited asthma education (information only) programmes reduce ER visits in high-risk adults.

Implications for research

To facilitate efficacious health care policy it is recommended that a comparison of the cost effectiveness of limited asthma education (information only) and more intensive self-management education programmes in Emergency Room be undertaken.

It is recommended that further investigation be undertaken to address whether limited asthma education (information only) satisfies the stated needs of patients for information about their disease.

There are opportunities to design and test the effects of brief interventions based on health behaviour change theory.

To minimise bias it is recommended that future studies consider the following methodological issues:

1. use a blinded method to generate a random sequence and state the method used;

2. state method used to conceal allocation to intervention(s) and control groups;

3. blind outcome assessors and state how they were blinded; and

4. use an 'active control'.

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* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Aiolfi 1995

Methods	DESIGN: Randomised controlled trial: Stratified according to severity of asthma. METHOD OF RANDOMISATION: randomisation stated but not described. CONCEALMENT OF ALLOCATION: not stated OUTCOME ASSESSOR BLINDING: Outcome assessor blinding not specified. WITHDRAWAL/DROPOUTS: all subjects accounted for.
Participants	Eligible: 360 Randomised: 44 (Intervention 22, Control 22) Completed: 44 (Intervention 22, Control 22) Age: mean Intervention 37 yrs Control 37 yrs Sex: Male 19 (43%) Female 25 (57%) Asthma Diagnosis: Doctors Diagnosis, Objective Lung Function according to International Consensus Report. Recruitment: Outpatient Clinic Major exclusions Not stated Baseline FEV1 % pred. 7% of eligible group < 50% pred. 13% were 50%<65% pred; 27% 65%>80% pred. and 53% > 80% predicted. PEF Not stated, exacerbations Not stated.
Interventions	SETTING: Hospital outpatients department MODE: Interactive group education coupled with written summary of key issues at each session. CONTENT: Asthma, general aspects of the disease, prevention and self management. DURATION: 4 weeks x 2.5 hrs x 2 times per week [20 hours in total]
Outcomes	Knowledge, Hospitalisations, Urgent visits, Scheduled visits.
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement

Aiolfi 1995 *(Continued)*

Adequate sequence generation?	Unclear risk	Randomised controlled trial: Stratified according to severity of asthma.
Allocation concealment?	Unclear risk	Information not available

Bolton 1991

Methods	DESIGN: Randomised controlled trial: Blocked in groups of 4, 6 and 8 and stratified by site. METHOD OF RANDOMISATION: randomisation stated but not described. CONCEALMENT OF ALLOCATION: not stated OUTCOME ASSESSOR BLINDING: telephone interviewers performing follow-up were blinded to the subject's group membership. Outcome assessor blinding not specified. WITHDRAWAL/DROPOUTS: all subjects accounted for.
Participants	Eligible: 537 Randomised: 241 (Intervention 119, Control 122) Completed: 185 (Intervention 93, Control 92) Age: mean +/- SD (Intervention 38.7 +/- 15 yrs; Control 36.8 +/- 14 yrs) Sex: Male Intervention 34%, Control 34%. Asthma Diagnosis: by doctor in emergency room. Recruitment: Emergency Room Major exclusions (language or psychiatric barriers to class attendance) Baseline FEV1 Not stated; PEF Not stated, exacerbations Not stated.
Interventions	SETTING: 2 sites (possibly hospital sites) plus home to review handout and tape. MODE: Interactive and non-interactive CONTENT: Asthma, general aspects of the disease, prevention and self management. DURATION: 4.5 hours (3 x 1.5 hour group sessions conducted at 2 sites plus handouts and an audio cassette to review at home.)
Outcomes	Hospitalisations, ER visits, Exacerbations
Notes	Questions for the Author: ? Method of randomisation and concealment of allocation. Ford et al conducted an analysis of ethnic group for this study.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Adequate sequence generation?	Unclear risk	Randomised controlled trial: Blocked in groups of 4, 6 and 8 and stratified by site.
Allocation concealment?	Unclear risk	Information not available

Hilton 1986

Methods	DESIGN: Controlled Clinical Trial METHOD OF RANDOMISATION: allocated systematically in the order in which they were recruited. METHOD OF ALLOCATION CONCEALMENT: systematically allocated - not concealed. OUTCOME ASSESSOR BLINDING: unclear.

Hilton 1986 *(Continued)*

	WITHDRAWAL/DROPOUTS: all subjects accounted for.
Participants	Eligibility Criteria: 5-70 yrs, asthma diagnosis by GP, anti-asthma treatment given on at least two occasions in the past year, no other asthma patient in the family or household recruited to the study. Eligible:415 Randomised: 339 Completed: 274 Age: mean: Not specified; Range Not specified. Sex: Male / Female - not specified. Asthma Diagnosis: by General Practitioner. Recruitment: from 14 general practices in South and West London. Major exclusions: not specified Baseline FEV1 Not stated; PEF Not stated, Exacerbations Not stated.
Interventions	TYPE: Non-interactive SETTING for the intervention: home reading of a booklet MODE: Non-interactive booklet plus a treatment card listing their medications. CONTENT: General aspects of the disease process, prevention and self management.
Outcomes	ER visits, Wheeze, Nocturnal Asthma.
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Adequate sequence generation?	High risk	Allocated systematically in the order in which they were recruited.
Allocation concealment?	High risk	Investigatorss aware as to order of allocation

Huss 1992

Methods	DESIGN: Randomised Controlled Trial. METHOD OF RANDOMISATION: the word "random" stated ; method not stated. METHOD OF ALLOCATION CONCEALMENT: not described. OUTCOME ASSESSOR BLINDING: not stated. WITHDRAWAL/DROPOUTS: all randomised subjects accounted for.
Participants	Eligibility Criteria: Eligible: Not Specified Randomised: 52 - Intervention 26, Control 26 Completed: ? Age: mean: 44.1yrs; Range 18-75. Sex: Male / Female - 25 male / 27 Female. Asthma Diagnosis: Allergist using criteria by Norman. Recruitment: Allergy Clinic at a tertiary medical centre and an allergy practice. Major exclusions: not specified Baseline: FEV1 severity measured (mild, moderate, severe) but not stated on what basis.; PEF Not stated, Exacerbations Not stated.

