Self-management education for patients with chronic obstructive pulmonary disease (Review)

Effing T, Monninkhof EEM, van der Valk PP, Zielhuis GGA, Walters EH, van der Palen JJ, Zwerink M

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TABLE OF CONTENTS

[Intervention Review]

Self-management education for patients with chronic obstructive pulmonary disease

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ABSTRACT

Background

There is great interest in chronic obstructive pulmonary disease (COPD) and the associated large burden of disease. COPD is characterised by frequent day by day fluctuations, and repetitive clinical exacerbations are typical. Self-management is a term applied to educational programmes aimed at teaching skills needed to carry out medical regimens specific to the disease, guide health behaviour change, and provide emotional support for patients to control their disease and live functional lives. In COPD, the value of self-management education is not yet clear. The first Cochrane review about self-management was published in 2003. It was intended to shed light on the effectiveness of self-management programmes in COPD and the relative efficacy of their constitutive elements. No conclusions about the effectiveness of self-management could be drawn because of the large variation in outcome measures used in the limited number of included studies. This article describes the first update of this review.

Objectives

The objective of this review was to assess the settings, methods and efficacy of COPD self-management education programmes on health outcomes and use of health care services.

Search strategy

We searched the Cochrane Airways Group trial register, MEDLINE (January 1985 to January 2006), reference lists, and abstracts of medical conferences.

Selection criteria

Controlled trials (randomised and non-randomised) of self-management education in patients with COPD. Studies focusing mainly on pulmonary rehabilitation and studies without usual care as a control group were excluded.

Data collection and analysis

Two reviewers independently assessed study quality and extracted data. Investigators were contacted for additional information.

Main results

The reviewers included 15 group comparisons drawn from 14 trials. They assessed a broad-spectrum of interventions and health outcomes with different follow-up times. Meta-analyses could often not appropriately be performed because of heterogeneity among studies. The studies showed a significant reduction in the probability of at least one hospital admission among patients receiving self-management education compared to those receiving usual care (OR 0.64; 95% CI (0.47 to 0.89)). This translates into a one year NNT ranging from 10 (6 to 35) for patients with a 51% risk of exacerbation, to an NNT of 24 (16 to 80) for patients with a 13% risk of exacerbation. On the disease specific SGRQ, differences reached statistical significance at the 5% level on the total score (WMD -2.58; 95% CI (-5.14 to -0.02)) and impact domain (WMD -2.83; 95% CI (-5.65 to -0.02)), but these difference did not reach the clinically relevant improvement of 4 points. A small but significant reduction was detected in dyspnoea measured with the BORG-scale (WMD -0.53; 95% CI (-0.96 to -0.10)). No significant effects were found either in number of exacerbations, emergency department visits, lung function, exercise capacity, and days lost from work. Inconclusive results were observed in doctor and nurse visits, on symptoms other than dyspnoea, the use of courses of oral corticosteroids and antibiotics, and the use of rescue medication.

Authors' conclusions

It is likely that self-management education is associated with a reduction in hospital admissions with no indications for detrimental effects in other outcome parameters. This would in itself already be enough reason for recommending self-management education in COPD. However, because of heterogeneity in interventions, study populations, follow-up time, and outcome measures, data are still insufficient to formulate clear recommendations regarding the form and contents of self-management education programmes in COPD. There is an evident need for more large RCTs with a long-term follow-up, before more conclusions can be drawn.

PLAIN LANGUAGE SUMMARY

Self-management education for patients with chronic obstructive pulmonary disease

Chronic obstructive pulmonary disease (COPD) is characterised by frequent day by day fluctuations and repeated severe exacerbations are common. The idea of self-management is to teach patients the skills needed to carry out medical regimens specific to COPD, guide health behaviour change, and provide emotional support for patients to control their disease. It is not clear, however, what the influence of self-management education is in patients with COPD. The medical literature was systematically searched for studies assessing the effects of self-management education in COPD. Self-management reduces hospital admissions. However, because of heterogeneity in interventions, study populations, follow-up time, and outcome measures, data are still insufficient to formulate clear recommendations regarding the form and contents of self-management education programmes in COPD. There is an evident need for more large RCTs with a long-term follow-up, before more conclusions can be drawn.

BACKGROUND

Chronic Obstructive Pulmonary Disease (COPD) is a serious public health problem. According to the Global Burden of Disease study conducted under the auspices of the World Health Organization and the World Bank, COPD is currently the fourth leading cause of death in the world, with 2.75 million deaths worldwide and a further increase in mortality is predicted for the coming years (Annesi 2006). Since many patients with COPD exhibit progressive disability rather than immediate death, mortality data do not present a complete picture of the burden of COPD (Annesi 2006). In addition to the burden to healthcare systems, a loss in health-related quality of life is seen in many patients. Therefore, appropriate therapies are necessary to deal with this disease.

Self-management is a term applied to any formalized patient education programme aimed at teaching skills needed to carry out medical regimens specific to the disease, guide health behaviour change, and provide emotional support for patients to control their disease and live functional lives (Bourbeau 2003). However, the effects of self-management programmes are still unclear. Data

abstracted in the previous version of this review were insufficient to form recommendations (Monninkhof 2003).

In asthma, patient education and self-management programmes have proven to be successful, at least when combined with regular review, in reducing the economic burden of disease, as well as in improving quality of life and lung function (Lahdensuo 1996; Gallefoss 1999; Gibson 2000; Klein 2001). In COPD, pulmonary rehabilitation has been proven to increase exercise capacity, reduce symptoms, and improve quality of life (Lacasse 2006).

Worth 1996 was the first to describe the effectiveness of a self-management programme which encouraged the patient to acquire self-management skills and seek to alter behaviour. Unfortunately, this pilot study was uncontrolled and studied a small sample of COPD patients (N=21). Impressive reductions in the frequency of exacerbations and home visits by the family doctor were observed, but no changes in lung function were found. Several controlled trials have been conducted to evaluate the effectiveness of COPD self-management education programmes. The first Cochrane review was published in 2003. No conclusions about the effectiveness of self-management could be drawn because of the large variation in outcome measures used in the limited numbers of published studies. Several studies have been published since the appearance of this Cochrane review. This article describes the first update of the review. It assesses the influence of self-management programmes on health outcomes and health-care utilisation in COPD.

OBJECTIVES

I. To evaluate whether self-management education programmes in COPD lead to improved health outcomes.

II. To evaluate whether self-management education programmes in COPD lead to a reduction of health-care utilisation.

METHODS

Criteria for considering studies for this review

Types of studies

Only randomised controlled trials and controlled clinical trials assessing the efficacy of self-management education in COPD patients were included. Studies focusing mainly on pulmonary rehabilitation, studies that did not include usual care, and studies published before 1985 were excluded since medicinal treatment of COPD prior to 1985 is not comparable with current practice and as a result, baseline populations would not be comparable.

Types of participants

Patients with a clinical diagnosis of COPD and not asthma as primary diagnosis were included.

Types of interventions

The interventions were categorised according to whether or not they involved COPD education and/or self-treatment guidelines (i.e. an action plan). The operational definition of COPD education was defined as: a programme which transfers information about COPD and treatment of COPD in any of the following forms: written, verbal, visual or audio. Minimal education included the provision of written material alone or a short structured verbal interaction between a health-care provider and a patient. However, it had to be embedded in a formal programme where the primary goal was to improve the knowledge and understanding of COPD. The educational programme might be directed towards smoking cessation, improving exercise, nutrition, self-treatment of exacerbations, inhalation technique or coping with activities of daily living, or a combination of these.
Operational definition of self-treatment guidelines (action plan): a written plan produced for the purpose of patient self-management of COPD exacerbations. It informs patients about when and how to adjust and/or start medication in case of an exacerbation.

Types of outcome measures

Any of the following outcomes: health-related quality of life scores, symptom scores, number and severity of exacerbations, courses of oral steroids or antibiotics, use of rescue medication, hospital admissions, emergency room visits, use of other health care facilities, days lost from work, lung function, and exercise capacity.

Search methods for identification of studies

Trials were identified using the Cochrane Airways Group Specialised Register of trials, which is derived from systematic searches of bibliographic databases including the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE, CINAHL, AMED and PsycINFO, and hand searching of respiratory journals and meeting abstracts. All records in the Specialised Register coded as 'COPD' were searched using the following terms:
educat* or self-manag* or "self manag*" or self-car* or "self car*" or train* or instruct* or "patient cent*" or patient-cent* or patient-focus* or "patient focus*" or patient-education or "patient education" or "management plan*" or "management program*"
Searches are current to January 2006.

Data collection and analysis

Selection of studies

Two review authors (TE and EM) independently coded the studies from the above searches based on the abstract/keywords/ title:
1) Include: Randomised Controlled Trial (RCT) or Controlled Clinical Trial (CCT), COPD, education/self-management
2) Possible RCT or CCT, but undetermined from the abstract
3) Exclude: non-RCT or non-CCT, pulmonary rehabilitation
Study eligibility, study quality and intervention types were independently assessed by two investigators (TE and PV). Agreement was examined; disagreement was resolved if possible by consensus, and otherwise by consultation with a third reviewer (JP). Articles were included if they were randomised or controlled clinical trials of COPD education with usual care as a control group, and reported relevant outcomes.

Data extraction and management

We collected the following information on studies meeting the entry criteria of the review:

1. Demographics: age, gender, socio-economic status
2. Setting of intervention: primary care, hospital based, group education, individual education, community based
3. Involvement of the partner in the intervention
4. Duration of intervention: number of sessions, hours of teaching, time frame
5. Inclusion of physical exercise: type, location, duration
6. Sample size / power
7. Disease severity
8. Intermediate outcomes: COPD specific knowledge, skills, inhalation technique, smoking cessation, compliance

Numerical outcome data were extracted by one author and checked by a second.

Assessment of risk of bias in included studies

Two reviewers (TE and JP) independently assessed the methodological quality of the included studies using the criteria list of Jadad et al (Jadad 1996).
The quality variables recorded in the criteria list of Jadad were:
- procedure of allocation
- withdrawals/drop-outs
- blinding of patients and outcome assessment

We used the information gleaned from this process as a basis for judging the risk of bias for each domain. Since blinding is not possible for participants and investigators, we restricted the issue of blinding to outcome assessors.

Dealing with missing data

An attempt was made to contact authors to complete missing data. A reminder was sent if the authors did not reply.

Assessment of heterogeneity

Variation between study findings was explored using the I square statistical measurement (Higgins 2003). Where I square >20% we conducted a sensitivity analysis by pooling data with a random effects model.

Data synthesis

Outcomes were analysed as continuous and/or categorical variables using standard statistical techniques.
A) For continuous outcomes, the Weighted Mean Difference (WMD) or Standardised Mean Difference with 95% - confidence intervals were calculated as appropriate
B) For dichotomous outcomes, a pooled odds ratios (OR) was calculated. NNTs were calculated for hospital admission using the pooled OR, using the control group data from individual studies to give study -specific NNTs, with Visual Rx.
We combined data with a fixed effect model and 95% confidence intervals.
Subgroups of interest were length of follow-up (< or > 12 months), type of education given (written action plan).

RESULTS

Description of studies

See: Characteristics of included studies; Characteristics of excluded studies.
See: Characteristics of included studies.

Results of the search

Searches identified 700 titles and abstracts that were screened to identify 56 potentially relevant articles about self-management education in COPD. Full-text versions of these papers were obtained, and independently assessed by two reviewers (TE and PV). Six new trials were added to this review, giving a total of 15 group comparisons drawn from 14 trials which met the review entry criteria (Blake 1990; Bourbeau 2003; Boxall 2005; Cockcroft 1987; Coultas 2005a; Coultas 2005b; Emery 1998; Gallefoss 1999; Gourley 1998; Littlejohns 1991; Martin 2004; Monninkhof 2003; Rea 2004; Watson 1997). We also included one non-randomised study (Howland 1986).

Included studies

SUBJECTS / RECRUITMENT

A total of 2239 patients were randomised in the 14 studies; 1924 (85.9%) patients completed these studies. The drop out rates ranged from 0% to 30.4%. Seven studies recruited their patients from outpatient clinics; four from general practice, one from the community, and two studies recruited patients from a mix of these settings.

INTERVENTIONS

All fourteen studies described COPD self-management education compared with usual care. In four studies the education delivery mode consisted of group education; in nine of individual education and one study used written education material only. In six studies the use of an action plan for self-treatment of exacerbations was assessed. The follow-up time was 12 months in eight studies, 10 months in one, 6 months in three, 12 weeks in one, and 2 months in one study. One study also evaluated the outcome "hospital admissions" after 24-months (Bourbeau 2003).

COMPARISONS

Fourteen studies that compared self-management education with usual care have been included in this review. In one study (Coultas 2005a; Coultas 2005b) two intervention groups and one usual care group were used. In meta-analyses both intervention groups were compared with the same usual care group, resulting in one extra comparison.

OUTCOMES: Number of studies reporting outcome.

- health-related quality of life (HRQoL) (14)
- symptoms (5)
- number and severity of exacerbations (3)
- courses of oral steroids and/or antibiotics (5)
- use of rescue medication (1)
- hospital admissions (10)
- emergency room visits (5)
- use of other health-care facilities (7)
- days lost from work (2)
- lung function (6)
- exercise capacity (5)

MISSING DATA

Replies were received from all authors who are listed in the acknowledgement section. However, not all authors could provide us with the additional requested information.

Excluded studies

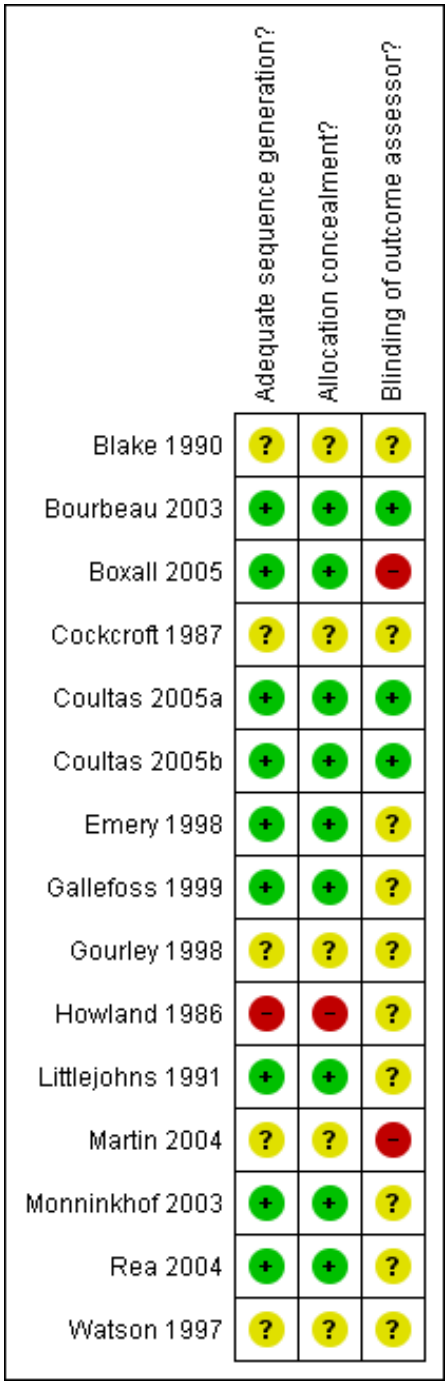
Thirty-six articles were excluded for the following reasons: the design of the study was not a CCT or RCT (n=15); the studies primarily focused on pulmonary rehabilitation (n=6); most of the patients had asthma as primary diagnosis (n=4); the design of the study did not include usual care as a control group (n=4); the article did not describe the results of the study (n=2); the studies were published before 1985 (n=2); the design of the study did not include an education part (n=1); the article described a review about the effects of physical activity (n=1); or the outcome assessed was not appropriate (n=1).

Risk of bias in included studies

Risk of bias items

Figure 1 presents our judgements for allocation and blinding of outcome assessor. Procedures for generating and concealing allocation were adequate in 10 studies (Bourbeau 2003; Boxall 2005; Coultas 2005a; Coultas 2005b; Emery 1998; Gallefoss 1999; Littlejohns 1991; Monninkhof 2003; Rea 2004). One study was not randomised (Howland 1986), and for the remaining four studies we could not determine how allocation had taken place.

