A systematic review of integrated use of disease-management interventions in asthma and COPD

Lemmens KM, Nieboer AP, Huijsman R

CRD summary
This review examined the effectiveness of multiple interventions versus single interventions or usual care for management of asthma and chronic obstructive pulmonary diseases. The authors concluded that triple, but not double interventions showed better health outcomes. Potential for missed studies and design and methodological limitations in the included studies made that the overall reliability of the authors' conclusions unclear.

Authors' objectives
To assess the effectiveness of multiple interventions compared with single interventions or usual care on health outcomes and health care utilisation within the context of integrated disease management in asthma and chronic obstructive pulmonary diseases (COPD).

Searching
MEDLINE and The Cochrane Library were searched from 1995 to May 2008. Search terms were reported.

Study selection
Controlled studies and time series that evaluated effectiveness of multiple interventions versus single interventions or usual care in patients aged 16 years or over diagnosed with asthma or COPD were eligible for inclusion. Studies needed to provide details on clinical outcomes, quality of life, health care utilisation and/or patient satisfaction. Interventions were classified according to the Cochrane Effective Practice and Organisation of Care (EPOC) classification. Studies on the effects of single interventions versus usual care or pulmonary rehabilitation programmes were excluded.

The evaluated interventions had a component of patient education in 86% and provider education in 53% of studies; other common components included continuity of care and expansion or revision of professional roles. Most studies used usual care as the control; some used patient education alone. Where reported, participant age ranged from 15 to 80 years. Follow-up ranged from 1.5 to 36 months. Most studies reported quality of life and health care utilisation measures. Instruments used to measure quality of life differed widely.

Two reviewers independently applied the inclusion criteria and resolved discrepancies by discussion.

Assessment of study quality
The quality of the included studies was assessed using Health Technology Assessment-Disease Management (HTA-DM) criteria to assess the population, description of the intervention, measurement of outcomes and data analysis/presentation of data. Maximum score was 100. Studies that scored less than 50 were considered inferior quality and those that scored 70 or more were considered good quality; studies of inferior quality were excluded.

It appeared that three reviewers assessed the quality of the included trials.

Data extraction
Means and standard deviations (SD) for continuous outcomes and incidence of binary outcomes were extracted. Mean differences and odds ratios (OR), with 95% confidence intervals (CIs), were calculated.

Three reviewers independently extracted data and resolved discrepancies by discussion.

Methods of synthesis
The analyses were: qualitative synthesis by type of intervention; and meta-analysis that combined continuous outcomes as weighted mean differences (WMDs) and dichotomous outcomes as odds ratios, with 95% CIs, using a fixed-effect model. Heterogeneity between studies was assessed with the $I^2$ statistic.
Results of the review
Thirty-six studies (108,367, range 24 to 101,368) met the inclusion criteria. Fourteen studies had good methodological quality (≥70 points) and 22 were moderate quality (50 to 69 points). Twenty-eight of the studies were RCTs and eight were controlled before-after studies. Eighteen of the 36 studies identified as multiple intervention studies focused on COPD, 16 focused on asthma and two on both asthma and COPD.

Patient education combined with case management compared to usual care (nine studies) showed mixed results. There was no significant difference between the intervention and control in lung function, symptoms scores or emergency department visits. Triple interventions were significantly more effective than usual care on total quality of life (WMD -4.59, 95% CI -8.34 to -0.83; three studies; 313 patients), activity (WMD -5.20, 95% CI -9.76 to -0.64; three studies; 320 patients) and impact (WMD -4.41, 95% CI -8.19 to -0.62; three studies; 313 patients). Multiple interventions led to a decrease in hospital admissions compared with usual care (WMD 0.58, 95% CI 0.40 to 0.83; five studies; 634 patients). Double interventions did not demonstrate any significant impact compared to usual care.

Patient education combined with revision of professional roles and professional education (six studies) showed that substitution of physicians by nurses was not associated with significant benefits, except process improvement (mostly inhalation technique) showed improvement (three studies). For studies that compared pharmacist provision of drug counselling that was formerly provided by nurses and physicians, double interventions showed significant improvement on quality of life when compared with usual care (WMD 0.72, 95% CI 0.47 to 0.96; two studies; 324 patients), but not triple interventions (two studies; 517 patients).

Four of the five studies that assessed multiple intervention versus single intervention and reported quality of life demonstrated a non-significant benefit with multiple interventions. Data on other outcomes were synthesised because they were too diverse.

Authors’ conclusions
Triple intervention programmes in asthma and COPD management demonstrated improvements in quality of life and reductions in hospitalisations (but not emergency department visits) when compared to usual care. In spite of the heterogeneity of disease management studies in asthma and COPD care, this review showed promising improvements in quality of life and reductions in hospitalisations, especially for triple intervention programmes.

CRD commentary
This review addressed a broad but well-defined question in terms of participants, interventions, outcomes and study design. The search was limited to only two databases and no specific attempts were made to retrieve unpublished studies; therefore, relevant data may have been missed. It was unclear whether language restrictions were applied in the search, so the possibility of language bias could not be ruled out. Two or more reviewers independently selected trials, extracted data and assessed the quality of the included trials to minimise bias and errors.

The characteristics of the individual studies were presented. Potential sources of heterogeneity were explored. Quality of the included studies was assessed with appropriate criteria; no details of the quality domains and how each component was assessed were reported, but a citation for the assessment tool was provided. Qualitative and quantitative synthesis was used for pooling data, which was appropriate given that there was clinical heterogeneity between the included studies. Most of the included studies were considered to be generally poor quality.

The overall reliability of the authors’ conclusions is unclear, due to potential for missed studies and design and methodological limitations in the studies included in this review.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that future research should: attempt to set up practical multicentre clinical trials that involved a wider range of physicians and settings to improve external validity; collect process measures in addition to outcomes measures; standardise reporting periods and data sets; and evaluate sustainability of multiple interventions on the longer term.
Funding
Partners in Care Solutions (PICASSO) for COPD.

Bibliographic details

PubMedID
19155168

DOI
10.1016/j.rmed.2008.11.017

Original Paper URL
chronic obstructive pulmonary diseases

Indexing Status
Subject indexing assigned by NLM

MeSH
Adolescent; Adult; Aged; Aged, 80 and over; Asthma /therapy; Disease Management; Evidence-Based Medicine; Health Resources /utilization; Hospitalization; Humans; Middle Aged; Outcome and Process Assessment (Health Care); Pulmonary Disease, Chronic Obstructive /therapy; Quality of Life; Randomized Controlled Trials as Topic; Young Adult

AccessionNumber
12010002187

Date bibliographic record published
16/06/2010

Date abstract record published
10/11/2010

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.