Huss 1992 *(Continued)*

Interventions	Interactive computer education in addition to "conventional instruction" which was a 2 page handout about avoidance measures for reducing house dust mite. The control group received only the conventional instruction.
Outcomes	Use of rescue medication, Dust Mite Levels, Avoidance measures for Dust Mite, ASC - Asthma symptom checklist.
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Adequate sequence generation?	Unclear risk	Described as randomised; other information not available
Allocation concealment?	Unclear risk	Information not available

Jenkinson 1988

Methods	DESIGN: Randomised Controlled Trial METHOD OF RANDOMISATION: the word "random" stated ; method stated by author was alternation. METHOD OF ALLOCATION CONCEALMENT: not concealed - alternated. OUTCOME ASSESSOR BLINDING: not stated. WITHDRAWAL/DROPOUTS: all subjects accounted for.
Participants	Eligibility Criteria: Eligible: 306 Randomised: 206 - Book only 46, Tape only 46, Book and tape 44, Control 41 Completed: 177 Age: mean: not specified; Range 13-88yrs (in text) 3-49 yrs (according to author), 26 teenagers, 63 adults. Sex: Male / Female - 93 male / 84 Female. Asthma Diagnosis: Doctor (wheezing 20 days/yr) Recruitment: General Practice. Included: Other chest diseases. Major exclusions: smokers Baseline: FEV1: Not stated PEF Not stated Exacerbations Not stated.
Interventions	SETTING: Patient's home. MODE: Three interventions: 1. Booket alone, 2. Audiocassette alone (17 minutes each side), 3. Booklet and Tape. CONTENT: was same in book and tape. Included general information about the disease, prevention, medications and self management information.
Outcomes	Knowledge, Skills, GP visits, Use of rescue medication, Quality of Life, Other asthma drugs, disrupted days.
Notes	

Risk of bias

Jenkinson 1988 *(Continued)*

Bias	Authors' judgement	Support for judgement
Adequate sequence generation?	High risk	Alternate allocation
Allocation concealment?	High risk	Investigator aware as to order of allocation

Maiman 1979

Methods	DESIGN: Randomised factorial study of three types of intervention. METHOD OF RANDOMISATION: Control group were those who presented to emergency unit on the shifts that the "asthmatic" nurse wasn't on duty. Subjects were systematically assigned to the initial intervention on the basis of when the asthmatic nurse worked. Randomisation to sequential interventions not described. METHOD OF ALLOCATION CONCEALMENT: allocated to intervention groups or control on the basis of when the shift nurse worked thus not concealed. OUTCOME ASSESSOR BLINDING: unclear. WITHDRAWAL/DROPOUTS: not clearly described.
Participants	Eligibility Criteria: Eligible: 588 Randomised: 289 but control group excluded from analysis [44] Completed: Not specified Age: mean: 34.4years; Range 18-64 years Sex: Male / Female - 76.3% Female. Asthma Diagnosis: Doctor Recruitment: ER - exit - Johns Hopkins. Included: Major exclusions: 65yrs or older, chronic conditions with steroid therapy and patients admitted Baseline: based on number of ER visits for asthma in previous year. FEV1: Not stated PEF Not stated, Exacerbations Not stated.
Interventions	Intervention 1. Exit Interview with asthmatic nurse who identifies herself as asthmatic Exit Interview with asthmatic nurse who does not identify herself as asthmatic Exit interview with other ER nurse Intervention 2. Booklet Intervention 3. Another one to one interview Intervention 4. Follow-up phone call (not really included as an intervention but randomised to receive follow-up as authors thought it might impact upon results).
Outcomes	ER visits
Notes	Controls not reported. Questions for Authors: 1. Number of ER visits for the control group. 2. Number of ER visits for all interventions.

Risk of bias

Bias	Authors' judgement	Support for judgement

Maiman 1979 *(Continued)*

Adequate sequence generation?	High risk	Subjects were systematically assigned to the initial intervention on the basis of when the asthmatic nurse worked
Allocation concealment?	High risk	Investigator aware as to order of allocation

Moldofsky 1979

Methods	DESIGN: Randomised controlled trial METHOD OF RANDOMISATION: Random stated. Method not described. METHOD OF ALLOCATION CONCEALMENT: not described. OUTCOME ASSESSOR BLINDING: not stated. WITHDRAWAL/DROPOUTS: all subjects accounted for.
Participants	Eligible: ? Randomised: 79; Intervention= 40; Control = 39. Completed: 62 (Control = 31) Age: mean: (Control = 46 years, Intervention = 46 years); +/- 3 years (SEM) Sex: Male / Female - Intervention 15/16, Control 15/16 Asthma Diagnosis: Objective lung function Recruitment: Asthma Clinic Included: Not specified Major exclusions: Not specified Baseline: FEV1: Not stated PEF: Not stated, Exacerbations: Not stated.
Interventions	SETTING: Hospital TYPE: Non-Interactive MODE: Video CONTENT: General aspects of the disease process and prevention (unclear whether self management was taught)
Outcomes	Knowledge, Hospitalisation, ER visits, GP visits, FEV1, Rescue medication, Quality of Life (Personality / Attitudes), Days off work, Wheeze.
Notes	Duration of asthma C=16yrs, I = 18 years. Questions for Authors: 1. Was self management a component of the video?

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Adequate sequence generation?	Unclear risk	Described as randomised; other information not available
Allocation concealment?	Unclear risk	Information not available

Osman 1994

Methods	DESIGN: Randomised controlled trial (2x2x2 design) METHOD OF RANDOMISATION: Random stated. Method not described. METHOD OF ALLOCATION CONCEALMENT: not described.

