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[Intervention Review]

Interventions to improve adherence to inhaled steroids for asthma

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ABSTRACT

Background

Despite its proven efficacy in improving symptoms and reducing exacerbations, many patients with asthma are not fully adherent to their steroid inhaler. Suboptimal adherence leads to poorer clinical outcomes and increased health service utilisation, and has been identified as a contributing factor to a third of asthma deaths in the UK. Reasons for non-adherence vary, and a variety of interventions have been proposed to help people improve treatment adherence.

Objectives

To assess the efficacy and safety of interventions intended to improve adherence to inhaled corticosteroids among people with asthma.

Search methods

We identified trials from the Cochrane Airways Trials Register, which contains studies identified through multiple electronic searches and handsearches of other sources. We also searched trial registries and reference lists of primary studies. We conducted the most recent searches on 18 November 2016.

Selection criteria

We included parallel and cluster randomised controlled trials of any duration conducted in any setting. We included studies reported as full-text articles, those published as abstracts only and unpublished data. We included trials of adults and children with asthma and a current prescription for an inhaled corticosteroid (ICS) (as monotherapy or in combination with a long-acting beta₂-agonist (LABA)). Eligible trials compared an intervention primarily aimed at improving adherence to ICS versus usual care or an alternative intervention.

Data collection and analysis

Two review authors screened the searches, extracted study characteristics and outcome data from included studies and assessed risk of bias. Primary outcomes were adherence to ICS, exacerbations requiring at least oral corticosteroids and asthma control. We graded results and presented evidence in 'Summary of findings' tables for each comparison.

We analysed dichotomous data as odds ratios, and continuous data as mean differences or standardised mean differences, all using a random-effects model. We described skewed data narratively. We made no a priori assumptions about how trials would be categorised but conducted meta-analyses only if treatments, participants and the underlying clinical question were similar enough for pooling to make sense.

Main results

We included 39 parallel randomised controlled trials (RCTs) involving adults and children with asthma, 28 of which (n = 16,303) contributed data to at least one meta-analysis. Follow-up ranged from two months to two years (median six months), and trials were conducted mainly in high-income countries. Most studies reported some measure of adherence to ICS and a variety of other outcomes such as quality of life and asthma control. Studies generally were at low or unclear risk of selection bias and at high risk of biases associated with blinding. We considered around half the studies to be at high risk for attrition bias and selective outcome reporting.

We classified studies into four comparisons: adherence education versus control (20 studies); electronic trackers or reminders versus control (11 studies); simplified drug regimens versus usual drug regimens (four studies); and school-based directly observed therapy (three studies). Two studies are described separately.

All pooled results for adherence education, electronic trackers or reminders and simplified regimens showed better adherence than controls. Analyses limited to studies using objective measures revealed that adherence education showed a benefit of 20 percentage points over control (95% confidence interval (CI) 7.52 to 32.74; five studies; low-quality evidence); electronic trackers or reminders led to better adherence of 19 percentage points (95% CI 14.47 to 25.26; six studies; moderate-quality evidence); and simplified regimens led to better adherence of 4 percentage points (95% CI 1.88 to 6.16; three studies; moderate-quality evidence). Our confidence in the evidence was reduced by risk of bias and inconsistency.

Improvements in adherence were not consistently translated into observable benefit for clinical outcomes in our pooled analyses. None of the intervention types showed clear benefit for our primary clinical outcomes - exacerbations requiring an oral corticosteroid (OCS) (evidence of very low to low quality) and asthma control (evidence of low to moderate quality); nor for our secondary outcomes - unscheduled visits (evidence of very low to moderate quality) and quality of life (evidence of low to moderate quality). However, some individual studies reported observed benefits for OCS and use of healthcare services. Most school or work absence data were skewed and were difficult to interpret (evidence of low quality, when graded), and most studies did not specifically measure or report adverse events.

Studies investigating the possible benefit of administering ICS at school did not measure adherence, exacerbations requiring OCS, asthma control or adverse events. One study showed fewer unscheduled visits, and another found no differences; data could not be combined.

Authors' conclusions

Pooled results suggest that a variety of interventions can improve adherence. The clinical relevance of this improvement, highlighted by uncertain and inconsistent impact on clinical outcomes such as quality of life and asthma control, is less clear. We have low to moderate confidence in these findings owing to concerns about risk of bias and inconsistency. Future studies would benefit from predefining an evidence-based 'cut-off' for acceptable adherence and using objective adherence measures and validated tools and questionnaires. When possible, covert monitoring and some form of blinding or active control may help disentangle effects of the intervention from effects of inclusion in an adherence trial.

PLAIN LANGUAGE SUMMARY

Strategies to help people with asthma take their steroid inhaler as prescribed

Background to the question

Inhalers containing steroids improve asthma-related symptoms and reduce asthma attacks when taken regularly. But many people with asthma do not take them as prescribed. This leads to more symptoms and flare-ups, which have been linked to a third of asthma deaths in the UK.

Missing doses is sometimes called 'non-adherence'. Reasons for missing doses vary from person to person. For example, people often forget to take their inhaler or have a busy and unpredictable lifestyle that makes it difficult to fit this in. Some people do not appreciate the need for taking inhalers as prescribed. Some people choose to reduce or discontinue taking steroids. This can happen for many reasons, including side effects, fear of side effects or a perception that benefits do not outweigh disadvantages.

The aim of this review was to find out whether strategies to help people with asthma take their steroid inhaler really work, and whether improved adherence leads to other benefits.

Study characteristics

We found 39 studies including more than 16,000 adults and children with asthma who were taking a steroid inhaler. Most studies collected data at six months, so we can really apply the messages in this review only over six months - we cannot say whether these methods are effective in a few years time, for example. We searched multiple sources for relevant studies. This review is current as of November 2016.

Different studies tried different ways to help people take their inhaler more regularly. We grouped studies according to four ways of helping people take their inhaler: providing education about adherence (20 studies); using electronic monitoring or reminders to take the inhaler

(11 studies); making the drug easier to take (e.g. once instead of twice a day, one inhaler instead of two) (four studies); and giving the inhaler during school hours (three studies).

We mainly looked for whether strategies helped people to take their inhaler as prescribed, and whether people had fewer asthma attacks and better asthma control.

Key results

People who were given education were better at taking their inhaler than controls; 20% more people took their treatment (likely to be somewhere between 8% and 33% more). Those given trackers or electronic reminders were 19% better at using their inhaler than controls (14% and 25%). People who were given an easier way of taking their inhaler (e.g. fewer times a day) were only 4% better than those who carried on as usual (2% and 6%).

Unfortunately, these efforts to help people take their inhaler as prescribed generally did not lead to obvious benefit for things like asthma control and number of attacks, but in most cases, we could not tell either way. We also did not see a difference for quality of life or time people needed off school or work, but the evidence was often uncertain.

Studies investigating the possible benefit of giving children their inhaler during school hours did not actually measure how often they missed doses.

Quality of the evidence

It's difficult to tell whether these different strategies are worth using because studies were quite different from one other. This variation means that we cannot be sure what the real benefit is, beyond improving adherence. Sometimes we did not find enough studies to detect a difference between groups. The fact that most people knew which group they were in also reduced our confidence in the findings because this can affect things like how positively people respond to questionnaires. We had concerns about how many people dropped out of about half the studies, and we are uncertain whether studies reported everything they measured.

Key message

The studies we found suggest that various strategies can help people with asthma take their inhaler better, compared with "control" (e.g. usual asthma care). However, many of these studies were quite different from one another, and we are not certain about whether people will find that their asthma is improved as a result of this approach.