Figure 1. Methodological quality summary: review authors' judgements about each methodological quality item for each included study.



Blinding of outcome assessor was described in three studies (Bourbeau 2003; Coultas 2005a; Coultas 2005b). In two studies investigators assessed outcomes (Boxall 2005; Martin 2004) and in the remaining studies we could not ascertain whether blinding of assessors had taken place.

Withdrawals and Jadad scores

A description of withdrawals and dropouts was given in 12 of the 14 studies. In a telephone call with the author of one of the studies in which the reasons for dropout were not described, it was emphasized that the dropouts in this study were non-selective (Coultas 2005a; Coultas 2005b).

Nine studies ((Gallefoss 1999; Emery 1998; Watson 1997; Littlejohns 1991; Blake 1990; Rea 2004; Monninkhof 2003; Bourbeau 2003; Boxall 2005) scored the maximum number of three quality points, four studies (Cockcroft 1987; Gourley 1998; Martin 2004; Coultas 2005a) two points and one study (Howland 1986) scored one point (Jadad 1996).

Effects of interventions

This recently updated review has been augmented with a summary of findings table, reflecting endpoints relating to quality of life, dyspnoea, exacerbations and healthcare use. This table was generated with GRADEpro software (Figure 2).

Figure 2. Summary of findings table for outcomes relating to quality of life, dyspnoea, exacerbations and healthcare use.

Self management for patients with chronic obstructive pulmonary disease

Patient or population: patients with chronic obstructive pulmonary disease
Settings: primary care, community, outpatient
Intervention: self management[1]
Comparision: usual care

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk **usual care**	Corresponding risk **self management**				
Quality of Life St George's Respiratory Questionnaire. Scale from: 0 to 100. (follow-up: 3 to 12 months)	The mean quality of life ranged across control groups from **38 to 60 points**	The mean quality of Life in the intervention groups was **2.58 lower** (5.14 to 0.02 lower)		698 (7)	⊕⊕⊕O **moderate**[2]	Lower score indicates better quality of life. A change of less than 4 points is not shown to be important to patients.
Dyspnoea Borg Scale. Scale from: 0 to 10. (follow-up: 3 to 6 months)	The mean dyspnoea ranged across control groups from **1.2 to 4.1 points**	The mean dyspnoea in the intervention groups was **0.53 lower** (0.96 to 0.1 lower)		144 (2)	⊕⊕OO **low**[3,4]	Lower score indicates improvement
Number and severity of exacerbations[5]	See comment	See comment	Not estimable[5]	591 (3)	See comment	Effect is uncertain
Respiratory-related hospital admissions (follow-up: 3 to 12 months)	**Low risk population**[6]		**OR 0.64** (0.47 to 0.89)	966 (8)	⊕⊕⊕O **moderate**[7]	
	10 per 100	**7 per 100** (5 to 9)				
	High risk population[6]					
	50 per 100	**39 per 100** (32 to 47)				
Emergency department visits for lung diseases (follow-up: 6 to 12 months)	The mean emergency department visits for lung diseases ranged across control groups from **0.2 to 0.7 visits per person per year**	The mean emergency department visits for lung diseases in the intervention groups was **0.1 higher** (0.2 lower to 0.3 higher)		328 (4)	⊕⊕⊕O **moderate**[4]	
Doctor and nurse visits (follow-up: 6 to 12 months)	The mean doctor and nurse visits ranged across control groups from **1 to 5 vists per person per year**	The mean doctor and nurse visits in the intervention groups was **0.02 higher** (1 lower to 1 higher)		629 (8)	⊕⊕⊕O **moderate**[8]	

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

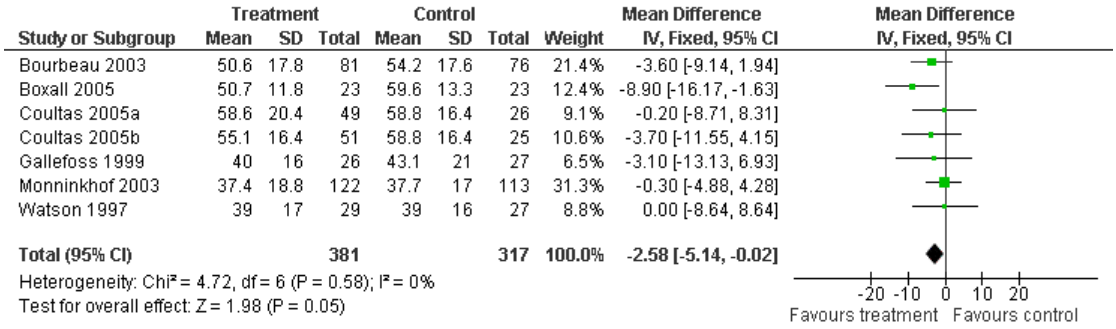
CI: Confidence interval; OR: Odds ratio;

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Health-related quality of life

Instruments for measurement of HRQoL differed widely among the studies. COPD-specific HRQoL was measured by means of the St. George's Respiratory Questionnaire (SGRQ) in seven studies (Watson 1997; Gallefoss 1999; Bourbeau 2003; Monninkhof 2003; Martin 2004; Boxall 2005; (Coultas 2005a; Coultas 2005b)). The SGRQ total and domain scores in the self-management groups were all lower (indicating a better HRQoL) or equal to the scores in the usual care groups. The differences on the SGRQ total (WMD -2.58; 95% CI (-5.14 to -0.02), Figure 3) and impact scores (WMD -2.83; 95% CI (-5.65 to -0.02)) reached statistical significance at the 5% level, but did not reach the clinically relevant improvement of 4 points. No significant or clinically relevant difference was found on the SGRQ-symptom score (WMD -1.45; 95% CI (-4.41 to 1.51)). The SGRQ-domain physical activity did not show a statistically significant effect in favour of treatment (WMD -2.88; 95% CI (-5.9 to 0.13)). The level of statistical heterogeneity for this outcome may be related to the outlying effect reported in Watson 1997, since its removal led to a lower I square statistic (65% versus 0%). Exploration of varying study characteristics may identify spurious differences since effect sizes from this study for other domains and total score did not yield high I square measurements. Martin 2004 could not be included in the meta-analyses due to a lack of required data. In this study, no differences in SGRQ-scores after 12 months of follow-up were found.

Figure 3. Forest plot of comparison: 1 Self-management versus control, outcome: 1.1 HRQOL: SGRQ total.



In Rea 2004 COPD-specific HRQoL was measured with the Chronic Respiratory Disease Questionnaire (CRQ). Two of the four dimensions, fatigue and mastery (sense of control over the disease), showed a significant improvement after a follow-up of twelve months. General HRQoL was measured with the Sickness Impact Profile (SIP) in three studies (Blake 1990; Littlejohns 1991; Emery 1998) and with the Short Form 36 (SF-36) health survey questionnaire in two studies (Rea 2004; Coultas 2005a). Data from the SIP were not suitable for meta-analysis and showed incongruent results. One study (Emery 1998) reported significant improvement in total function measured by the SIP in the control group. Conversely, another study (Blake 1990) showed better physical function and total function in favour of the intervention group, and the third study (Littlejohns 1991) showed a significant greater improvement in physical function in the intervention group. Meta-analyses were performed on data of the SF-36. No between-group differences in any domain were found. Other studies used the Health Status Questionnaire 2.0 (Gourley 1998), the General Health Questionnaire (Cockcroft 1987), the Illness Intrusiveness Instrument (Coultas 2005a), and a self de-

signed questionnaire (Howland 1986), to measure general health status. In the studies by Howland 1986 and Cockcroft 1987, general HRQoL was not significantly different between the self-management and control group. Gourley 1998 showed significantly improved scores for the well-being dimension of the Health Status Questionnaire 2.0 in the intervention group. Coultas 2005b found a statistically significant improvement in the perceived Illness Intrusiveness instrument in one of the intervention groups (nurse assisted collaborative management) compared with usual care. However, the author noted that the clinical relevance of this finding was uncertain.

Symptoms

The effect of self-management education on COPD symptoms was examined in five studies (Gourley 1998; Watson 1997; Bourbeau 2003; Monninkhof 2003; Boxall 2005). In the studies by Gourley 1998 and Boxall 2005, dyspnoea was assessed with the BORG-scale. Meta-analysis showed a small but significant effect at the 5% level in favour of treatment (WMD -0.53; 95% CI (-0.96 to -0.10)). In the study by Gourley 1998, the Global Assessment Scale (measuring symptom severity on a 6-point scale) was also used. It showed a reduction (not statistically significant) in symptom severity in the self-management education group, while in the control group no reduction was observed. In the study by Watson 1997, patients scored their respiratory status in symptom diaries on a four-point scale (usual; mild; moderate; severe). They found no significant between-group differences in the proportion of days rated as mild, moderate or severe. In the study by Monninkhof 2003, no significant between-group differences were seen in mean breathlessness and sputum production scores over two-week periods. However, small differences in mean cough and sputum colour scores were seen in favour of the intervention group. Although these differences reached borderline significance, the author stated that the differences were probably not clinically relevant. Finally, in the study by Bourbeau 2003, symptoms during exacerbations were scored (breathlessness, sputum volume and sputum colour), but no significant differences were found between the scores of the intervention and control group.

Number and severity of exacerbations

Three studies (Littlejohns 1991; Bourbeau 2003, Monninkhof 2003) reported the number of exacerbations. However, different definitions of exacerbations were used. Littlejohns 1991 reported only the number of acute exacerbations in the intervention group. The follow-up of the studies by Bourbeau 2003 and Monninkhof 2003 was 12 months. Whereas Bourbeau found 299 exacerbations in the intervention- and 362 exacerbations in the control group, Monninkhof found 360 exacerbations in the intervention- and 177 exacerbations in the control group.

Outcome measures such as courses of oral steroids and/or antibiotics, use of rescue medication, hospitalisations, and use of health care facilities can serve as proxy variables for exacerbations of COPD, because these variables indicate worsening of COPD.

Courses of oral steroids and/or antibiotics

Five studies assessed the use of oral corticosteroids for respiratory problems (Littlejohns 1991; Watson 1997; Gallefoss 1999; Martin 2004; Rea 2004). Three studies (Littlejohns 1991; Gallefoss 1999; Rea 2004) contributed data to the meta-analysis. Patients receiving self-management education were more likely to be prescribed at least one course of oral corticosteroids, but this was not statistically significant (OR 1.44; 95% CI (0.91 to 2.30)). Two studies (Littlejohns 1991; Gallefoss 1999) reported increased use of oral steroids in the intervention group (Gallefoss 1999: intervention group 69% - control group: 44%; Littlejohns 1991: intervention group 49% - control group 37%), while one study reported no difference between the two study groups (Rea 2004). Watson 1997 analysed from symptom diaries the days on prednisolone as percentage of the days recorded. The intervention group used prednisolone on 15% of the days recorded compared to 9% in the control group. In the study by Martin 2004, the frequency of oral prednisolone use was higher in the intervention group, but it did not reach significance (2.3 versus 1.3 courses per patient per 12 months).

Use of antibiotics for respiratory problems was assessed in four studies (Littlejohns 1991; Watson 1997; Martin 2004; Rea 2004). Littlejohns 1991 reported that 79% of the patients in the intervention group were prescribed antibiotics during the study year, compared to 52% in the control group. Watson 1997 analysed from symptom diaries the days on antibiotics as percentage of the days recorded. The intervention group used antibiotics on 10% of the days compared with 4% in the control group. Treatment differences in both studies were statistically significant. Two studies reported no significance difference in the use of antibiotics between the two study groups (Martin 2004; Rea 2004). Rea 2004 reported the difference between the pre trial period and the trial period in percentage of patients using antibiotics in both groups: intervention group: -1%; and control group: +2%, whereas Martin 2004 reported the courses per patient per year: intervention group 3.6 and control group 2.5.

Use of rescue medication

Gallefoss 1999 reported on the use of short-acting ß$_2$- agonists as rescue medication. Use of rescue medication was coded as the Defined Daily Dosages (DDD) for comparison of medications within the same chemical therapeutic group. In this study the educated patients used less rescue medication (median DDD =125) than the control group (median DDD=209). This reduction was statistically significant.

Hospital admissions

Ten studies reported COPD-related hospitalisations (Cockcroft 1987; Littlejohns 1991; Gourley 1998; Gallefoss 1999; Bourbeau 2003; Monninkhof 2003; Martin 2004; Rea 2004; Boxall 2005; (Coultas 2005a; Coultas 2005b)). Seven studies were included in the meta-analyses (Littlejohns 1991; Gallefoss 1999; Bourbeau 2003; Monninkhof 2003; Rea 2004; Boxall 2005; Coultas 2005a; Coultas 2005b). There was a clinically and statistically significant reduction of the probability of at least one hospital admission among patients receiving self-management education compared to those receiving regular care (OR 0.64; 95% CI (0.47 to 0.89), Figure 4). Study-specific NNTs were between 10 and 30, which indicated some variation in the baseline risk which may relate to length of follow-up and severity (see Table 1). Over the course of a year the NNT ranged from 10 (95% CI: 6 to 35) for patients with a 51% risk of exacerbation Figure 5, to an NNT of 24 (16 to 80) for patients with a 13% risk of exacerbation Figure 6.

Figure 4. Forest plot of comparison: 1 Self-management versus control, outcome: 1.16 Respiratory-related hospital admissions.

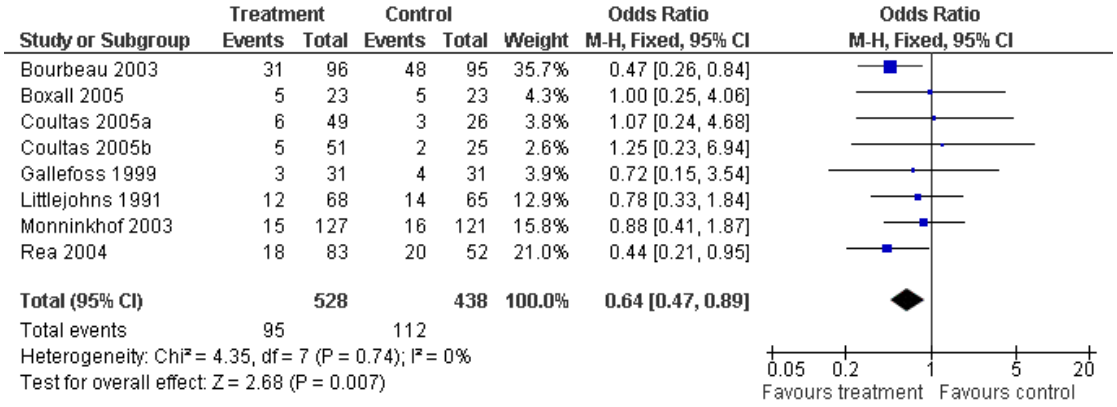


Figure 5. Ten high risk patients (51% risk of admission without treatment) treated with Self-management education prevented one hospital admission over one year