Osman 1994 *(Continued)*

	OUTCOME ASSESSOR BLINDING: unclear WITHDRAWAL/DROPOUTS: not stated
Participants	Eligible: 801 (but only 285 randomised to the no-Peak Flow arm) Randomised: Intervention (Peak Flow) = 516; Control (no Peak flow)= 285. Intervention (Enhanced Education) = 397, Control = 404. Completed: Not specified Age: mean: Not specified ; Range Not specified Sex: Male / Female - Not Specified Asthma Diagnosis: Doctor's diagnosis Recruitment: Patients attending Chest Clinics Included: Reversibility of at least 20% - other not specified Major exclusions: Not specified Baseline: FEV1: Not stated PEF: Not stated Exacerbations: Not stated.
Interventions	Three interventions: 1. Integrated care vs clinic care 2. Peak flow vs no peak flow 3. Enhanced Education vs no enhanced education. 285 participants had either integrated or clinic care, no peak flow and enhanced or usual education. This is the group we are interested in.
Outcomes	Hospitalisation, GP Visits (Unscheduled), Use of rescue medication, Steroids (ICS & oral), Disrupted days (restricted activity), Nocturnal asthma.
Notes	Questions for Authors: 1. What was the method or randomisation & allocation concealment. 2. Were the outcome assessors blinded? 3. Were all drop-outs accounted for? 4. Outcomes data (mean & 95% CI) for each intervention and control arm.

Risk of bias

Bias	Authors' judgement	Support for judgement
Adequate sequence generation?	Unclear risk	Described as randomised; other information not available
Allocation concealment?	Unclear risk	Information not available

Ringsberg 1990

Methods	DESIGN: Randomised controlled trial METHOD OF RANDOMISATION: Random stated. Method not described. METHOD OF ALLOCATION CONCEALMENT: not described. OUTCOME ASSESSOR BLINDING: not stated. WITHDRAWAL/DROPOUTS: all subjects accounted for.
Participants	Eligible:121 Randomised: 38. Intervention = 20; Control = 18 Completed: 38 Age: mean: I = 49yrs; C = 45yrs ; Range I = 22-66yrs; C = 22-66yrs. Sex: Male / Female I = 7M, 13 F; C = 7M, 11 F. Asthma Diagnosis: Not stated - Implied Doctors Diagnosis

Ringsberg 1990 *(Continued)*

	Recruitment: Patients who had been hospitalised for asthma. Included: Not specified Major exclusions: Not specified Baseline: FEV1: I = 68% predicted; C = 69% predicted PEF: Not stated Exacerbations: Not stated.
Interventions	SETTING: Hospital TYPE: Interactive MODE: Group sessions DURATION: Met once per week for unknown number of weeks. CONTENT: General aspects of the disease process and prevention (unclear whether self management was taught)
Outcomes	Hospitalisation, ER visits, Unschedulled GP or Acute OP visits, Lung Function, Quality of Life (Nottinham Health Profile / The Mood Adjective Check List / QLQ in severe heart failure)
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Adequate sequence generation?	Unclear risk	Described as randomised; other information not available
Allocation concealment?	Unclear risk	Information not available

Sondergaard 1992

Methods	DESIGN: Randomised controlled trial METHOD OF RANDOMISATION: Random stated. Method not described. METHOD OF ALLOCATION CONCEALMENT: not stated. OUTCOME ASSESSOR BLINDING: not stated. WITHDRAWAL/DROPOUTS: all subjects accounted for.
Participants	Eligible: not stated Randomised: 62 Completed: 58 (Intervention 30, Control 28) Age: mean: (Intervention 43.8, Control 43.8) Range: Not specified Sex: Male/Female - not stated Asthma diagnosis: not stated Recruitment: not stated - probably hospital outpatients department Major exclusions: terminal care, cancer, AIDS or dementia. Baseline: FEV1 Not stated; PEF Not stated Exacerbations: Not stated
Interventions	SETTING: Hospital and home TYPE: Interactive MODE: Individual and group sessions Content: General aspects of the disease process, drug therapy, adverse effects, use of peak flow and inhaler technique

Sondergaard 1992 *(Continued)*

Outcomes	Physician visits/ phone calls, hospitalisation, days off work or school, quality of life, rescue medication, steroid use, physician costs, medication costs, lost earnings
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Adequate sequence generation?	Unclear risk	Described as randomised; other information not available
Allocation concealment?	Unclear risk	Information not available

Thapar 1994

Methods	DESIGN: Randomised Trial of two interventions METHOD OF RANDOMISATION: Random stated. Method used was alternation. METHOD OF ALLOCATION CONCEALMENT: allocated by receptionist blind to types of intervention. OUTCOME ASSESSOR BLINDING: Not blinded WITHDRAWAL/DROPOUTS: all subjects accounted for.
Participants	Eligible: 69 Randomised: 68. Intervention (group) = 34; intervention (individ) = 34 Completed: 68 Age: mean: 43 yrs Group mean 33 yrs Individual mean 36 yrs; Range: 4-78. Sex: Male / Female 33 M , 35 F. Asthma Diagnosis: Hospital Diagnosis or PEF variability or Clinical features and response to medication. Recruitment: patients who attended an asthma clinic run by a semi-rural practice. Included: Not specified Major exclusions: Not specified Baseline: used wheeziness over previous 4 weeks FEV1: PEF: 15% variability Exacerbations: Not stated.
Interventions	SETTING: Semi-rural practice which runs asthma clinics TYPE: Interactive MODE: Intervention 1 = group sessions, Intervention 2 = individual sessions DURATION: Group average 35 minutes plus 10-15 minute follow-up session. Individual average time 20 minutes per patient plus 5-10 min follow-up session. CONTENT: General aspects of the disease process, prevention and self management.
Outcomes	Knowledge, Hospitalisation, Compliance with medication, Self rated wheeziness scores (frequency).
Notes	Questions Answered by Author: 1. How was randomisation done? - Alternation 2. Were outcome assessors blinded? - No 3. There were only 3 under the age of 14yrs in each intervention. Is it possible to have outcomes data for adults alone? - No, data not available.

