Effects of asthma education on children's use of acute care services: a meta-analysis

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CRD summary
This review concluded that paediatric asthma education interventions reduced the mean number of hospitalisations and the numbers and odds of emergency department visits due to asthma. The authors’ conclusions seem appropriate, but are only generalisable to low-income children in the USA and, due to the lack of a quality assessment, the reliability of the evidence cannot be verified.

Authors' objectives
To assess the impact of paediatric asthma education on hospitalisations, emergency department visits and urgent physician visits for asthma.

Searching
PubMed, CINAHL, Cochrane Central Register of Controlled Trials (CENTRAL) and Cochrane Database of Systematic Reviews were searched for studies conducted in the USA and published in English. Search terms were reported.

Study selection
Randomised controlled trials, cluster randomised trials, controlled clinical trials and observational studies with a contemporaneous comparison group of an asthma education intervention in children (aged between two and 17 years) with a clinical diagnosis of asthma, were eligible for inclusion. Clinical diagnosis was defined as a diagnosis by a physician, or at least one previous urgent physician, or emergency department visit, or hospitalisation for asthma.

Most studies compared asthma education with usual care; some compared different types of asthma education interventions. In most studies, education was given to children and their caregivers. Interventions included individualised education to children and/or their caregivers, group classes and computer games, most often provided in outpatient clinics or physician offices. Intervention periods ranged from a few weeks to more than 12 months, and the numbers of sessions ranged from one to 90. Over half of the studies provided comprehensive education, covering all four major topics recommended by National Health, Lung and Blood Institute guidelines (pathophysiology, correct medication use, symptom monitoring techniques, trigger avoidance). Mean age ranged from four to 12 years and, in 70% of studies, most children were from low-income areas.

Studies were screened by one reviewer and inclusion agreed with another three reviewers.

Assessment of study quality
The authors did not assess validity.

Data extraction
Odds ratios (OR) with 95% confidence intervals (CI) for hospitalisations, emergency department and urgent physician visits were calculated. Where mean numbers of visits were reported, standardised mean differences (SMD) were calculated using Hedge's g method because of variation in time intervals. If necessary, study authors were contacted for further information.

The authors did not state how many reviewers performed the data extraction.

Methods of synthesis
Results were pooled according to outcome using random-effects (DerSimonian-Laird) meta-analysis. Statistical heterogeneity was assessed using Cochran's Q test.

Results of the review
Thirty-seven studies (n=7,670 children, sample size ranging from 14 to 1,033) were included in the review; four were
observational studies.

Paediatric asthma education reduced the mean number of hospitalisations (SMD -0.35, 95% CI -0.63 to -0.08; five studies) and emergency department visits (SMD -0.17, 95% CI -0.31 to -0.03; 13 studies) compared with usual care. There was evidence of significant heterogeneity for emergency department visits (p=0.03), but not for hospitalisations (p=0.10). There was no evidence of a difference for the mean number of urgent physician visits. In the analysis of binary outcomes, paediatric asthma education reduced the odds of both hospitalisation and an emergency department visit, but neither were statistically significant.

For studies comparing two or more asthma education interventions, one study found that children whose caregivers attended five interactive small-group classes had significantly less emergency department visits that those whose caregivers attended three large group lectures. One study also reported less emergency department visits from one educational session followed by additional telephone calls and in-person educational sessions, but a similar study found no significant differences. One study found that six home visits were more effective than a three-visit intervention on the odds of an emergency department visit. Two studies compared the addition of a computer game or an internet-based program to in-person education alone; one reported a reduction in the mean number of emergency department visits but the other found no differences.

Three studies assessed the use of two or more acute care services. One study found that children whose caregivers had received seven home educational sessions had significantly fewer urgent physician, emergency department and hospitalisations combined compared with those having only one session. Another study found less visits overall from supplementing education on proper use of inhalers and access to a 24-hour advice line.

**Authors' conclusions**
Paediatric asthma education reduced the mean number of hospitalisations and both the numbers and odds of emergency department visits due to asthma.

**CRD commentary**
This review had clearly specified inclusion criteria. The search was limited so that only studies conducted in the USA were included. Studies were screened by one reviewer, with final selection decisions made in conjunction with others, but this method may have missed some studies.

There was no formal assessment of study validity and, although a random-effects model was used for the pooling, combining randomised and observational studies may have increased the heterogeneity.

The authors' conclusions seem appropriate but are only generalisable to low-income children in the USA and, due to the lack of a quality assessment, the reliability of the evidence cannot be verified.

**Implications of the review for practice and research**
**Practice:** The authors stated that health plans and medical groups should develop asthma education programs or provide incentives for clinicians to provide such education.

**Research:** The authors stated that research is needed to assist clinicians, medical groups and health plans in determining the type and amount of asthma education to offer and who should receive it. Large randomised trials to determine the most important components and costs of education programs are needed.

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**Bibliographic details**
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.