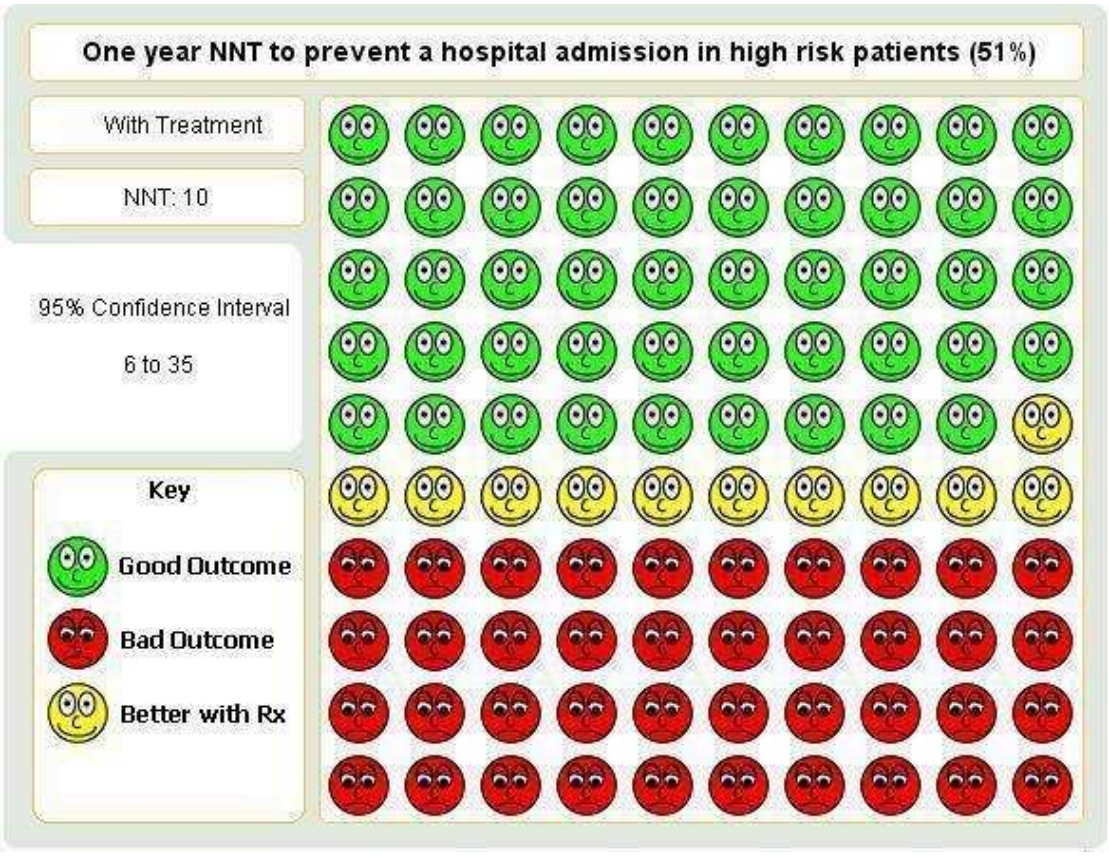


Figure 6. 24 low risk patients (13% risk of admission) treated with self-management education prevented one admission over one year

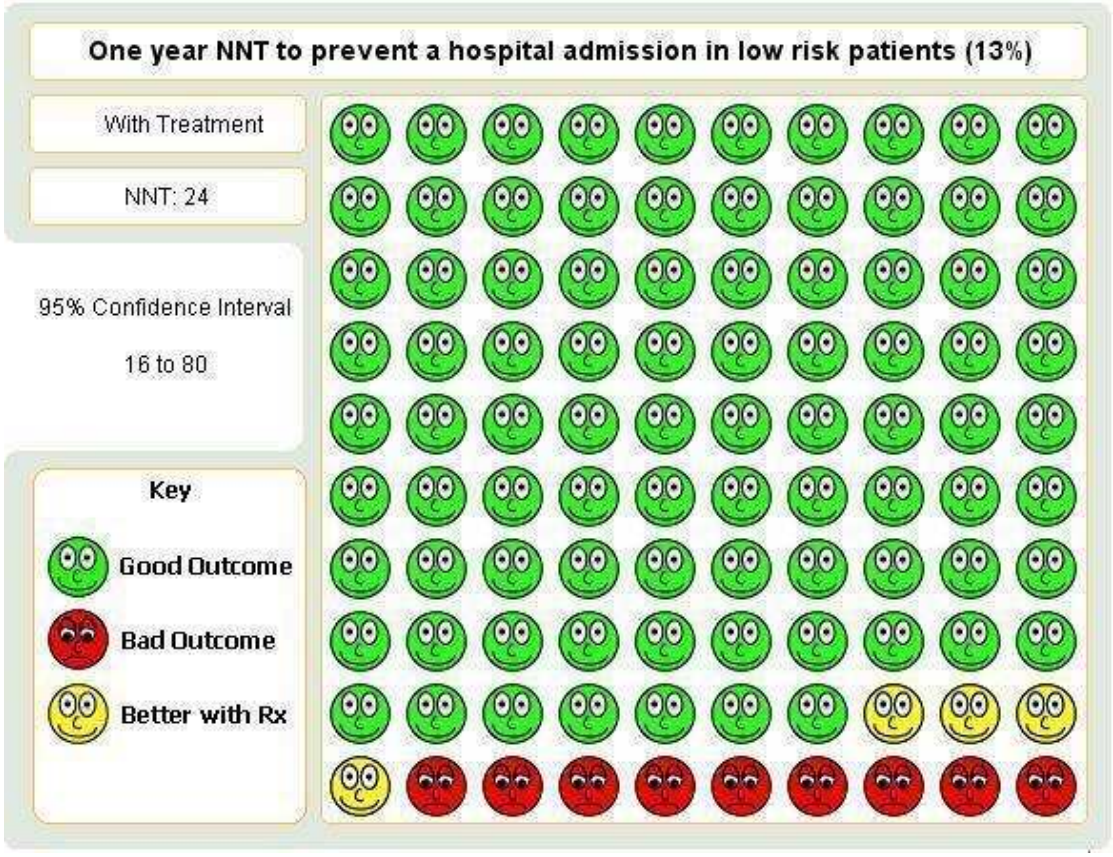


Table 1. NNTs and event rates for respiratory-related hospitalisations

Study ID	Control %	Duration	NNT
Bourbeau 2003	51	52	10 (6 to 35)
Boxall 2005	22	12	15 (10 to 52)
Coultas 2005a/b	10	24	30 (20 to 100)
Gallefoss 1999a	13	52	24 (16 to 80)
Littlejohns 1991	22	52	15 (10 to 52)
Monninkhof 2003	13	52	24 (16 to 80)
Rea 2004	38	52	11 (7 to 37)

Three studies could not be included in the meta-analyses due to a lack of required data (Cockcroft 1987; Gourley 1998; Martin 2004). In these three studies no statistically differences were found between the two study groups. In Martin 2004 more hospitalisations were seen in the intervention group (1.1 hospitalisation per patient per year in the intervention group and 0.7 hospitalisation per patient per year in the control group), whereas in the other two studies (Cockcroft 1987; Gourley 1998) no trend could be detected. The 24-month results on hospital admission (all causes) of the Bourbeau 2003 were presented in a subsequent trial publication. A statistically significant reduction of -0.44 hospitalisations per patient per year in favour of the self-management education group was reported.

Emergency room visits

Five trials (Gourley 1998; Bourbeau 2003; Martin 2004; Rea 2004; (Coultas 2005a; Coultas 2005b)) reported the effect of self-management education on Emergency Room (ER) visits related to COPD. In the study by Martin 2004, ambulance calls related to COPD were taken as a proxy for ER-visits. Three studies were included in the meta-analysis (Gourley 1998; Martin 2004; (Coultas 2005a; Coultas 2005b)).There was no significant difference between patients receiving self-management education compared to those receiving regular care in the average number of respiratory-related emergency room visits (WMD 0.07; 95% CI (-0.17 to 0.31)). There were conflicting findings between Bourbeau 2003 and Martin 2004 for all cause emergency-room visits, with a significant treatment effect in favour of self-management reported by Bourbeau 2003, and a significant treatment effect in favour of control by Martin 2004. Finally, in the study by Rea 2004, ER-visits not leading to hospital admissions were reported (intervention group n=5 (6.0%); control group n=7 (13.5%).

Use of other health care facilities

Doctor and nurse visits were reported in seven studies (Watson 1997; Gourley 1998; Gallefoss 1999; Bourbeau 2003; Monninkhof 2003; Martin 2004; (Coultas 2005a; Coultas 2005b)). Five studies were used in the meta-analysis (Watson 1997; Gourley 1998; Gallefoss 1999; Martin 2004; Coultas 2005a; Coultas 2005b). The meta-analysis showed only a trend towards a reduction of doctor and nurse visits per patient per year in the self-management group compared to usual care group with a Fixed Effect model (WMD -0.28; 95% CI (-0.66 to 0.09)). Due to the high level of heterogeneity in this outcome we applied Random Effects modelling as a sensitivity analysis. This gave a non-significant difference of 0.02 (95% CI -1.1 to 1.13). The studies by Bourbeau 2003 and Monninkhof 2003 could not be included in the meta-analysis because of lack standard deviations, but showed both a reduction in unscheduled doctor and nurse visits per person per year (Bourbeau 2003: mean difference -0.7; Monninkhof 2003: mean difference -0.39).

Days lost from work

Gallefoss 1999 reported no significant difference between groups in days lost from work. Almost 50% of the COPD-patients in this study were employed, and only three out of 14 and 2 out of 13 in the intervention and control group respectively, reported on absence from work. Blake 1990 and Monninkhof 2003 both used the term restricted activity days, defined as days where work was missed or where activities were significantly reduced because of health problems. In the study by Monninkhof a reduction in restricted activity days during exacerbation recovery was seen in the education group compared with the control group (average number of restricted activity days: intervention group 4.1 (SD 4.2); control group 5.3 (SD 5.3)). However, in neither study (Blake 1990; Monninkhof 2003) were significant between-group differences detected.

Lung function

Lung function was assessed as the forced expiratory volume in 1 second as percent predicted for age, gender and height (FEV1%-predicted). Six studies included in the meta-analysis (Littlejohns 1991; Watson 1997; Emery 1998; Gallefoss 1999; Bourbeau 2003; Rea 2004); five were entered as post-bronchodilator levels. One study (Littlejohns 1991) only reported mean within-group differences, so the results were entered as % change in predicted FEV1. No significant difference in deterioration of FEV1%-predicted was seen between the intervention and control groups (Standardised Mean Difference 0.04; 95% CI (-0.12 to 0.21)).

Exercise capacity

In five studies exercise capacity was evaluated (Littlejohns 1991; Bourbeau 2003; Monninkhof 2003; Boxall 2005; Rea 2004). In four studies, the 6 minutes walking test (6MWT) was used (Littlejohns 1991; Bourbeau 2003; Monninkhof 2003; Boxall 2005). Three studies were included in the meta-analysis (Bourbeau 2003; Monninkhof 2003; Boxall 2005). No significant between-group difference was found (WMD -6.25; 95% CI (-24.05 to 11.55), and significant heterogeneity between these studies was present (Chi Sq 8.97; P< 0.05). Because of a lack of standard deviations the study by Littlejohns 1991 could not be included in the meta-analysis. In this study no between-group difference was found. Finally, in the study by Rea (Rea 2005), the Incremental Shuttle Walk Test was used; the difference between the intervention (303.3 metres) and usual care group (283.4 metres) was not clinically relevant or statistically significant (Rea 2004).

DISCUSSION

This review systematically evaluated 15 treatment-control comparisons from 14 randomised trials of self-management education for patients with COPD compared to usual care as an update of our 2003 review. The studies showed a significant and clinically relevant reduction in the number of patients with one or more

hospital admissions and a small but significant reduction of the BORG-dyspnoea score was detected. For Quality of Life, a positive trend was seen. No effects were found in number of exacerbations, ER-visits, lung function, exercise capacity, and days lost from work. Inconclusive results were observed on symptoms other than dyspnoea, doctor and nurse visits, the use of courses of oral corticosteroids and antibiotics, and the use of rescue medication.

Positive effects of self-management education were detected on health care utilisation. Whereas a decrease in the number of patients with one or more hospital admissions and a reduction in doctor and nurse visits for lung disease were seen, an increase in the use of oral steroids and antibiotics was detected. However, only the reduction in hospital admission reached statistical significance. In the majority of the studies included in the meta-analyses, action plans for self-treatment of exacerbations were assessed. Self-management education including the use of action plans might possibly lead to more and better self-treatment of exacerbation with a perhaps quicker initiation of courses of prednisolone and antibiotics. By starting early treatment, this might explain the trend towards a reduction in unscheduled doctor and nurse visits and the severity of exacerbations. As a consequence, hospital admissions will decrease. However, it should be emphasized that in this review, apart from a reduction in hospitalisations, no more direct indications are found for a reduction of severe exacerbations by a self-management education programme. Subgroup analyses with regard to the use of action plans, could not be performed because of a lack of power. The effects of action plans have been considered in a Cochrane review (Turnock 2005). As in our review, evidence was seen of an increased use of courses of prednisolone and antibiotics. The authors concluded that the action plans aided the patients in recognising and responding to their exacerbations through the self-initiation of medication. However, because of insufficient data, clinical recommendations could not be drawn.

A significant improvement was seen in HRQoL. However, this improvement was too small to be clinically relevant. On the outcome "days lost from work" no effect was found. Because the age profile of many COPD-patients is relatively old, they represent a population which is generally retired, and as such this might not be a relevant outcome. Since in most COPD studies a minority of the patients undertake paid work, probably restricted activity days, indicating days in which the normal activities are impaired by the disease, would be a better outcome measure. Restricted activity days were used as an outcome in the studies by Blake 1990 and Monninkhof 2003, but no clinically relevant differences were found.

For lung function, we did not expect to find an effect of self-management education. The accelerated decline in pulmonary function in COPD-patients is very difficult to modify, even with maintenance pharmacotherapy (Yang 2007). Inconclusive results were also observed for COPD symptoms. Although no differences in symptoms of cough and sputum were seen, a small but significant reduction in dyspnoea was detected. Perhaps, education results in a reduction of fear of becoming short of breath during activities in daily life. As a result patients might experience less dyspnoea during activities. Self-management education did reduce the need for rescue medication, which supports the reduction in breathlessness. However, use of rescue medication was measured in only one study, so the evidence for this observation is weak.

Finally, exercise capacity did not change as a result of self-management. In all studies that reported exercise capacity as an outcome, an exercise programme was included in the intervention, although this was not often an obligatory component of the intervention. Thus it was not clear how many patients really participated in an exercise programme.

A reduction in hospitalisations by self-management education will probably positively influence the cost-effectiveness of self-management education programmes. Until now only two self-management studies (Bourbeau 2003; Monninkhof 2003) were evaluated with regard to cost-effectiveness, but only one (Bourbeau 2003) appeared to show that self-management programmes are cost-effective. Cost-effectiveness analyses should be performed alongside RCTs in the future. The review also identified a number of limitations in the current published literature that need to be considered:

1. The studies assessed a broad spectrum of outcome measures. Often meta-analyses could not be performed because included studies used different outcome measures or calculated the same outcome (e.g. ER-visits) in different ways (e.g. mean number of visits versus percentage of patients with ER-visits). Such lack of availability of data hampered statistical combination and therefore may have biased the estimates in the review. Furthermore, establishing disease-specific events was challenging. Doctor and nurse visits were described in seven articles, but only two studies presented the number of visits related to lung diseases. In the other studies no further specification of this outcome was provided. Efforts to obtain detailed event data from COPD studies are hampered in part by communication difficulties with study investigators, and partly because of the influence of co-morbidities which are clinically hard to distinguish. In this review, we have only presented disease-specific event-data when these were reported by the individual authors. In future studies, more clarity about the specification of this outcome should be strived for.

2. Variable follow-up. Eight studies followed patients for 12 months, whereas the follow-up of the other six ranged from 2 to 10 months. Because self-management education programmes are intended to achieve behavioural changes, differences in outcomes should still be measurable after a long-term follow-up. It would be very interesting to perform subgroup analyses with regard to follow-up time, however these could not be performed because of a lack of power.

3. The COPD-population was defined in varying detail, and stud-

ies used very diverse inclusion criteria. Three studies only included patients with a history of hospital admissions or frequent exacerbations (Cockcroft 1987; Bourbeau 2003; Martin 2004), whereas others included practically all patients with a diagnosis of COPD (Howland 1986; Gourley 1998). As a result, heterogeneity in disease severity was present. Because of a relatively small number of studies and a small overlap in outcome measures, subgroup analysis with regard to the severity of the population was not possible. The heterogeneity in the study population might possibly explain the contradictory results between specific studies (e.g. Bourbeau 2003 versus Monninkhof 2003).

4. There was variation in intervention. In addition to education, some studies added action plans and/or exercise programmes to the self-management programmes. The type and intensity of education also varied from group education, individual education, to written education material only. With regard to exercise programmes, extensive evidence is available that pulmonary rehabilitation is effective (Lacasse 2006) and there are also data that support the effectiveness of some out-patient exercise programmes (Chavannes 2002). However, the effects of exercise programmes within self-management programmes remain unclear. In four studies (Bourbeau 2003; Boxall 2005; Monninkhof 2003; Rea 2004) exercise programmes were included. These programmes did not (always) meet the standards of rehabilitation (e.g. proper structure, frequency and intensity of supervised training sessions) and non-participation was not a criterion for study withdrawal, which has implications for the consistency of treatment offered within treatment groups. Future studies have to be performed to achieve more clarity about the appropriate content of exercise programmes within self-management programmes. However the above mentioned factors should certainly be improved. Besides an improvement in physical condition, behavioural change with regard to exercise should also be an important goal. In our opinion the training period should be long enough to make the shift from exercising with the physiotherapists to exercising at home (at least six months), and home exercise sessions should become a part of the programme (next to the supervised sessions with the physiotherapist).