Risk of bias

Bias	Authors' judgement	Support for judgement

Thapar 1994 *(Continued)*

Adequate sequence generation?	High risk	Alternate allocation
Allocation concealment?	High risk	Investigator aware as to order of allocation

Wilson 1993

Methods	DESIGN: Randomised Controlled Trial - Blocked according to asthma severity. METHOD OF RANDOMISATON: Random stated. Method not described. METHOD OF ALLOCATION CONCEALMENT: Not Described. OUTCOME ASSESSOR BLINDING: not stated. WITHDRAWALS / DROPOUTS: not accounted for.
Participants	Eligible: 579 Randomised: 323 (at 5 months = 271) (at 12 months = 277) Completed: not described Age: (eligibility was 18 - 50 years) Overall mean: ? Group mean ? Individual mean ?; Information Only mean ? Range: ? (p566 "no significant difference with respect to gender, age, level of education, asthma severity. Sex: Male / Female - not stated - see above Asthma Diagnosis: Dr diagnosis and objective lung function Recruitment: Community: patients of the Kaiser Medical Centers in California. Included: Moderate - severe asthma, Dr's diagnosis. Major exclusions: Irreversible respiratory disease, emphysema, COPD. Baseline: recurrent wheeziness FEV1: >15% change PEF: 20% variability Exacerbations: History of recurrent episodes of wheezing and/or objective evidence of airflow obstruction during episodes and improved airflow when treated with a bronchodilator.
Interventions	SETTING: Asthma Clinics in California TYPE: Interactive x 2, non-interactive x 1 MODE: Intervention 1 = small group sessions plus handouts, Intervention 2 = individual sessions plus handouts, Intervention 3 = information only (this intervention only is reported in this review). DURATION: Small group = 4 x 90 minute sessions; individual = 3 to 5 x 45 minute meetings; information only = duration not applicable - 80 page workbook 17 brief chapters written at about 8th grade level. CONTENT: General aspects of the disease process, prevention and self management.
Outcomes	Relative Bother Rating 1 year vs enrolment, Relative number of symptomatic days 1 year vs enrolment, physician evaluation of asthma status (5 months vs enrolment and 1 year vs 5 months), reported change in physical activity 1 year vs enrolment, improvements in bedroom environment 1 year vs enrolment, improved MDI technique at 1 yr vs enrolment, acute visit rates, difference in acute visit rates
Notes	Questions for the Author: Method of randomisation, allocation concealment and blinding. Numbers in each intervention Mean age and age range - overall and for each of the intervention arms. Data for hospitalisations for each arm. If person did not complete, their data was extrapolated from existing data.

Risk of bias

Bias	Authors' judgement	Support for judgement
Adequate sequence generation?	Unclear risk	Described as randomised; other information not available

Wilson 1993 *(Continued)*

Allocation concealment?	Unclear risk	Information not available

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Abdulwadad 1997	Self Management Intevention - baseline data only
Abdulwadad 1999	Self Management Intervention
Allen 1995	Self Management Intervention
Amirav 1995	Not patient education
Ayres 1996	Self Management Intervention
Bailey 1990	Self Management Intervention
Bailey 1999	Self Management Intervention
Baldwin 1997	Self Management Intervention
Berg 1997	Self Management Intervention
Blixen 2001	Self Management Intervention
Boulet 1995	Retrospective Control Group
Brewin 1995	Self Management Intervention
Charlton 1990	Self Management Intervention
Cote 1997	Self Management Intervention
Cote 2001	Self Management Intervention
Cowie 1997	Self Management Intervention
Cox 1993	Not a patient education intervention. Patient rehabilitation.
de Oliveira 1999	Self Management Intervention
Erickson 1998	Not an RCT. Sample size too small
Gallefoss 1999	Self Management Intervention
Garret 1994	Self Management Intervention
George 1999	Self Management Intervention
Gergen 1995	Not an RCT or CCT
Ghosh 1998	Self Management Intervention

Study	Reason for exclusion
Graft 1991	Not an RCT or CCT.
Grainger-Rousseau	Not randomised. Children included. Mean age unknown
Grampian 1994	Self Management Intervention
Grampian 1994b	Not education intervention
Hausen 1999	Not an RCT
Hayward 1996	Self Management Intervention
Heard 1999	Self Management Intervention
Heringa 1987	Inappropriate outcomes
Hindi-Alexander 1987	Not RCT or CCT
Hoskins 1996	Self Management Intervention
Ignacio-Garcia 1995	Self Management Intervention
Jackevicius 1999	Inhaler technique
Janson-Bjerklie 1988	Not a patient education trial
Jones 1987	Inappropriate outcomes - focussed on compliance
Jones 1995	Self Management Intervention
Kauppinen 1998	Self Management Intervention
Kelso 1996	Retrospective control group
Klein 2001	Self Management Intervention
Knoell 1998	Self Management Intervention
Kotses 1995	Self Management Intervention
Kotses 1996	Self Management Intervention
Lahdensuo 1996	Self Management Intervention
LeBaron 1985	Not a patient education intervention
Legorreta 2000	Not an RCT
Levy 2000	Self Management Intervention
Lirsac 1991	Not a patient education intervention
Lopez-Vina 2000	Self Management Intervention
Maes 1988	Not randomised, sample size too small, unknown age, inappropriate outcomes.