5. Studies were conducted over a period of 18 years, during which time changes in the educational content, the mode of delivery, and background therapy are likely to have occurred. In the last few years, improving self-management skills or behavioural change has become increasingly important. Whereas almost no attention was given to behavioural change in the older studies, four of the six studies (Bourbeau 2003; Monninkhof 2003; Coultas 2005a; Rea 2004) published in the last four years were clearly aimed at changing behaviour. Knowledge of the disease does not directly implicate behavioural change. In our opinion core-elements of behaviour change (e.g. enhancing self-efficacy expectations or social support) should be implemented in the self-management educational programmes. A theoretical model of behaviour and behavioural change, for example the ASE-model (Bandura 1986), can be very helpful in designing a self-management programme. Furthermore, experiences gained within existing programmes have to be used for designing new ones. Therefore, not only results of studies should be published, but solutions for logistic problems should also be described (e.g. the use of a case-manager in the study by Bourbeau 2003).

For future research it is important to create more homogeneity in the design of studies (follow-up period and outcome measures). Because the content of self-management changes over time, it may be wise to exclude the oldest studies about self-management in the next update of this review. Finally, the effectiveness of the components of self-management education programmes (i.e. education, action plans, exercise programmes) should also be evaluated.

We have shown that self-management education is associated with a reduction in hospital admissions with no indication for detrimental effects in other outcome parameters. This would in itself suffice to justify a recommendation of self-management education in COPD. However, due to heterogeneity in interventions, study populations, follow-up time, and outcome measures, data are still insufficient to formulate clear recommendations regarding the form and contents of self-management education programmes in COPD. There is an evident need for more large RCTs with a long-term follow-up of at least one year, before more conclusions can be drawn.

AUTHORS' CONCLUSIONS

Implications for practice

Self-management education is associated with improvement in quality of life (as measured by the SGRQ) and a reduction in hospital admissions with no indications of detrimental effects in other outcome parameters. However, because of heterogeneity in interventions, study populations, follow-up time, and outcome measures, data are still insufficient to formulate clear recommendations regarding the form and contents of self-management education programmes in COPD. Clear benchmarks need to be specified by authoritative bodies about outcome measures and length of such studies.

Implications for research

Future studies with sufficient sample size and longer follow-up time should focus on:

- acquisition of self-management skills and behavioural change
- the definition of the effective elements of self-management programmes

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J. Bourbeau (Bourbeau 2003)

H. Worth (Worth 1996)

D. Coultas (Coultas 2005a)

D. Taylor (Martin 2004)

H. Rea (Rea 2004)

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

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

Blake 1990

Methods	RCT. FUP=12 m control: usual care
Participants	Eligible:109 Randomised: 94 Completed: 83 Mean age: I: 63 (?) yrs C: 64 (?) yrs Sex (% male): I: 80% C: 82% Diagnosis COPD: respiratory symptoms + abnormal pulmonary function: - Daily cough and/or shortness of breath over the preceding six months - FEV1/VC < 75 % or FVC% pred < 75% Recruitment: outpatients Major exclusions: - FEV1%pred: ? - FEV1/VC: I: 46% C: 43%
Interventions	Mode: individual education + patient brochure + audiotape Content: stress management; relaxation exercise; meditation; guided imagery focusing on breathing; social and recreational activities; communication skills Duration: 1-4 hrs Action Plan: N
Outcomes	-Health status: - SIP - Hospital days - Bed-disability days - Restricted-activity days - Physician visits
Notes	-Follow-up data for 6 and 12 months -19% never smokers

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	Participants randomly assigned to intervention or control
Allocation concealment?	Unclear	The methods used to conceal the sequence of treatment group allocation were not available
Blinding of outcome assessor?	Unclear	We could not ascertain how and whether outcome assessors were blinded to treatment group assignment

Bourbeau 2003

Methods	RCT. FUP=12 m. Control: usual care
Participants	Eligible: 469 Randomised: 191 Completed: 175 Mean age: I: 69.4 (6.5) yrs; C: 69.6 (7.4) yrs Sex (% male): I: 52% C: 59% Stable COPD with at least one hospitalisation for an exacerbation in preceding year - Age =>50 yrs - packyrs => 10 - FEV1% pred (post): 25-70% - FEV1/VC < 70 Recruitment: outpatients Major exclusions: - no previous diagnosis of astma or left congestive heart failure, terminal disease, dementia, uncontrolled psychiatric disease. - no pulmonary rehab < 1 yrs ago - no long term facility stays
Interventions	Mode: Individual sessions by an experienced health professional at the patients' home. Content: COPD knowledge, breathing and coughing techniques, energy conservation during day-by-day activities, relaxation exercises, preventing and controlling symptoms through inhalation techniques, understanding and using plan of action for acute exacerbations, adopting a healthy lifestyle, leisure activities and travelling, a simple home exercise program, long term oxygen therapy when appropriate. Duration: 7-8 week * 1 hour; first two months weekly telephone calls, from then once a month a telephone call. Exercise evaluation (not mandory): + exercise teaching. Duration: 3 times a week for 30-45 minutes. Action Plan: Y
Outcomes	- Health status: - SGRQ - Exacerbations - Spirometry - FEV1 (L) - Forced vital capacity - Hospital admissions - Symptoms - Emergency room visits - Outpatients visits - Walking distance - 6MWT
Notes	- Gadoury 2005 presents 2 year data from the Bourbeau study. One outcome was analysed: hospital admissions all causes (I: n=91 en UC: n=84)

Risk of bias

Item	Authors' judgement	Description

Bourbeau 2003 (*Continued*)

Adequate sequence generation?	Yes	'...central computer-generated list of random numbers. Randomization was stratified per center and in blocks of 6, and patients were assigned to the self-management program (intervention group) or to usual care.'
Allocation concealment?	Yes	'The blocking factor was not known by the investigators or their staff in each participating center.'
Blinding of outcome assessor?	Yes	'...an independent evaluator unaware of the patient assignment was responsible for the evaluation process in each center. The evaluator was cautioned not to ask about the workbook modules and types of contact.'

Boxall 2005

Methods	RCT. FUP=12 weeks. Control: usual care
Participants	Eligible: not clear Randomised: 60 Completed: 46 Mean age: I: 77.6 (7.6) yrs; C: 75.8 (8.1) yrs Sex (% male): I: 47.8; C: 65.2. Diagnosis of COPD by a hospital respiratory specialist. - age > 60 years - FEV1% pred:? - FEV1/VC:? - dyspnoe or exertion - live locally - motivated to exercise daily unsupervised - stable for two weeks - functionally housebound Major exclusions: - attending outpatient based pulmonary rehabilitation - restricted shoulder movement - living in nursing home - previous lung volume surgery - pain limiting mobility
Interventions	Mode: Exercise program consisting of walking (level 1-10) and arm exercises (level 1-18) + education sessions. Content: Patients were required to carry out exercises once daily. Weekly physiotherapy sessions were scheduled for the first 6 weeks, and then fortnightly visits were made until week 12. Visits were used to monitor exercise performance, progress exercises, retest (6MWT), and provide encouragement to patients. Educational sessions at home were conducted for patients and carers by physiotherapists, occupational therapists and nurses. Those sessions covered: anatomy and physiology of the lungs, use of respiratory devices, medications, breathing techniques (during exercises), secretion removal techniques, energy conservation, use of adaptive aids, and stress management. Number of visits depended on: patients comprehension and skill acquisition (approximately 6 a week).

Boxall 2005 (*Continued*)

	Duration: not mentioned Frequency (mean): I: 10,8 (3,82); C: 7,0 (3,46) only measurements?? Action plan: N
Outcomes	- Health status: - SGRQ - Walking distance - 6 MWT - Hospital admissions - Average length of stay (days) - Dyspnoea - Borg scale
Notes	- Baseline characteristics are only given of the group patients who completed the 3-month follow-up period. - The intervention group began their program immediately, whereas the control group had a 12 week delay before commencing an identical program.

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Yes	'Patients were randomized to equal groups using computer-generated random numbers...'
Allocation concealment?	Yes	'...random numbers (...) were coded into opaque envelopes by a person independent from the study, they retained the envelopes until initial assessment was completed.'
Blinding of outcome assessor?	No	'Neither assessors nor participants were blinded to group assignment in this study.'

Cockcroft 1987

Methods	RCT. FUP=10 m. Control: usual care
Participants	Eligible: 92 Randomised: 75 Completed: 73 Mean age: I: 69 (?) yrs C: 71 (?) yrs Sex (% male): I: 69 C: 67 Diagnosis of COPD: all pts suffering from chronic respiratory disability that was caused mainly by chronic obstructive airways disease; at least admitted twice during previous 3 yrs. Recruitment: outpatients Major exclusions: disability not caused by a respiratory condition FEV1% pred:? FEV1/VC:?

Cockcroft 1987 (*Continued*)

Interventions	Mode: individual by home visits of a respiratory health worker Content: COPD knowledge; symptoms; coping behaviour Duration: about 10 hrs Action Plan: N
Outcomes	-Health Status -GHQ -Hospital admissions -Deaths -Knowledge about medication and condition -VAS-scales concerning physical and psychological aspects
Notes	

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	'Randomisation was stratified according to the number of admissions to hospital in the previous three years.'
Allocation concealment?	Unclear	The methods used to conceal the sequence of treatment group allocation were not available
Blinding of outcome assessor?	Unclear	'Patients were assessed twice (November 1984 and August 1985) by questionnaires administered by two doctors (JB and JA) who did not otherwise participate in the study.' We could not verify from this whether attempts were made to maintain blinding to treatment groups.

Coultas 2005a

Methods	RCT. FUP=6 m. Intervention MM versus intervention CM versus usual care (UC)
Participants	Eligible: 217 Randomised: 217 Completed: 151 Mean age: MM: 68.3 (6.6) yrs; CM: 70.1 (7.0) yrs; UC 68.8 (10.4) yrs Sex (% male): MM: 42.9; CM: 32.7; UC: 53.8 COPD related diagnosis code (International Classification of Diseases, Ninth revision: codes 491, 492, 496): - Age > 44 yrs - current or former smoker (at least 20 pack years) - at least 1 respiratory symptom (cough, shortness of breath, wheeze) during the past 12 months - FEV1% pred (pre or post?): < 80% - FEV1/VC (pre or post?) < 70 Recruitment: outpatients No exclusion criteria reported

Coultas 2005a (*Continued*)

Interventions	Mode: MM = nurse assisted medical management = enhance patient knowledge. CM: nurse assisted collaborative management = goals of MM + facilitating the adoption of healthy behaviour including life style and self-management skills. Content: MM: COPD, symptoms, optimal medical management, smoking cessation, action plan for worsening symptoms. Finally a letter was written to the patients GP describing the patient's status and suggestions of modifying management consistent with the GOLD guidelines. Duration (mean): MM: 124 min (7 sessions); CM: 207 min (8 sessions). Action plan: Y (not well described)
Outcomes	- Health status: - SGRQ - SF-36 - perceived illness intrusiveness - Doctor visits - ER visits - Hospital admissions
Notes	-Baseline characteristics are only given of the group patients who completed the 6-month follow-up period. - Drop-out percentages are high: MM: 32,0%; CM: 29,2 ; UC: 30,1% - Patients who dropped out of the study had a more severe airflow obstruction, higher levels of distress, and lower quality of life compares with the patients who completed the study. - Content of the interventions is not describes properly, whereas the training of the nurses who were providing the intervention was described in detail. - Outcome measures self-efficacy, social support, the BSI-18 and the CES-D score were measured but not reported in the article.

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Yes	'Patients were randomly assigned (...) using a computer-generated random list.'
Allocation concealment?	Yes	Investigators were unaware as to the order of treatment group assignment.
Blinding of outcome assessor?	Yes	'Health outcomes in the intervention groups were assessed at baseline and after the 6-month intervention by two different trained interviewers who were not involved in the interventions and were blinded to group assignments.'

Coultas 2005b

Methods	see Coultas 2005
Participants	see Coultas 2005
Interventions	see Coultas 2005
Outcomes	see Coultas 2005
Notes	see Coultas 2005

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Yes	'Patients were randomly assigned (...) using a computer-generated random list.'
Allocation concealment?	Yes	Investigators were unaware as to the order of treatment group assignment.
Blinding of outcome assessor?	Yes	'Health outcomes in the intervention groups were assessed at baseline and after the 6-month intervention by two different trained interviewers who were not involved in the interventions and were blinded to group assignments.'

Emery 1998

Methods	RCT. FUP= 2 m. Control: usual care
Participants	Eligible: 92 Randomised: 50 Completed: 49 Mean age: I: 67 (6) yrs C: 67 (6) yrs Sex (% male): I: 42 C: 48 Diagnosis of COPD: stable COPD; > 50 yrs; FEV1/VC<70;> 6 months clinical symptoms of COPD Recruitment: outpatients + GP-patients + advertisements + word of mouth Major exclusions: significant cardiac disease; other diseases affecting exercise tolerance or learning skills last 3 months; asthma without fixed obstruction FEV1%pred: I: 43 (18) C: 39 (16) FEV1/VC:?
Interventions	Mode: group education Content: COPD knowledge;therapy; coping; interpreting pulmonary function tests; understanding of arterial blood gases; stress management Duration: 26 hrs Action Plan: N

Emery 1998 (*Continued*)

Outcomes	-Health status - SIP - HRQoL-MHLC -Health knowledge test - FEV1%pred
Notes	The third arms was disregarded, because it was focused on pulmonary rehabilitation.

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Yes	'Group assignments were taken from a random number schedule...'
Allocation concealment?	Yes	'...printed on a piece of paper, and placed in a sealed envelope. Participants were not given the envelope containing their group assignment until after completing the baseline assessment, and technical staff conducting the assessments were not aware of group assignments.'
Blinding of outcome assessor?	Unclear	No information was available regarding the blinding of outcome assessors.

Gallefoss 1999

Methods	RCT. FUP=12 m. Control: usual care
Participants	Eligible: 68 Randomised: 62 Completed: 53 Mean age: I: 57 (9) yrs C: 58 (10) yrs Sex (% male): I:48 C: 52 Diagnosis of COPD: FEV1pred>= 40% and FEV1pred<80% Recruitment: outpatients Major exclusions: any serious disease FEV1%pred: I:59 (9) C: 56 (11) FEV1/VC: I: 55(9) C:52(10)
Interventions	Mode:patient brochure + group sessions Content:COPD knowledge; medication; symptoms; exacerbations; inhalation technique;smoking cessation; relaxation; coping Duration: max 6.5 hrs Action Plan: Y
Outcomes	-Health status -SGRQ -other HRQoL instruments

Gallefoss 1999 (*Continued*)

	-Hospital admissions -Days lost from work -GP-consultation -FEV1%pred
Notes	

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Yes	Participants '...randomized to an intervention group or a control group using random number tables.'
Allocation concealment?	Yes	Study investigators unaware as to order of treatment group assignment
Blinding of outcome assessor?	Unclear	We were unable to ascertain whether outcome assessment was made blind to treatment group assignment.