Study	Reason for exclusion
Mayo 1990	Self management intervention
Moudgil 2000	Self Management Intervention
Muhlhauser 1991	Not an RCT or CCT
Mulloy 1996	Self Management Intervention
Neri 1996	Self Management Intervention
Perdomo-Ponce 1996	Not an RCT. Focus on allergic diseases and therapeutic compliance
Petro 1995	Not predominantly asthma
Premaratne 1999	Nurse education
Rydman 1999	Inhaler technique
Schott-Baer 1999	Self Management Intervention
Shields 1986	Self Management Intervention
Snyder 1987	Intervention too intensive
Sommaruga 1995	Self Management Intervention
Tougaard 1992	Self Management Intervention
Turner 1998	Self Management Intervention
Verver 1996	Not a patient education program (focus was inhaler technique).
White 1989	Not education intervention
Yoon 1993	Self Management Intervention
Zeiger 1991	Self Management Intervention

DATA AND ANALYSES

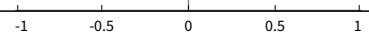
Comparison 1. Limited (Information Only) patient education vs Usual Care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Hospitalisations (av / pers / yr)	3	906	Mean Difference (IV, Fixed, 95% CI)	-0.03 [-0.09, 0.03]
2 ER Visits (av / pers / yr)	1	224	Mean Difference (IV, Fixed, 95% CI)	-2.76 [-4.34, -1.18]
3 Dr Visits (av / pers / yr)	5	1114	Mean Difference (IV, Fixed, 95% CI)	0.22 [-0.09, 0.52]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
4 Lung Function (FEV1)	1	62	Mean Difference (IV, Fixed, 95% CI)	0.20 [-0.35, 0.75]
5 Oral Corticosteroids (courses /pers /yr)	1	638	Mean Difference (IV, Fixed, 95% CI)	0.20 [-0.16, 0.56]
6 Oral corticosteroids (% using)	1	62	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.68 [0.25, 1.84]
7 Rescue Medication (no./ pers /yr)	1	638	Mean Difference (IV, Fixed, 95% CI)	0.30 [-0.78, 1.38]
8 Rescue Medication (% using)	1	62	Peto Odds Ratio (Peto, Fixed, 95% CI)	1.0 [0.26, 3.83]
9 Absence from work (times)	1	188	Mean Difference (IV, Fixed, 95% CI)	0.39 [0.01, 0.77]
10 Restricted Activity (d / pers /yr)	2	286	Mean Difference (IV, Fixed, 95% CI)	0.08 [-0.63, 0.78]
11 Symptomatic days	1	109	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.40 [0.18, 0.86]
12 Activity reduction (%)	1	125	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.58 [0.27, 1.24]
13 Asthma symptoms	2	298	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.44 [0.26, 0.74]
14 Knowledge of Drug Therapy	1	188	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.93 [0.52, 1.68]
15 Knowledge Overall	1	62	Mean Difference (IV, Fixed, 95% CI)	1.0 [-0.94, 2.94]

Analysis 1.1. Comparison 1 Limited (Information Only) patient education vs Usual Care, Outcome 1 Hospitalisations (av / pers / yr).

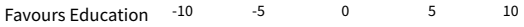
Study or subgroup	Education N	Education Mean(SD)	Usual Care N	Usual Care Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
Aiolfi 1995	22	0.1 (0.3)	22	0.1 (0.3)		10.52%	0[-0.17,0.17]
Bolton 1991	106	0.8 (2.4)	118	1.2 (2.4)		0.78%	-0.36[-0.99,0.27]
Osman 1994	315	0.2 (0.4)	323	0.2 (0.4)		88.7%	-0.03[-0.09,0.03]
Total ***	**443**		**463**			**100%**	**-0.03[-0.09,0.03]**
Heterogeneity: Tau^2=0; Chi^2=1.17, df=2(P=0.56); I^2=0%							
Test for overall effect: Z=1.04(P=0.3)							



Favours Education — Favours Usual Care

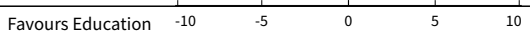
Analysis 1.2. Comparison 1 Limited (Information Only) patient education vs Usual Care, Outcome 2 ER Visits (av / pers / yr).

Study or subgroup	Education N	Education Mean(SD)	Usual Care N	Usual Care Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
Bolton 1991	106	1.9 (2.4)	118	4.7 (8.4)		100%	-2.76[-4.34,-1.18]
Total ***	**106**		**118**			**100%**	**-2.76[-4.34,-1.18]**
Heterogeneity: Not applicable							
Test for overall effect: Z=3.42(P=0)							



Analysis 1.3. Comparison 1 Limited (Information Only) patient education vs Usual Care, Outcome 3 Dr Visits (av / pers / yr).

Study or subgroup	Education N	Education Mean(SD)	Usual Care N	Usual Care Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
Aiolfi 1995	22	0.6 (0.9)	22	0.5 (0.7)		44.57%	0.09[-0.36,0.54]
Bolton 1991	106	7 (9.6)	118	5.5 (8.4)		1.62%	1.46[-0.91,3.83]
Moldofsky 1979	31	1.3 (3.3)	31	1.7 (3.3)		3.3%	-0.4[-2.06,1.26]
Osman 1994	315	3 (3.2)	323	2.7 (2.7)		43.09%	0.3[-0.16,0.76]
Wilson 1993	75	3.1 (3.5)	71	2.6 (3.4)		7.43%	0.5[-0.61,1.61]
Total ***	**549**		**565**			**100%**	**0.22[-0.09,0.52]**
Heterogeneity: Tau^2=0; Chi^2=2.26, df=4(P=0.69); I^2=0%							
Test for overall effect: Z=1.41(P=0.16)							

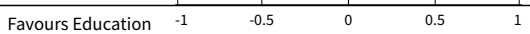


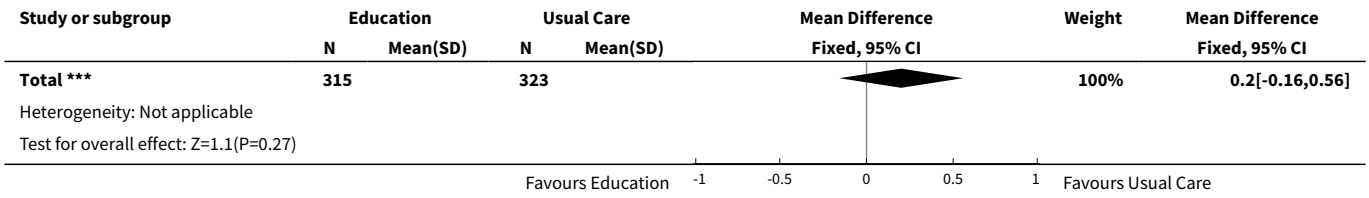
Analysis 1.4. Comparison 1 Limited (Information Only) patient education vs Usual Care, Outcome 4 Lung Function (FEV1).

Study or subgroup	Education N	Education Mean(SD)	Usual Care N	Usual Care Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
Moldofsky 1979	31	2.3 (1.1)	31	2.1 (1.1)		100%	0.2[-0.35,0.75]
Total ***	**31**		**31**			**100%**	**0.2[-0.35,0.75]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.72(P=0.47)							

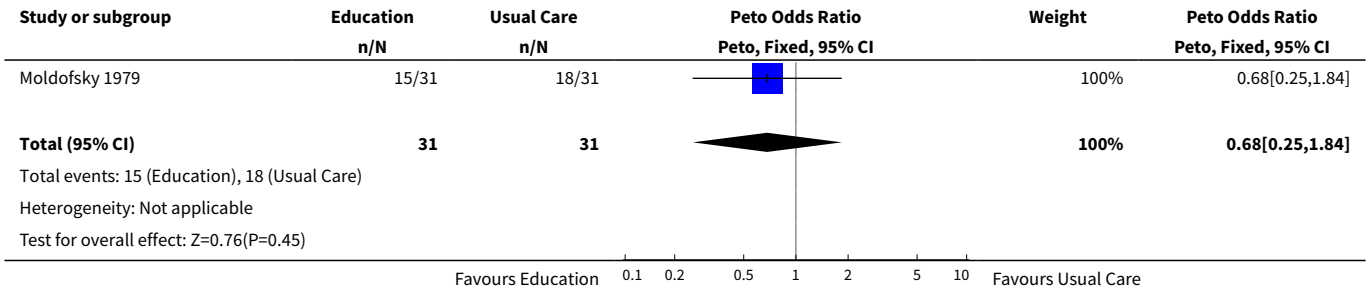
Analysis 1.5. Comparison 1 Limited (Information Only) patient education vs Usual Care, Outcome 5 Oral Corticosteroids (courses /pers /yr).

Study or subgroup	Education N	Education Mean(SD)	Usual Care N	Usual Care Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
Osman 1994	315	1.9 (2.3)	323	1.7 (2.3)		100%	0.2[-0.16,0.56]

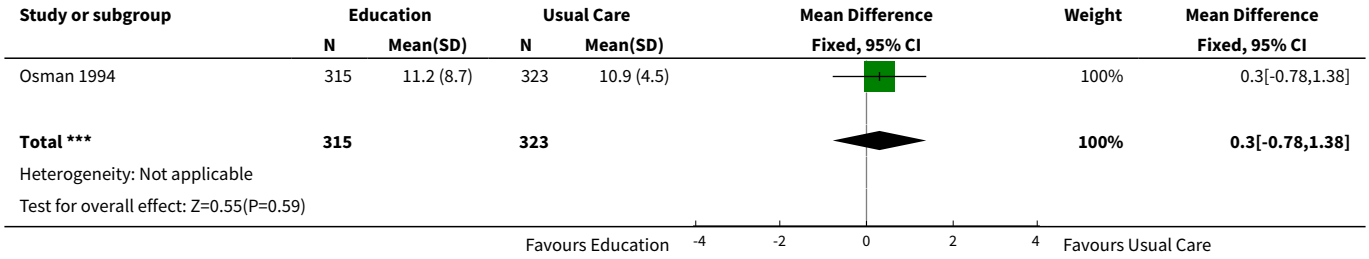




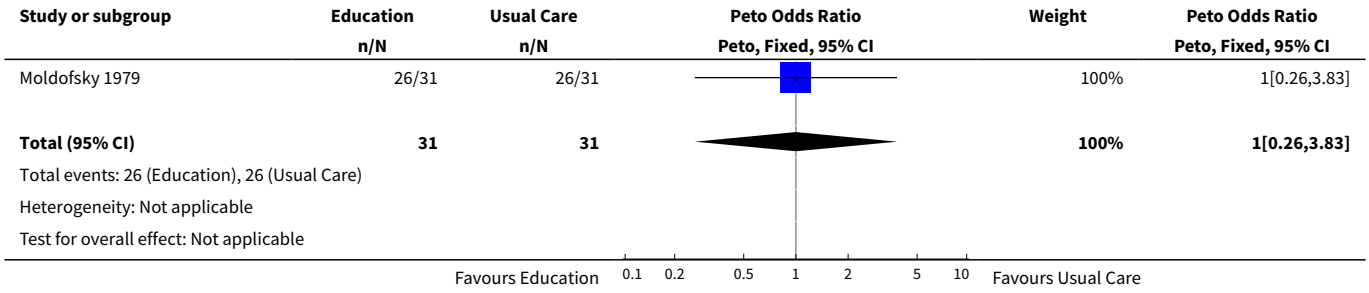
Analysis 1.6. Comparison 1 Limited (Information Only) patient education vs Usual Care, Outcome 6 Oral corticosteroids (% using).