Gourley 1998

Methods	RCT. FUP= 6 m. Ccontrol: usual care
Participants	Eligible: 193 Randomised: 128 Completed: 98 Mean age: I: 69 (6) yrs C: 69 (9) yrs Sex (% male): I: 100 C:100 Diagnosis of COPD: COPD ATS criteria; at least one MDI; > 40 yrs Recruitment: outpatients Major exclusions: life expectancy < 6 months; hospitalisation or ER-visits during past 2 wks; lung infection past 2 wks; decompensated CHF class 3 or 4; other lung disease except for concomitant asthma FEV1%pred:? FEV1/VC:?
Interventions	Mode: individual verbal education Content: COPD knowledge; therapy; coping Duration: 3 hrs Action Plan: N
Outcomes	- Health status - HSQ2 - Patient satisfaction - Disease knowledge - Disease management knowledge -Control of disease

Gourley 1998 (*Continued*)

	-Symptoms -Hospital admissions -ER-visits -Use of other health care facilities
Notes	

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	Described as randomised; no other information available
Allocation concealment?	Unclear	Information not available
Blinding of outcome assessor?	Unclear	Information not available

Howland 1986

Methods	CCT FUP=12 m control: usual care
Participants	Eligible: 923 Randomised: 659 Completed: 538 Mean age: I: 59 (?) yrs C: 60 (?) yrs Sex (% male): I: 54% C: 51% Diagnosis COPD: presence of COAD; FEV1/FVC< 60% or between 60-70% with chronic symptoms of cough, wheezing or breathlessness Recruitment: community patients Major exclusions: - FEV1%pred: ? FEV1/VC: ?
Interventions	Mode:group education (one for the mildly and one for the severely impaired patients) Content: Severe group: COPD knowledge; nutrition; exercise; smoking cessation; Mild group: emphasized prevention and impairment oa smoking cessation, building and maintaining physical endurance and reducing stress Duration: Severe group=12 hrs ; Mild group = 6 hrs Action Plan: N
Outcomes	-Health status measured by a self designed questionnaire - FEV1%pred
Notes	- They assessed a severe and a mild group of patients

Risk of bias

Howland 1986 (*Continued*)

Item	Authors' judgement	Description
Adequate sequence generation?	No	Severity of COPD determined treatment group allocation
Allocation concealment?	No	Investigators likely to have known which treatment would be received.
Blinding of outcome assessor?	Unclear	Information not available

Littlejohns 1991

Methods	RCT. FUP= 12 m control: usual care
Participants	Eligible: 166 Randomised: 152 Completed: 133 Mean age: I: 63 (8) yrs C: 63 (7) yrs Sex (% male): I: 67 C: 63 Diagnosis of COPD: previously documented chronic airflow obstruction; 30-75 yrs; FEV1%pred < 60%; stable state Recruitment: outpatients Major exclusions: other major disease; change in medication at least six weeks before recruitment FEV1%pred: I: 45 (22) C: 50 (23) FEV1/VC:?
Interventions	Mode: individual by respiratory health worker Content: COPD knowledge; inhalation technique; impairment, disability and handicap Duration: ? Action Plan: N
Outcomes	-Health status - SIP -No. of exacerbations -Courses of oral steroids -Courses of antibiotics -Hospital admissions -FEV1%pred -Excercise capacity -6MW
Notes	

Risk of bias

Item	Authors' judgement	Description

Littlejohns 1991 (*Continued*)

Adequate sequence generation?	Yes	'Random numbers were generated by tables in permuted blocks of four stratified by age (55 years and above and below 55) and sex.'
Allocation concealment?	Yes	'The groups to which successive patients were to be allocated were noted in sealed, numbered envelopes, which were kept centrally. The physician recruiting a patient contacted the controller, who opened the appropriate envelope. The physician was aware which group the patient was in.'
Blinding of outcome assessor?	Unclear	No information on blinding of outcome assessors was available.

Martin 2004

Methods	RCT. FUP=12 m. Control: usual care
Participants	Eligible: ? Randomised: 96 Completed: 80 Mean age: I: 71.1 (range: 68.7-73.5); C: 69.1 (range: 63.5-74.7) Sex (% male): I: 34.1; C: 65.3 Diagnosis of COPD: moderate to severe (GOLD) - age > 35 yrs - at least 1 hospital admission or two acute exacerbations during last 2 months - Mini Mental State Examinations > 22 - FEV1% pred:? - FEV1/VC:? Major exclusion: - terminally ill - coexisting lung cancer - admission to hospital with cardiac disease within previous year - receiving home oxygen therapy
Interventions	Mode: Individualised care plan based on an interview between the patient and the respiratory nurse. Contents: Instructions regarding: - time of interventions such as inhaled / nebulized bronchodilator - corticosteroids and antibiotics in relation to the onset of deteriorating symptoms - use of oxygen and diuretics; - use of the care plan. The use of the plan was commenced at the time when each patient was in a stable condition. During the 12-month period all patients were visited by a respiratory nurse at the study start and after 3, 6, and 12 months. Duration of visits: ?

Martin 2004 (*Continued*)

	Action plan: Y
Outcomes	- Health status: - SGRQ - Utilisation of health care: - GP visits - Ambulance calls (interpreted as emergency department visits) - Hospital admissions - Medication: - Courses of oral steroids - Courses of antibiotics
Notes	

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	'Patients were randomly assigned to the intervention (care plan) or control (usual care) groups.'
Allocation concealment?	Unclear	Information not available
Blinding of outcome assessor?	No	Research nurse administered SGRQ at each visit

Monninkhof 2003

Methods	RCT. FUP= 12 m. Control: usual care
Participants	Eligible: 615 Randomised: 248 Completed: 236 Mean age: I: 65 (7) yrs C: 65 (7) yrs Sex (% male): I: 85% C: 84% Diagnosis of stable COPD (ATS). - Age 40-75 yrs - current or former smoker - FEV1% pred (pre): 25-80% - FEV1/VC (pre): < 60 - reversibility =< 12% pred - TLC > TLC pred (1.64*sd) Recruitment: outpatients Major exclusions: - no previous diagnosis of astma. - exacerbation in the months prior to inclusion - medical condition with low survival or serious psychiatric morbidity - any other lung disease - maintenance treatment of oral steroids or antibiotics

Monninkhof 2003 (*Continued*)

Interventions	Mode: group education by respiratory nurse. Content: COPD knowledge; inhalation technique; importance of exercise; relaxation; nutrition; coping with breathlessness; ergonomic posture and energy conservation during daily activities or work; communication and social relationships; guidelines for self-treatment for exacerbations (action plans). Duration: 5 * 2h A fitness program was aimed at coping with disease, recognising their individual capacity, social interactions and behavioural change. Duration 1-2 a week for 30-45 min. Action Plan: Y
Outcomes	-Health status - SGRQ - Euroqol - Self-confidence - Walking distance - 6 MWT - Exacerbations - Symptoms - Doctor consultations - Hospital admissions - Symptoms - Days lost from work
Notes	

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Yes	Computer-generated randomisation schedule.
Allocation concealment?	Yes	Central randomisation; study investigators were not aware as to the order of treatment group assignment.
Blinding of outcome assessor?	Unclear	Information not available

Rea 2004

Methods	RCT (cluster) FUP=12m. Control: usual care
Participants	Eligible: 158 Randomised: 135 Completed:117 Mean age of both groups: 68 yrs (range 44-84). Sex (% male) of the whole study populations: 41.5 A diagnosis of COPD by ICD-9-CM codes and GP-records for a clinical diagnosis of moderate to severe COPD. Major exclusions: - chronic asthma

Rea 2004 (*Continued*)

	- bronchiectasis - comorbidity more significant than COPD - unable to give informed consent - prognosis< 12 months, long term oxygen therapy or too unwell - deceased - no longer enrolled with GP-practice or moved out - unable to contact patient - insufficient practice nurse
Interventions	Mode: Timetable for regular maintenance checks and set achievable goals for lifestyle changes. Content: an action plan with detailing advice how to manage worsening symptoms, when to call the GP, and self-medication options decided by the GP. Information about smoking cessation and the use of inhalers was given. Annual influenza vaccination and attendance at a pulmonary rehabilitation program were recommended. Monthly visits with practice nurse, and 3-monthly with the GP. More visits were demanded if there was a worsening of the symptoms. Duration of visits: ? Action plans: Y
Outcomes	- Health status - SF-36 - CRQ - Walking distance - ISWT - Hospital admissions - Spirometry - FEV1 - Medication - courses of oral steroids - courses of antibiotics - Smoking cessation
Notes	Randomisation is done at the level of GP-practice, analysis performed at the level of patients.

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Yes	'Fifty-one eligible practices with 116 GPs were randomized, using a set of computer-generated random numbers...'
Allocation concealment?	Yes	Investogators not aware of order of treatment group assignment.
Blinding of outcome assessor?	Unclear	Information not available

Watson 1997

Methods	RCT. FUP= 6 m control: usual care
Participants	Eligible: 93 Randomised: 69 Completed: 56 Mean age: I: 68 (10) yrs C: 67 (8) yrs Sex (% male): I: 62 C: 67 Diagnosis of COPD: COPD (ATS criteria) as major limiting disease; smoking history > 10 pack years; FEV1%pred<65%; FEV1/VC < 70 %; bronchodilator therapy Recruitment: GP-patients Major exclusions: asthma (onset < 35 yrs) as primary diagnosis; cardiac disease as primary diagnosis, another functionally limiting disease (except cor pulmonale)affecting mortality FEV1%pred: I: 37 (14) C: 36 (16) FEV1/VC: I: 52 (25) C: 48 (15)
Interventions	Mode: action plan and patient brochure Content: COPD knowledge; exercise; smoking cessation; coping (controlling breathlessness); nutrition Duration: < 1 hr Action Plan: Y
Outcomes	-Health Status - SGRQ -Symptoms -GP-visits -Courses of prednisolone -Courses of antibiotics -FEV1%pred
Notes	

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	Described as randomised; no other information available
Allocation concealment?	Unclear	Information not available
Blinding of outcome assessor?	Unclear	Information not available

Coultas has three study groups: two intervention groups and one control group. To be able to do the analyses, two comparisons are made: UC-MM (=Coultas 2005a) and UC and CM (Coultas 2005b)

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

Ashikaga 1980	<1985; asthma + COPD
Brough 1982	< 1985; methodological flaws
Brundage 1993	No CCTor RCT
Carone 2002	No results
Carriei 2005	No usual care as a control group
Chavannes 2002	Review
De Assuncao 1999	No CCTor RCT; asthma
Devine 1996	No CCT or RCT: meta-analysis
Ferrari 2004	No CCT or RCT
Gallefoss 2000b	No adequate outcome
Garrod 1997	Abstract only; primarily focused on pulmonary rehabilitation;
Gibbons 2001a	No results
Gibbons 2001b	No CCTor RCT
Griffiths 2005	No results for solely COPD
Grosbois 1996	No CCT or RCT; pulmonary rehabilitation
Hausen 1998	No CCTor RCT; 76% asthma
Hausen 1999	No CCTor RCT
Janelli 1991	No CCT or RCT
Lorig 2003	No CCTor RCT
Macfarlane 2002	No results for solely COPD
Maltais 2005	No usual care as a control group
Muller 1996	No CCT or RCT; asthma + COPD group
Murphy 2005a	No education included in intervention

(*Continued*)

Murphy 2005b	No CCT or RCT
Nguyen 2005	No usual care as a control group
Pande 2005	No CCT or RCT
Ries 1995	Primarly focused on pulmonary rehabilitation
Sassi-Dambron 1995	No usual care group
Scherer 1996	No CCT or RCT
Scherer 1998	Primarly focused on pulmonary rehabilitation; no adequate outcome
Stulbarg 2002	No usual care a a control group
Toshima 1990	Primarly focused on pulmonary rehabilitation; the same article as refnr. 83
Tougaard 1992	About 90% were asthma patients
Tougaard 1993	The same article as refnr. 100
van den Broek 1995	Primarly focused on pulmonary rehabilitation
Wedzicha 1998	Primarly focused on pulmonary rehabilitation
Worth 1997	No CCT

DATA AND ANALYSES

Comparison 1. Self-management versus control

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 HRQOL: SGRQ total	7	698	Mean Difference (IV, Fixed, 95% CI)	-2.58 [-5.14, -0.02]
2 HRQOL: SGRQ symptoms	7	698	Mean Difference (IV, Fixed, 95% CI)	-1.45 [-4.41, 1.51]
3 HRQOL: SGRQ activity	7	698	Mean Difference (IV, Fixed, 95% CI)	-2.88 [-5.90, 0.13]
4 HRQOL: SGRQ impacts	7	698	Mean Difference (IV, Fixed, 95% CI)	-2.83 [-5.65, -0.02]
5 HRQOL: CRQ dyspnea	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
6 HRQOL: CRQ fatigue	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
7 HRQOL: CRQ emotional function	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
8 HRQOL: CRQ mastery	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
9 General HRQOL: SIP Total score	3	249	Mean Difference (IV, Fixed, 95% CI)	0.30 [-4.00, 4.60]
10 General HRQoL: SIP physical	2	201	Mean Difference (IV, Fixed, 95% CI)	Not estimable
11 General HRQoL : SIP psychosocial	2	201	Mean Difference (IV, Fixed, 95% CI)	Not estimable
12 HRQOL: SF-36 Total + domains	3		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
12.1 SF-36 - total	0	0	Mean Difference (IV, Fixed, 95% CI)	Not estimable
12.2 SF-36 - physical functioning	3	268	Mean Difference (IV, Fixed, 95% CI)	0.59 [-8.64, 9.83]
12.3 SF-36 - role limitations - physical	3	268	Mean Difference (IV, Fixed, 95% CI)	3.33 [-9.22, 15.87]
12.4 SF36 - bodily pain	3	268	Mean Difference (IV, Fixed, 95% CI)	8.91 [-2.49, 20.32]
12.5 SF-36 - social limitations	3	268	Mean Difference (IV, Fixed, 95% CI)	-1.90 [-13.70, 9.90]
12.6 SF-36 - mental health	3	268	Mean Difference (IV, Fixed, 95% CI)	0.01 [-7.70, 7.72]
12.7 SF-36 - role limitations - emotional	3	268	Mean Difference (IV, Fixed, 95% CI)	-4.64 [-17.79, 8.51]
12.8 SF-36 - vitality, energy, fatigue	3	268	Mean Difference (IV, Fixed, 95% CI)	4.21 [-4.19, 12.61]
12.9 SF-36 - general health	3	268	Mean Difference (IV, Fixed, 95% CI)	-0.70 [-9.73, 8.33]
13 Borg score dyspnoea	2	144	Mean Difference (IV, Fixed, 95% CI)	-0.53 [-0.96, -0.10]
14 Patients using at least one course of oral steroids	3	291	Odds Ratio (M-H, Fixed, 95% CI)	1.44 [0.91, 2.30]
15 Patients using at least one course of antibiotics	1		Odds Ratio (M-H, Fixed, 95% CI)	Totals not selected
16 Respiratory-related hospital admissions	8	966	Odds Ratio (M-H, Fixed, 95% CI)	0.64 [0.47, 0.89]
17 All cause hospital admissions	3	286	Odds Ratio (M-H, Fixed, 95% CI)	1.55 [0.87, 2.75]
18 Emergency department visits per person per year	5		Mean Difference (IV, Random, 95% CI)	Subtotals only
18.1 Emergency department visits per person per year (all causes)	2	280	Mean Difference (IV, Random, 95% CI)	0.37 [-1.97, 2.71]

18.2 Emergency department visits per person per year (lung diseases)	4	328	Mean Difference (IV, Random, 95% CI)	0.07 [-0.17, 0.31]
19 Doctor and nurse visits: mean number per person per year	8		Mean Difference (IV, Random, 95% CI)	Subtotals only
19.1 doctor and nurse visits: mean number per person per year	8	875	Mean Difference (IV, Random, 95% CI)	0.02 [-1.10, 1.13]
19.2 doctor and nurse visits: mean number per person per year (all)	1	88	Mean Difference (IV, Random, 95% CI)	4.0 [-0.51, 8.51]
20 Days lost from work: mean number per person per year	2	121	Mean Difference (IV, Fixed, 95% CI)	-17.5 [-50.05, 15.05]
21 Lung function: FEV1% pred	6	552	Std. Mean Difference (IV, Fixed, 95% CI)	0.04 [-0.12, 0.21]
22 Exercise capacity: 6MW	3	413	Mean Difference (IV, Fixed, 95% CI)	-6.25 [-24.05, 11.55]
23 Smokers (number of smokers)	1		Odds Ratio (M-H, Fixed, 95% CI)	Totals not selected

Comparison 2. Subgroup analyses

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Respiratory-related hospital admissions (subgroup by follow-up)	8		Odds Ratio (M-H, Fixed, 95% CI)	Subtotals only
1.1 <12 month follow-up	3	197	Odds Ratio (M-H, Fixed, 95% CI)	1.09 [0.45, 2.60]
1.2 >12 month follow-up	5	769	Odds Ratio (M-H, Fixed, 95% CI)	0.59 [0.42, 0.84]
2 Respiratory-related hospital admissions (subgroup by type of intervention)	8		Odds Ratio (M-H, Fixed, 95% CI)	Subtotals only
2.1 Action plan	6	787	Odds Ratio (M-H, Fixed, 95% CI)	0.60 [0.42, 0.86]
2.2 Other type of intervention	2	179	Odds Ratio (M-H, Fixed, 95% CI)	0.84 [0.40, 1.74]
3 doctor and nurse visits: mean number per person per year	6		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
3.1 Action plan	4	292	Mean Difference (IV, Fixed, 95% CI)	-0.34 [-1.49, 0.80]
3.2 Other type of intervention	2	144	Mean Difference (IV, Fixed, 95% CI)	-0.27 [-0.67, 0.12]

Analysis 1.1. Comparison 1 Self-management versus control, Outcome 1 HRQOL: SGRQ total.

Review: Self-management education for patients with chronic obstructive pulmonary disease

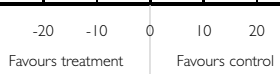
Comparison: 1 Self-management versus control

Outcome: 1 HRQOL: SGRQ total

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
Bourbeau 2003	81	50.6 (17.8)	76	54.2 (17.6)		21.4 %	-3.60 [-9.14, 1.94]
Boxall 2005	23	50.7 (11.8)	23	59.6 (13.3)		12.4 %	-8.90 [-16.17, -1.63]
Coultas 2005a	49	58.6 (20.4)	26	58.8 (16.4)		9.1 %	-0.20 [-8.71, 8.31]
Coultas 2005b	51	55.1 (16.4)	25	58.8 (16.4)		10.6 %	-3.70 [-11.55, 4.15]
Gallefoss 1999	26	40 (16)	27	43.1 (21)		6.5 %	-3.10 [-13.13, 6.93]
Monninkhof 2003	122	37.4 (18.8)	113	37.7 (17)		31.3 %	-0.30 [-4.88, 4.28]
Watson 1997	29	39 (17)	27	39 (16)		8.8 %	0.0 [-8.64, 8.64]
Total (95% CI)	**381**		**317**			**100.0 %**	**-2.58 [-5.14, -0.02]**

Heterogeneity: Chi^2 = 4.72, df = 6 (P = 0.58); I^2 =0.0%

Test for overall effect: Z = 1.98 (P = 0.048)



Analysis 1.2. Comparison 1 Self-management versus control, Outcome 2 HRQOL: SGRQ symptoms.

Review: Self-management education for patients with chronic obstructive pulmonary disease

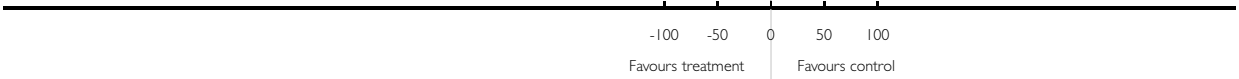
Comparison: 1 Self-management versus control

Outcome: 2 HRQOL: SGRQ symptoms

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
Bourbeau 2003	81	56.9 (20.9)	76	56.9 (18.7)		22.8 %	0.0 [-6.20, 6.20]
Boxall 2005	23	63.7 (18.9)	23	70.9 (19.3)		7.2 %	-7.20 [-18.24, 3.84]
Coultas 2005a	49	62.3 (16.7)	26	61.4 (16.5)		14.1 %	0.90 [-6.98, 8.78]
Coultas 2005b	51	59.8 (14.7)	25	61.4 (16.5)		15.1 %	-1.60 [-9.22, 6.02]
Gallefoss 1999	26	44.9 (21)	27	51.3 (22)		6.5 %	-6.40 [-17.98, 5.18]
Monninkhof 2003	122	46.1 (23.2)	113	47.3 (21.3)		27.1 %	-1.20 [-6.89, 4.49]
Watson 1997	29	58 (21)	27	59 (21)		7.2 %	-1.00 [-12.01, 10.01]
Total (95% CI)	**381**		**317**			**100.0 %**	**-1.45 [-4.41, 1.51]**

Heterogeneity: $Chi^2 = 2.31$, df = 6 (P = 0.89); $I^2 = 0.0\%$

Test for overall effect: Z = 0.96 (P = 0.34)



Analysis 1.3. Comparison 1 Self-management versus control, Outcome 3 HRQOL: SGRQ activity.

Review: Self-management education for patients with chronic obstructive pulmonary disease

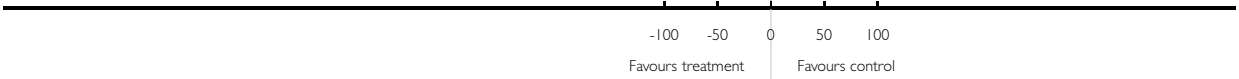
Comparison: 1 Self-management versus control

Outcome: 3 HRQOL: SGRQ activity

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
Bourbeau 2003	81	72.6 (19.3)	76	72.6 (19.5)		24.7 %	0.0 [-6.07, 6.07]
Boxall 2005	23	57.7 (12.8)	23	62.6 (15.4)		13.6 %	-4.90 [-13.08, 3.28]
Coultas 2005a	49	75.4 (20.6)	26	77.3 (18.3)		11.0 %	-1.90 [-11.00, 7.20]
Coultas 2005b	51	73.8 (18.3)	25	77.3 (18.3)		11.9 %	-3.50 [-12.26, 5.26]
Gallefoss 1999	26	53.2 (19)	27	50.9 (21)		7.8 %	2.30 [-8.47, 13.07]
Monninkhof 2003	122	51.4 (25.4)	113	52.3 (21.3)		25.5 %	-0.90 [-6.88, 5.08]
Watson 1997	29	23 (24)	27	51 (25)		5.5 %	-28.00 [-40.85, -15.15]
Total (95% CI)	**381**		**317**			**100.0 %**	**-2.88 [-5.90, 0.13]**

Heterogeneity: Chi^2 = 17.14, df = 6 (P = 0.01); I^2 =65%

Test for overall effect: Z = 1.87 (P = 0.061)



Analysis 1.4. Comparison 1 Self-management versus control, Outcome 4 HRQOL: SGRQ impacts.

Review: Self-management education for patients with chronic obstructive pulmonary disease

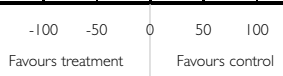
Comparison: 1 Self-management versus control

Outcome: 4 HRQOL: SGRQ impacts

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
Bourbeau 2003	81	36.1 (20.3)	76	42.8 (21.4)		18.6 %	-6.70 [-13.23, -0.17]
Boxall 2005	23	42.6 (17.1)	23	54.5 (17.6)		7.9 %	-11.90 [-21.93, -1.87]
Coultas 2005a	49	47.9 (25.3)	26	47.3 (19.3)		7.5 %	0.60 [-9.66, 10.86]
Coultas 2005b	51	43 (19.6)	25	47.3 (19.3)		9.2 %	-4.30 [-13.58, 4.98]
Gallefoss 1999	26	30.9 (18)	27	37.4 (24)		6.1 %	-6.50 [-17.89, 4.89]
Monninkhof 2003	122	26.4 (18.8)	113	25.8 (17)		37.9 %	0.60 [-3.98, 5.18]
Watson 1997	29	25 (15)	27	26 (15)		12.8 %	-1.00 [-8.86, 6.86]
Total (95% CI)	**381**		**317**			**100.0 %**	**-2.83 [-5.65, -0.02]**

Heterogeneity: Chi^2 = 7.78, df = 6 (P = 0.25); I^2 =23%

Test for overall effect: Z = 1.97 (P = 0.049)



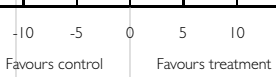
Analysis 1.5. Comparison 1 Self-management versus control, Outcome 5 HRQOL: CRQ dyspnea.

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 1 Self-management versus control

Outcome: 5 HRQOL: CRQ dyspnea

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
Rea 2004	71	18 (0)	46	16 (0)		0.0 [0.0, 0.0]



Analysis 1.6. Comparison 1 Self-management versus control, Outcome 6 HRQOL: CRQ fatigue.

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 1 Self-management versus control

Outcome: 6 HRQOL: CRQ fatigue

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
Rea 2004	71	17.7 (0)	46	15.7 (0)		0.0 [0.0, 0.0]

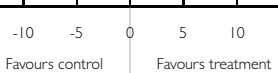
Analysis 1.7. Comparison 1 Self-management versus control, Outcome 7 HRQOL: CRQ emotional function.

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 1 Self-management versus control

Outcome: 7 HRQOL: CRQ emotional function

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
Rea 2004	71	36.8 (0)	46	33.1 (0)		0.0 [0.0, 0.0]



Analysis 1.8. Comparison 1 Self-management versus control, Outcome 8 HRQOL: CRQ mastery.

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 1 Self-management versus control

Outcome: 8 HRQOL: CRQ mastery

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
Rea 2004	71	21.4 (0)	46	20.7 (0)		0.0 [0.0, 0.0]

Analysis 1.9. Comparison 1 Self-management versus control, Outcome 9 General HRQOL: SIP Total score.

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 1 Self-management versus control

Outcome: 9 General HRQOL: SIP Total score

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
Blake 1990	32	9.8 (0)	36	15.9 (0)		0.0 [0.0, 0.0]
Emery 1998	23	10.7 (7.4)	25	10.4 (7.8)		0.30 [-4.00, 4.60]
Littlejohns 1991	68	8.77 (0)	65	7.6 (0)		0.0 [0.0, 0.0]
Total (95% CI)	**123**		**126**			**0.30 [-4.00, 4.60]**

Heterogeneity: Chi^2 = 0.0, df = 0 (P = 1.00); I^2 =0.0%

Test for overall effect: Z = 0.14 (P = 0.89)

Analysis 1.10. Comparison 1 Self-management versus control, Outcome 10 General HRQoL: SIP physical.

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 1 Self-management versus control

Outcome: 10 General HRQoL: SIP physical

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
Blake 1990	32	6.3 (0)	36	13 (0)		0.0 [0.0, 0.0]
Littlejohns 1991	68	1.57 (0)	65	3.45 (0)		0.0 [0.0, 0.0]
Total (95% CI)	**100**		**101**			**0.0 [0.0, 0.0]**

Heterogeneity: Chi² = 0.0, df = 0 (P<0.00001); I² =0.0%

Test for overall effect: Z = 0.0 (P < 0.00001)

Analysis 1.11. Comparison 1 Self-management versus control, Outcome 11 General HRQoL : SIP psychosocial.

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 1 Self-management versus control

Outcome: 11 General HRQoL : SIP psychosocial

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
Blake 1990	32	8.6 (0)	36	12 (0)		0.0 [0.0, 0.0]
Littlejohns 1991	68	7.42 (0)	65	5.82 (0)		0.0 [0.0, 0.0]
Total (95% CI)	**100**		**101**			**0.0 [0.0, 0.0]**

Heterogeneity: Chi² = 0.0, df = 0 (P<0.00001); I² =0.0%

Test for overall effect: Z = 0.0 (P < 0.00001)

Analysis 1.12. Comparison 1 Self-management versus control, Outcome 12 HRQOL: SF-36 Total + domains.

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 1 Self-management versus control

Outcome: 12 HRQOL: SF-36 Total + domains

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 SF-36 - total						
Subtotal (95% CI)	**0**		**0**			**0.0 [0.0, 0.0]**
Heterogeneity: not applicable						
Test for overall effect: not applicable						
2 SF-36 - physical functioning						
Coultas 2005a	49	25.3 (25.7)	26	28.7 (27.6)		-3.40 [-16.22, 9.42]
Coultas 2005b	51	33.6 (28.3)	25	28.7 (27.6)		4.90 [-8.42, 18.22]
Rea 2004	71	48.6 (0)	46	46.7 (0)		0.0 [0.0, 0.0]
Subtotal (95% CI)	**171**		**97**			**0.59 [-8.64, 9.83]**
Heterogeneity: Chi^2 = 0.77, df = 1 (P = 0.38); I^2 =0.0%						
Test for overall effect: Z = 0.13 (P = 0.90)						
3 SF-36 - role limitations - physical						
Coultas 2005a	49	34.3 (36.4)	26	31.5 (36.7)		2.80 [-14.60, 20.20]
Coultas 2005b	51	35.4 (40)	25	31.5 (36.7)		3.90 [-14.20, 22.00]
Rea 2004	71	43.4 (0)	46	35 (0)		0.0 [0.0, 0.0]
Subtotal (95% CI)	**171**		**97**			**3.33 [-9.22, 15.87]**
Heterogeneity: Chi^2 = 0.01, df = 1 (P = 0.93); I^2 =0.0%						
Test for overall effect: Z = 0.52 (P = 0.60)						
4 SF36 - bodily pain						
Coultas 2005a	49	54.4 (32.6)	26	46.6 (33.8)		7.80 [-8.08, 23.68]
Coultas 2005b	51	56.7 (35.1)	25	46.6 (33.8)		10.10 [-6.28, 26.48]
Rea 2004	71	59.5 (0)	46	65.1 (0)		0.0 [0.0, 0.0]
Subtotal (95% CI)	**171**		**97**			**8.91 [-2.49, 20.32]**
Heterogeneity: Chi^2 = 0.04, df = 1 (P = 0.84); I^2 =0.0%						
Test for overall effect: Z = 1.53 (P = 0.13)						
5 SF-36 - social limitations						
Coultas 2005a	49	70.8 (37.6)	26	70.3 (33.7)		0.50 [-16.19, 17.19]
Coultas 2005b	51	66 (37.1)	25	70.3 (33.7)		-4.30 [-20.98, 12.38]
Rea 2004	71	49.1 (0)	46	45.6 (0)		0.0 [0.0, 0.0]
Subtotal (95% CI)	**171**		**97**			**-1.90 [-13.70, 9.90]**
Heterogeneity: Chi^2 = 0.16, df = 1 (P = 0.69); I^2 =0.0%						

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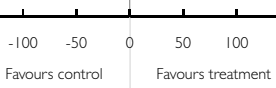
Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
Test for overall effect: Z = 0.32 (P = 0.75)						
6 SF-36 - mental health						
Coultas 2005a	49	69.7 (19.6)	26	71 (23.5)		-1.30 [-11.87, 9.27]
Coultas 2005b	51	72.5 (23.6)	25	71 (23.5)		1.50 [-9.76, 12.76]
Rea 2004	71	63.4 (0)	46	60.8 (0)		0.0 [0.0, 0.0]
Subtotal (95% CI)	**171**		**97**			**0.01 [-7.70, 7.72]**
Heterogeneity: Chi² = 0.13, df = 1 (P = 0.72); I² =0.0%						
Test for overall effect: Z = 0.00 (P = 1.0)						
7 SF-36 - role limitations - emotional						
Coultas 2005a	49	68.5 (40.1)	26	76 (38.7)		-7.50 [-26.14, 11.14]
Coultas 2005b	51	74.2 (39)	25	76 (38.7)		-1.80 [-20.37, 16.77]
Rea 2004	71	68.1 (0)	46	62 (0)		0.0 [0.0, 0.0]
Subtotal (95% CI)	**171**		**97**			**-4.64 [-17.79, 8.51]**
Heterogeneity: Chi² = 0.18, df = 1 (P = 0.67); I² =0.0%						
Test for overall effect: Z = 0.69 (P = 0.49)						
8 SF-36 - vitality, energy, fatigue						
Coultas 2005a	49	25.8 (27.4)	26	25.9 (24.4)		-0.10 [-12.22, 12.02]
Coultas 2005b	51	34.1 (24.3)	25	25.9 (24.4)		8.20 [-3.46, 19.86]
Rea 2004	71	57.2 (0)	46	57.9 (0)		0.0 [0.0, 0.0]
Subtotal (95% CI)	**171**		**97**			**4.21 [-4.19, 12.61]**
Heterogeneity: Chi² = 0.94, df = 1 (P = 0.33); I² =0.0%						
Test for overall effect: Z = 0.98 (P = 0.33)						
9 SF-36 - general health						
Coultas 2005a	49	40 (27.1)	26	40.6 (26.4)		-0.60 [-13.27, 12.07]
Coultas 2005b	51	39.8 (27.9)	25	40.6 (26.4)		-0.80 [-13.67, 12.07]
Rea 2004	71	56.5 (0)	46	54.5 (0)		0.0 [0.0, 0.0]
Subtotal (95% CI)	**171**		**97**			**-0.70 [-9.73, 8.33]**
Heterogeneity: Chi² = 0.00, df = 1 (P = 0.98); I² =0.0%						
Test for overall effect: Z = 0.15 (P = 0.88)						
Test for subgroup differences: Chi² = 3.66, df = 7 (P = 0.82), I² =0.0%						



Analysis 1.13. Comparison 1 Self-management versus control, Outcome 13 Borg score dyspnoea.