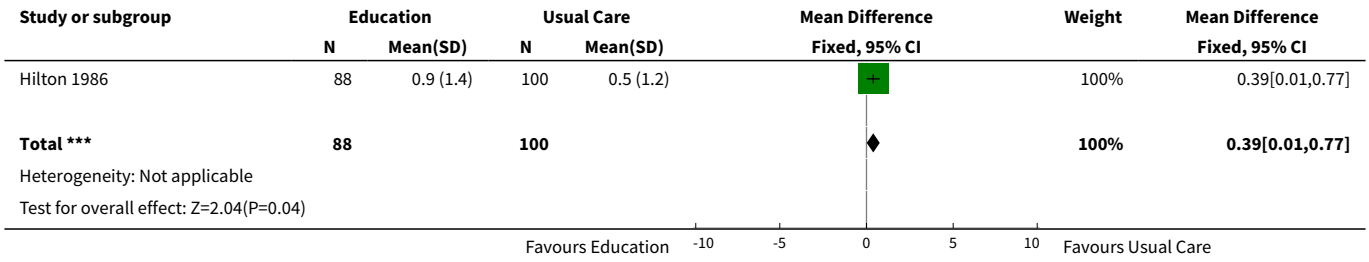
Analysis 1.7. Comparison 1 Limited (Information Only) patient education vs Usual Care, Outcome 7 Rescue Medication (no./pers /yr).



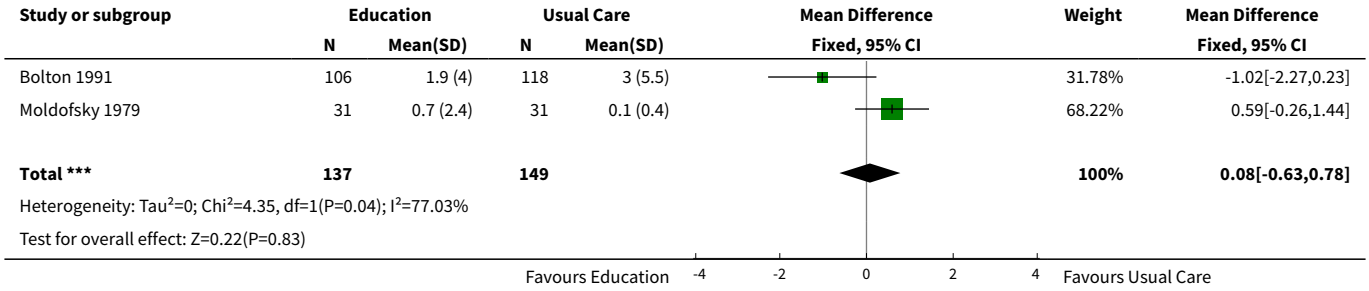
Analysis 1.8. Comparison 1 Limited (Information Only) patient education vs Usual Care, Outcome 8 Rescue Medication (% using).



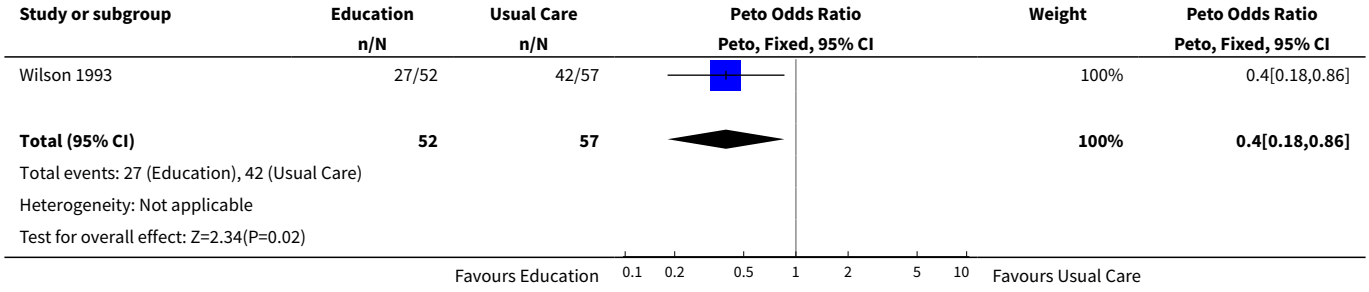
Analysis 1.9. Comparison 1 Limited (Information Only) patient education vs Usual Care, Outcome 9 Absence from work (times).



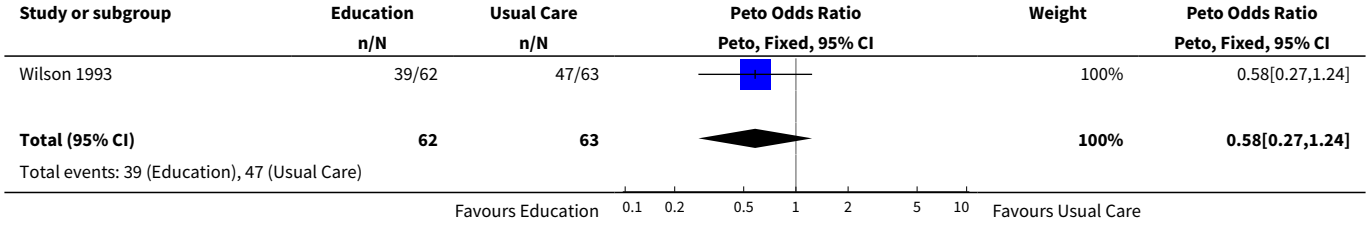
Analysis 1.10. Comparison 1 Limited (Information Only) patient education vs Usual Care, Outcome 10 Restricted Activity (d /pers /yr).

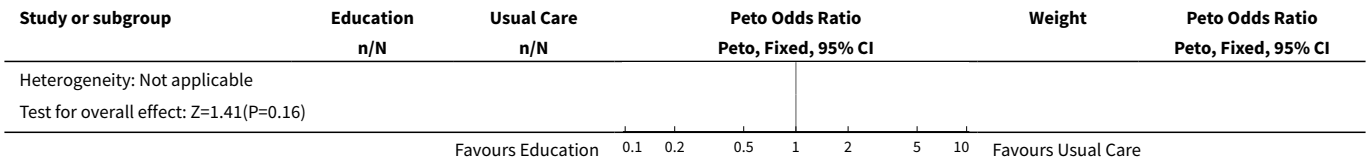


Analysis 1.11. Comparison 1 Limited (Information Only) patient education vs Usual Care, Outcome 11 Symptomatic days.