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 1 Self-management versus control

Outcome: 13 Borg score dyspnoea

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
Boxall 2005	23	3.2 (1.3)	23	4.1 (1.4)		30.0 %	-0.90 [-1.68, -0.12]
Gourley 1998	43	0.87 (1.1)	55	1.24 (1.48)		70.0 %	-0.37 [-0.88, 0.14]
Total (95% CI)	**66**		**78**			**100.0 %**	**-0.53 [-0.96, -0.10]**

Heterogeneity: Chi² = 1.24, df = 1 (P = 0.27); I² =19%

Test for overall effect: Z = 2.42 (P = 0.015)

Analysis 1.14. Comparison 1 Self-management versus control, Outcome 14 Patients using at least one course of oral steroids.

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 1 Self-management versus control

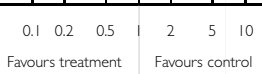
Outcome: 14 Patients using at least one course of oral steroids

Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H,Fixed,95% CI	Weight	Odds Ratio M-H,Fixed,95% CI
Gallefoss 1999	18/26	12/27		12.3 %	2.81 [0.91, 8.68]
Littlejohns 1991	33/68	24/65		42.9 %	1.61 [0.81, 3.22]
Rea 2004	30/63	21/42		44.8 %	0.91 [0.42, 1.99]
Total (95% CI)	**157**	**134**		**100.0 %**	**1.44 [0.91, 2.30]**

Total events: 81 (Treatment), 57 (Control)

Heterogeneity: Chi² = 2.79, df = 2 (P = 0.25); I² =28%

Test for overall effect: Z = 1.55 (P = 0.12)

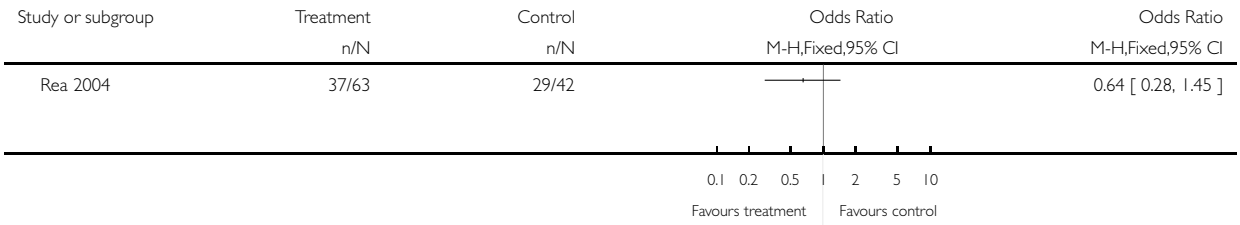


Analysis 1.15. Comparison 1 Self-management versus control, Outcome 15 Patients using at least one course of antibiotics.

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 1 Self-management versus control

Outcome: 15 Patients using at least one course of antibiotics

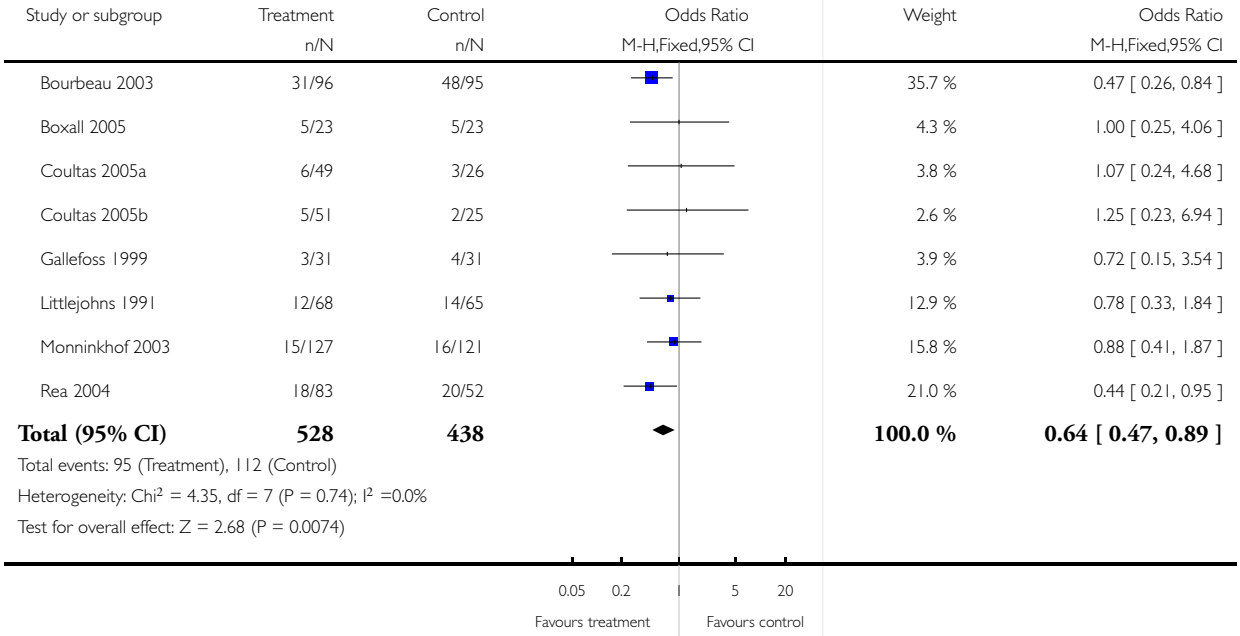


Analysis 1.16. Comparison 1 Self-management versus control, Outcome 16 Respiratory-related hospital admissions.

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 1 Self-management versus control

Outcome: 16 Respiratory-related hospital admissions

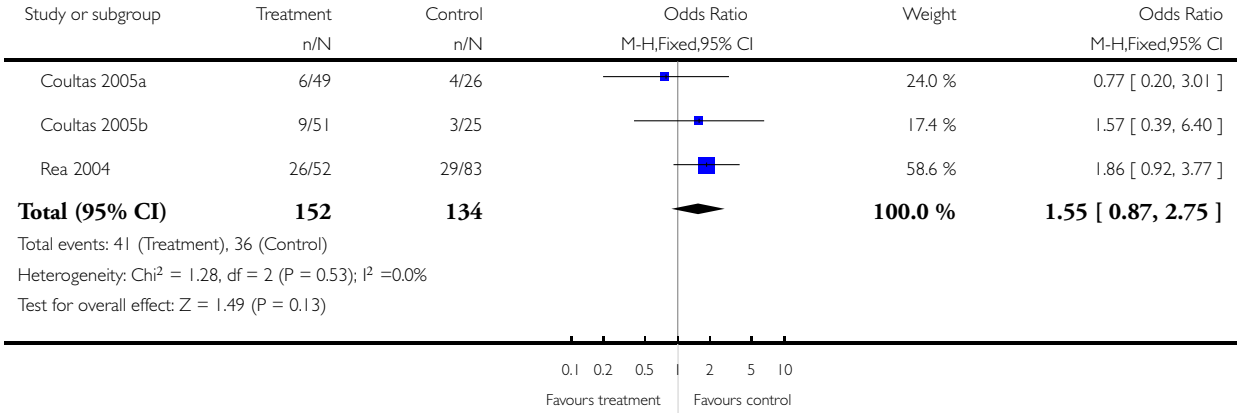


Analysis 1.17. Comparison 1 Self-management versus control, Outcome 17 All cause hospital admissions.

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 1 Self-management versus control

Outcome: 17 All cause hospital admissions



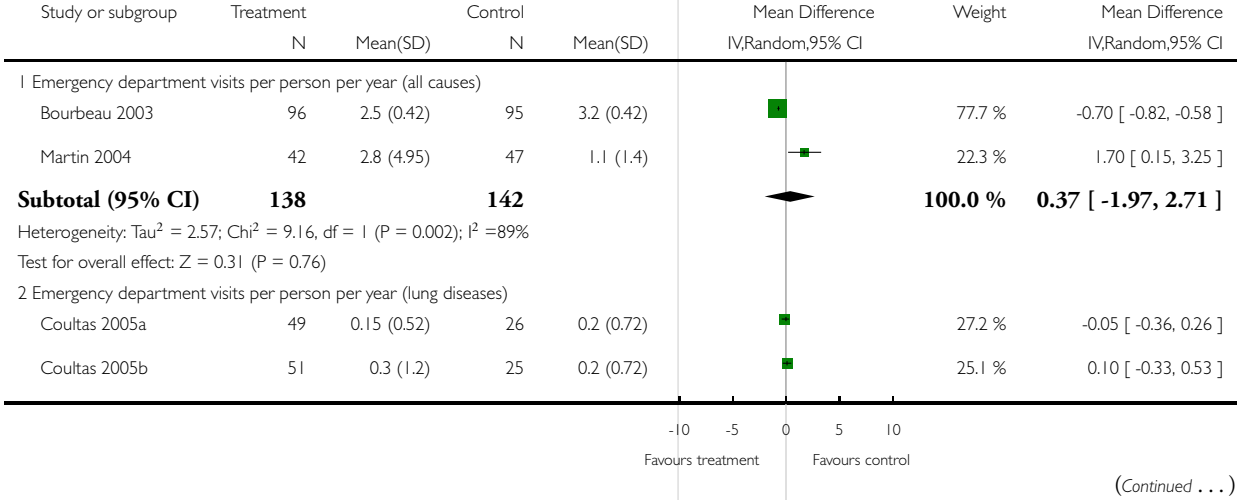
Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H,Fixed,95% CI	Weight	Odds Ratio M-H,Fixed,95% CI
Coultas 2005a	6/49	4/26		24.0 %	0.77 [0.20, 3.01]
Coultas 2005b	9/51	3/25		17.4 %	1.57 [0.39, 6.40]
Rea 2004	26/52	29/83		58.6 %	1.86 [0.92, 3.77]
Total (95% CI)	**152**	**134**		**100.0 %**	**1.55 [0.87, 2.75]**
Total events: 41 (Treatment), 36 (Control)					
Heterogeneity: Chi^2 = 1.28, df = 2 (P = 0.53); I^2 =0.0%					
Test for overall effect: Z = 1.49 (P = 0.13)					

Analysis 1.18. Comparison 1 Self-management versus control, Outcome 18 Emergency department visits per person per year.

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 1 Self-management versus control

Outcome: 18 Emergency department visits per person per year



Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
1 Emergency department visits per person per year (all causes)							
Bourbeau 2003	96	2.5 (0.42)	95	3.2 (0.42)		77.7 %	-0.70 [-0.82, -0.58]
Martin 2004	42	2.8 (4.95)	47	1.1 (1.4)		22.3 %	1.70 [0.15, 3.25]
Subtotal (95% CI)	**138**		**142**			**100.0 %**	**0.37 [-1.97, 2.71]**
Heterogeneity: Tau^2 = 2.57; Chi^2 = 9.16, df = 1 (P = 0.002); I^2 =89%							
Test for overall effect: Z = 0.31 (P = 0.76)							
2 Emergency department visits per person per year (lung diseases)							
Coultas 2005a	49	0.15 (0.52)	26	0.2 (0.72)		27.2 %	-0.05 [-0.36, 0.26]
Coultas 2005b	51	0.3 (1.2)	25	0.2 (0.72)		25.1 %	0.10 [-0.33, 0.53]

(*Continued . . .*)

(. . . *Continued*)

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
Gourley 1998	41	0.15 (0.36)	47	0.17 (0.48)		29.1 %	-0.02 [-0.20, 0.16]
Martin 2004	42	1.6 (2.31)	47	0.7 (1.05)		18.6 %	0.90 [0.14, 1.66]
Subtotal (95% CI)	**183**		**145**			**100.0 %**	**0.07 [-0.17, 0.31]**

Heterogeneity: Tau² = 0.03; Chi² = 5.67, df = 3 (P = 0.13); I² =47%

Test for overall effect: Z = 0.60 (P = 0.55)

Analysis 1.19. Comparison 1 Self-management versus control, Outcome 19 Doctor and nurse visits: mean number per person per year.

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 1 Self-management versus control

Outcome: 19 Doctor and nurse visits: mean number per person per year

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Random,95% CI	Mean Difference IV,Random,95% CI
1 doctor and nurse visits: mean number per person per year						
Bourbeau 2003	96	0.48 (0)	95	1.18 (0)		0.0 [0.0, 0.0]
Coultas 2005a	49	2.89 (3.58)	26	3.04 (3.78)		-0.15 [-1.92, 1.62]
Coultas 2005b	51	4.64 (9)	25	3.04 (3.78)		1.60 [-1.28, 4.48]
Gallefoss 1999	26	0.5 (0.9)	27	3.4 (5.5)		-2.90 [-5.00, -0.80]
Gourley 1998	41	0.81 (0.93)	47	1.17 (1.03)		-0.36 [-0.77, 0.05]
Martin 2004	41	7.8 (9.16)	47	5.2 (5.62)		2.60 [-0.63, 5.83]
Monninkhof 2003	127	0.54 (0)	121	0.93 (0)		0.0 [0.0, 0.0]
Watson 1997	29	3 (3)	27	2 (3)		1.00 [-0.57, 2.57]
Subtotal (95% CI)	**460**		**415**			**0.02 [-1.10, 1.13]**

Heterogeneity: Tau² = 1.04; Chi² = 13.36, df = 5 (P = 0.02); I² =63%

Test for overall effect: Z = 0.03 (P = 0.98)

2 doctor and nurse visits: mean number per person per year (all)

Martin 2004	41	15.6 (12.68)	47	11.6 (8.02)		4.00 [-0.51, 8.51]
Subtotal (95% CI)	**41**		**47**			**4.00 [-0.51, 8.51]**

Heterogeneity: not applicable

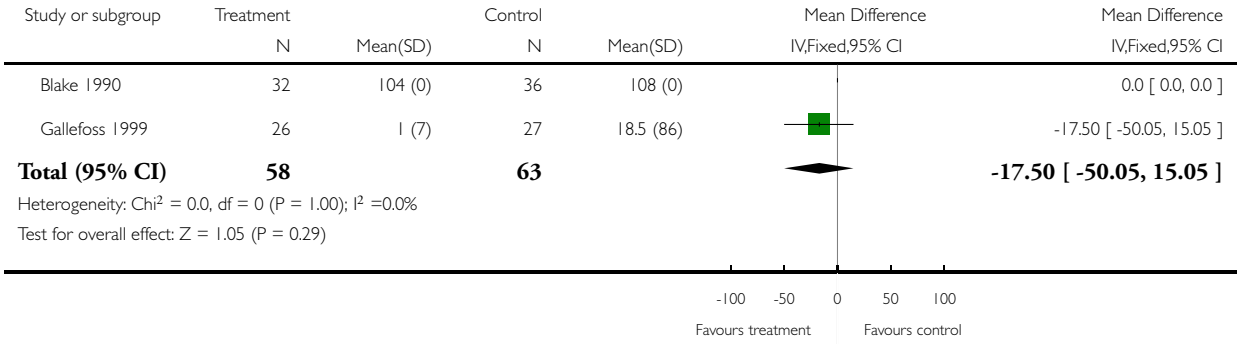
Test for overall effect: Z = 1.74 (P = 0.082)

Analysis 1.20. Comparison 1 Self-management versus control, Outcome 20 Days lost from work: mean number per person per year.