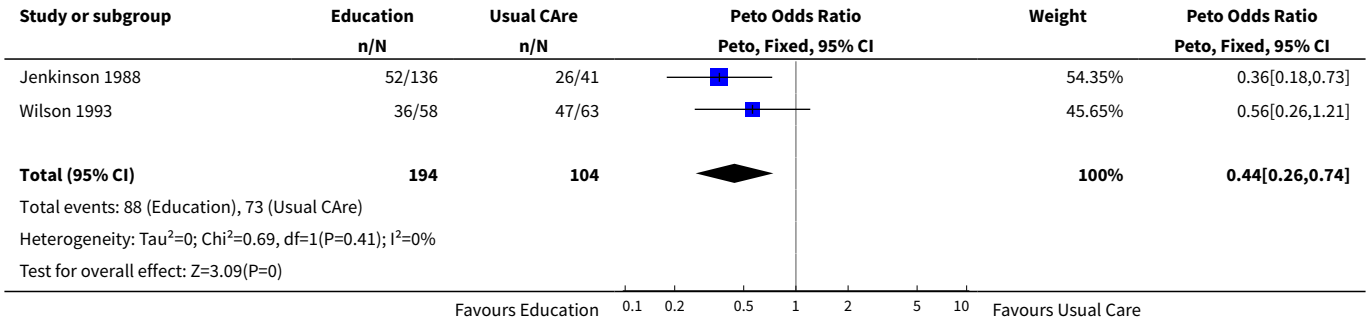


Analysis 1.12. Comparison 1 Limited (Information Only) patient education vs Usual Care, Outcome 12 Activity reduction (%).

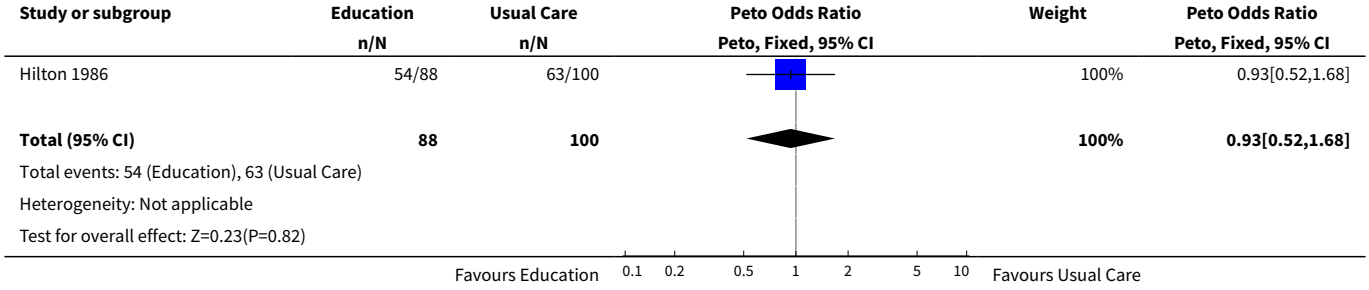




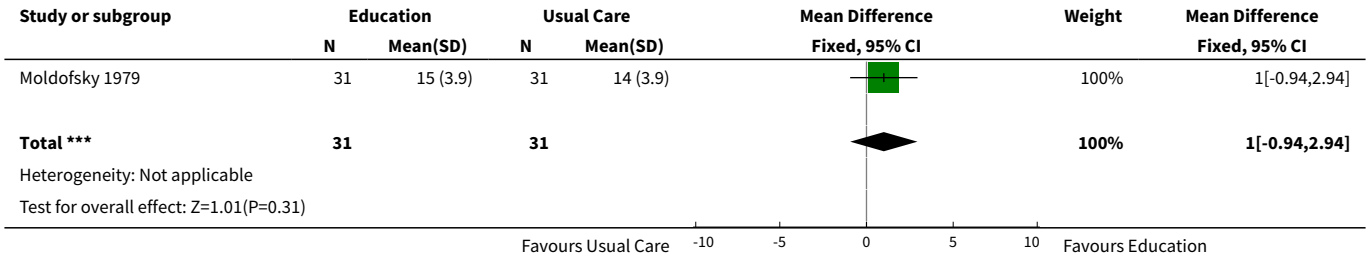
Analysis 1.13. Comparison 1 Limited (Information Only) patient education vs Usual Care, Outcome 13 Asthma symptoms.



Analysis 1.14. Comparison 1 Limited (Information Only) patient education vs Usual Care, Outcome 14 Knowledge of Drug Therapy.



Analysis 1.15. Comparison 1 Limited (Information Only) patient education vs Usual Care, Outcome 15 Knowledge Overall.



WHAT'S NEW

Date	Event	Description
1 August 2008	Amended	Converted to new review format.

HISTORY

Protocol first published: Issue 2, 1997
Review first published: Issue 2, 2000

Date	Event	Description
3 September 2001	New citation required and conclusions have changed	Substantive amendment

CONTRIBUTIONS OF AUTHORS

Gibson PG - instigator of the review and conceptual direction, inclusion/exclusion, quality assessment, data extraction, analysis and interpretation, writing and editing.
Powell H - responsible for review update, inclusion/exclusion, quality assessment, data extraction, analysis, interpretation and writing.
Roberts JL - inclusion/exclusion, quality assessment, data extraction, analysis, interpretation and writing.
Wilson A - inclusion/exclusion, quality assessment, data extraction and writing.
Hensley MJ - text review and intellectual direction and input.
Bauman A - input of some guiding principles particularly in regards to educational principles.
Abramson MJ - inclusion/exclusion, review of text and concepts.
Walters EH - academic input particularly with respect to educational concepts.

DECLARATIONS OF INTEREST

None declared.

SOURCES OF SUPPORT

Internal sources

- Hunter Area Health Service, NSW Health, Australia.

External sources

- Cooperative Research Centre for Asthma, Australia.
- Garfield Weston Foundation, UK.

INDEX TERMS

Medical Subject Headings (MeSH)

*Patient Education as Topic; Asthma [*therapy]; Treatment Outcome

MeSH check words

Adult; Humans