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 1 Self-management versus control

Outcome: 20 Days lost from work: mean number per person per year

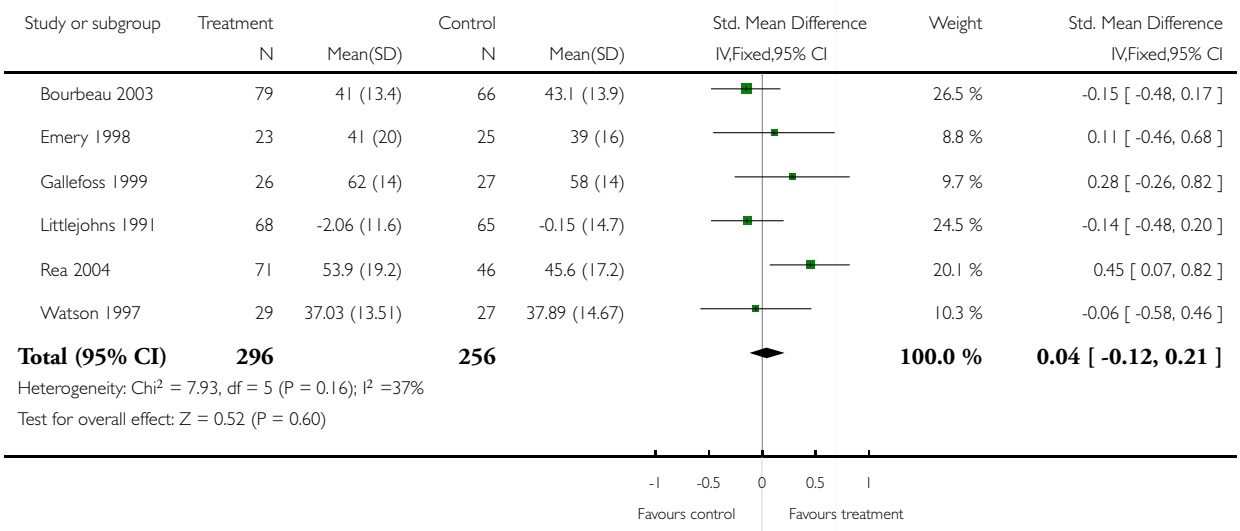


Analysis 1.21. Comparison 1 Self-management versus control, Outcome 21 Lung function: FEV1% pred.

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 1 Self-management versus control

Outcome: 21 Lung function: FEV1% pred



Analysis 1.22. Comparison 1 Self-management versus control, Outcome 22 Exercise capacity: 6MW.

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 1 Self-management versus control

Outcome: 22 Exercise capacity: 6MW

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
Bourbeau 2003	67	289.2 (110)	53	298.5 (86)		25.8 %	-9.30 [-44.37, 25.77]
Boxall 2005	23	202 (69.6)	23	151.7 (75.1)		18.1 %	50.30 [8.45, 92.15]
Monninkhof 2003	127	415.54 (104.7)	120	438.62 (85.3)		56.1 %	-23.08 [-46.84, 0.68]
Total (95% CI)	**217**		**196**			**100.0 %**	**-6.25 [-24.05, 11.55]**

Heterogeneity: Chi² = 8.97, df = 2 (P = 0.01); I² =78%

Test for overall effect: Z = 0.69 (P = 0.49)

Analysis 1.23. Comparison 1 Self-management versus control, Outcome 23 Smokers (number of smokers).

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 1 Self-management versus control

Outcome: 23 Smokers (number of smokers)

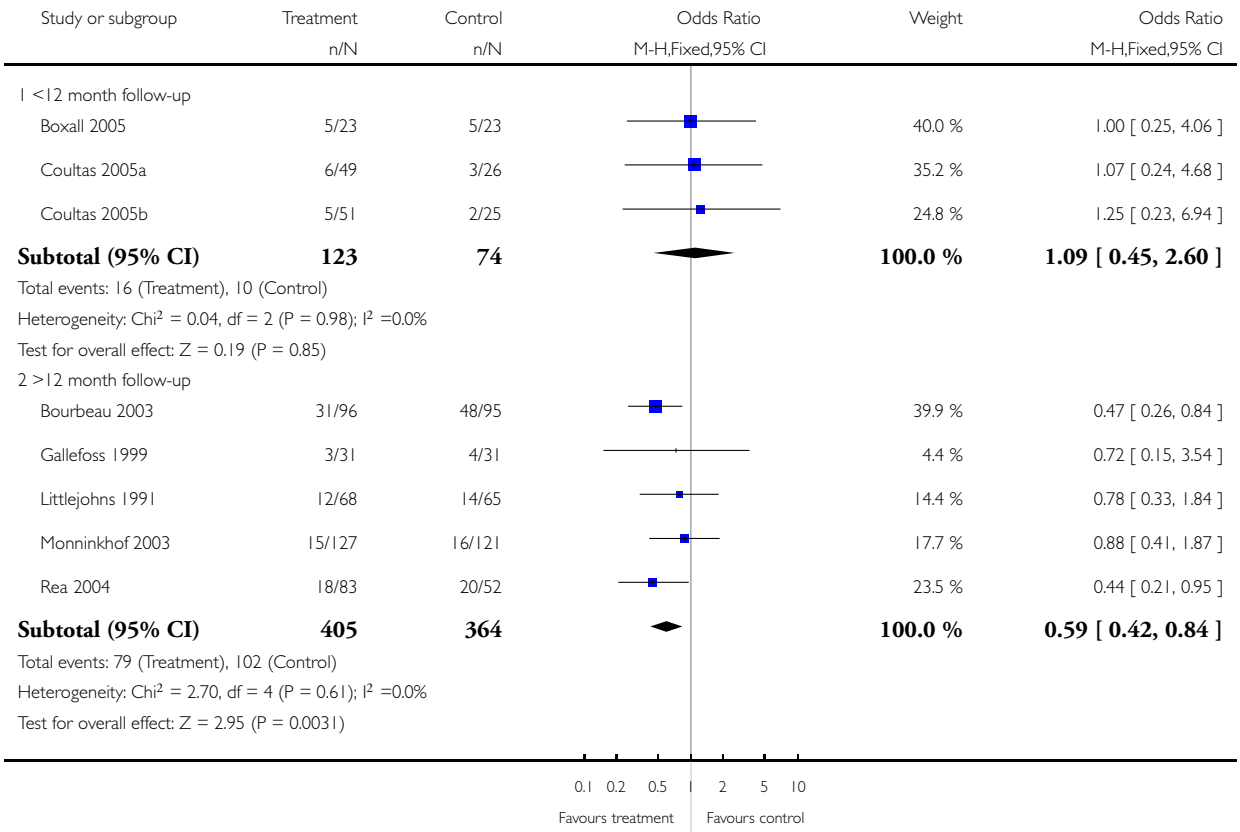
Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H,Fixed,95% CI	Odds Ratio M-H,Fixed,95% CI
Rea 2004	18/71	14/46		0.78 [0.34, 1.77]

Analysis 2.1. Comparison 2 Subgroup analyses, Outcome 1 Respiratory-related hospital admissions (subgroup by follow-up).

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 2 Subgroup analyses

Outcome: 1 Respiratory-related hospital admissions (subgroup by follow-up)

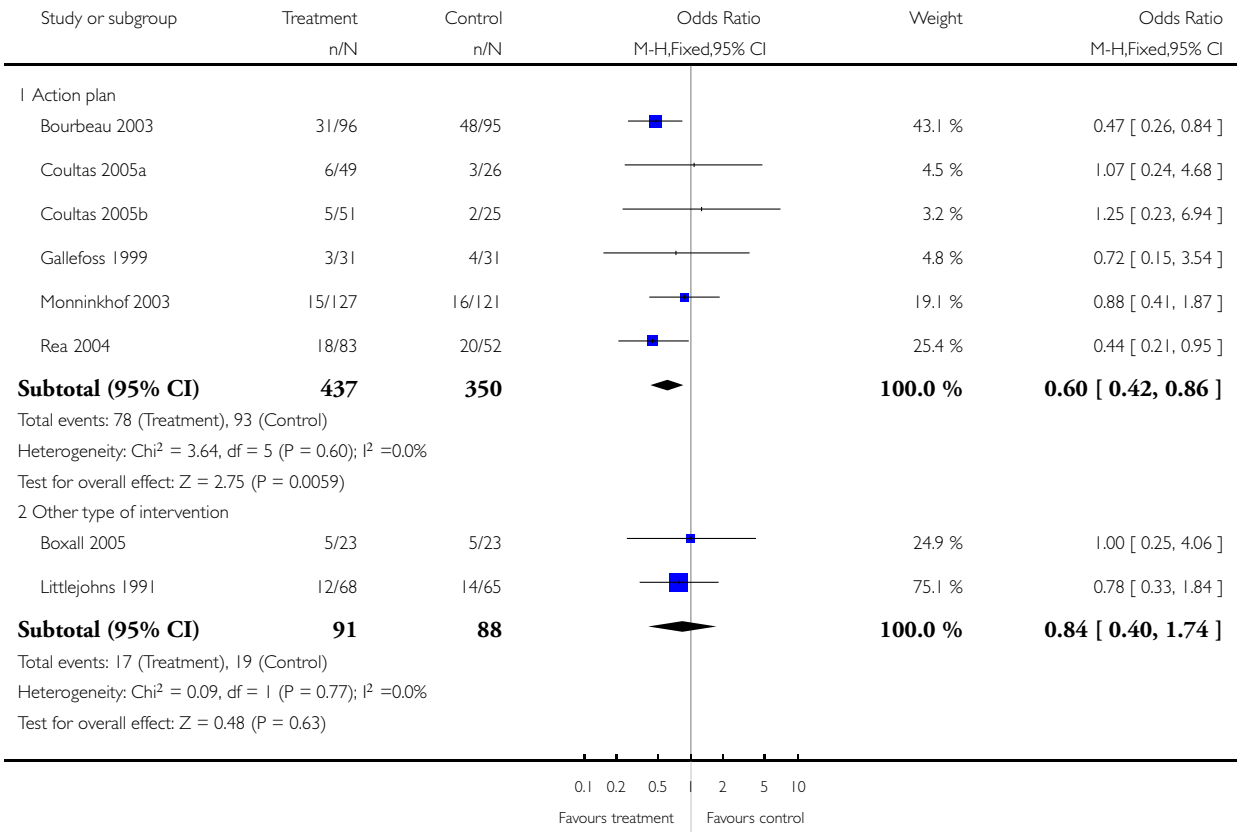


Analysis 2.2. Comparison 2 Subgroup analyses, Outcome 2 Respiratory-related hospital admissions (subgroup by type of intervention).

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 2 Subgroup analyses

Outcome: 2 Respiratory-related hospital admissions (subgroup by type of intervention)

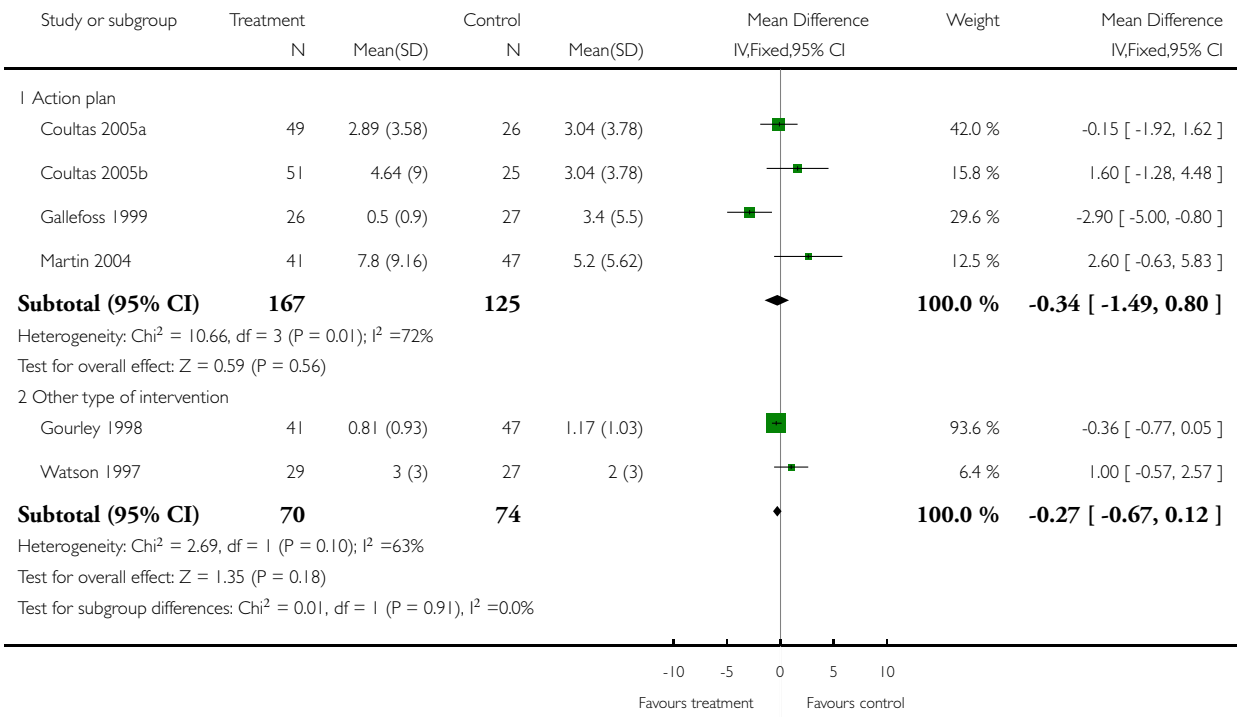


Analysis 2.3. Comparison 2 Subgroup analyses, Outcome 3 doctor and nurse visits: mean number per person per year.

Review: Self-management education for patients with chronic obstructive pulmonary disease

Comparison: 2 Subgroup analyses

Outcome: 3 doctor and nurse visits: mean number per person per year



F E E D B A C K

Subgroup analysis of action plans, 27 July 2009

Summary

I am interested in the sub-group analyses and note that in Analysis 2.3 Watson 1997 is not included in the action plan subgroup although Watson 1997 used an action plan as stated in table of included studies.

Reply

We agree that the study data from Watson 1997 should have been included in this subgroup analysis. We will incorporate the study data in the analysis in our next update.

Contributors

Julia Walters

New Feedback

WHAT'S NEW

Last assessed as up-to-date: 20 August 2007.

25 March 2008	Amended	Converted to new review format.

HISTORY

Protocol first published: Issue 2, 2001

Review first published: Issue 1, 2003

21 August 2007	New citation required and conclusions have changed	New studies: N = 7 (Bourbeau 2003; Boxall 2005; Coultas 2005a; Coutas 2005b; Martin 2004; Monninkhof 2003; Rea 2004) What these studies have added: Data on health related quality of life; exacerbations (hospitalisations, requirement for oral steroids); lung function (FEV1). Quality of life scores and respiratory-related hospital admission now show significant benefits. Lung function parameters do not show a significant difference. Steroid-treated exacerbations were not significantly different. How this has changed the review: The review now demonstrates that from the self-management interventions assessed in the studies assembled in the review, patients were less likely to require hospital admissions when treated with this type of intervention. There was a small improvement in total quality of life scores measured by the St George's Respiratory Questionnaire. There were no indications of detrimental effects in other outcome parameters. The effects of different components of self-management interventions and their requisite intensity requires more research.

CONTRIBUTIONS OF AUTHORS

T. Effing

Co-ordinating the update of the review

All steps belonging to data collection of the update

Datamanagement

Analysis of data

Interpretation of data

Writing the update

E. Monninkhof:

Designing, analysing and writing the original review

Screening retrieved papers against inclusion criteria

Providing a methodological perspective

P. van der Valk

Screening search results against inclusion criteria

Screening retrieved papers against inclusion criteria

Providing a clinical perspective

J. van der Palen

Conceiving the original review

Independent arbitrator to reach "consensus agreement"

Appraising quality of papers for the update

Supporting data-management and data-analysis

Providing a methodological perspective

Updating the review

G. Zielhuis:

Designing the original review

Providing a methodological perspective

Providing general advice on the review

Critically revising the review

E H Walters:

Editorial guidance

DECLARATIONS OF INTEREST

Netherlands Asthma Foundation provided funding for this review but this was in no way able to influence the results of the review.

SOURCES OF SUPPORT

Internal sources

- No sources of support supplied

External sources

- Netherlands Asthma Foundation, Netherlands.
- New Source of support, Not specified.

INDEX TERMS

Medical Subject Headings (MeSH)

*Patient Education as Topic; *Self Care; Outcome Assessment (Health Care); Patient Compliance; Program Evaluation; Pulmonary Disease, Chronic Obstructive [*therapy]; Quality of Life; Randomized Controlled Trials as Topic

MeSH check words

Humans