Review: Individualized written action plans based on peak expiratory flow improve asthma health outcomes

Gibson PG, Powell H. **Written action plans for asthma: an evidence-based review of the key components.** Thorax. 2004;59:94-9.

QUESTION

In patients with asthma, do individualized written action plans (WAPs) improve asthma health outcomes?

METHODS

Data sources: Studies were identified by searching the Cochrane Airways Group Clinical Trials Register, including searches of MEDLINE, EMBASE/Excerpta Medica, and CINAHL; hand searching respiratory journals and meeting abstracts; and scanning the citations of identified studies.

Study selection and assessment: Studies were selected if they were randomized controlled trials (RCTs) that compared WAPs (sets of instructions for the management of deteriorating asthma) with usual care. Action plans were deemed individualized and complete if they specified when and how to increase the intensity of treatment, duration of treatment, and when to seek medical help. Action points (level of symptoms or lung function that determines when to activate action plan) were based on symptoms or peak expiratory flow (PEF).

Outcomes: Hospital admissions, emergency department (ED) visits, and lung function (mean percentage of PEF). Outcomes were analyzed according to variations in action plans: the number of action points, personal best or percentage predicted PEF, "traffic light" action plan (colors used to signal the continuation of usual treatment [green], increasing treatment [yellow], or the need to seek help urgently [red]), and use of inhaled corticosteroids (ICSs) and oral corticosteroids (OCSs).

MAIN RESULTS

Of the 26 RCTs that met the inclusion criteria, 17 trials used individualized WAPs. Meta-analysis was done on action plans based on personal best PEF (5 RCTs), predicted PEF (4 RCTs), "traffic light" system (2 RCTs), and treatment instruction with the use of ICSs and OCSs (9 RCTs). Action plans based on personal best PEF and predicted PEF reduced hospital admissions (Table), but only the personal best PEF action plan reduced ED visits (Table) or improved lung function (standardized mean difference [SMD] for PEF 0.56, 95% CI 0.37 to 0.76). Hospital admissions were reduced with WAPs containing 4 action points (6 RCTs; relative risk [RR] 0.65, CI 0.48 to 0.88) or 2 to 3 action points (3 RCTs; RR 0.23, CI 0.07 to 0.71). "Traffic light" action plans and usual care did not differ (2 RCTs; RR 0.58, CI 0.17 to 1.92). An individualized WAP that included treatment instruction for increasing the use of ICSs and OCSs reduced hospital admissions (Table), ED admissions (Table), and mean PEF (SMD 0.39, CI 0.23 to 0.56).

CONCLUSION

In patients with asthma, individualized written action plans based on peak expiratory flow, 2 to 4 action points, and treatment instruction on the use of both inhaled and oral corticosteroids improve asthma health outcomes.

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Individualized written action plans vs usual care (UC) for asthma at 6 weeks to 24 months*

Outcomes	Number of trials	Comparisons	Weighted event rates	RRR (95% CI)	NNT (CI)
Hospital admissions	4	PP PEF vs UC	3% vs 8%	54% (19 to 74)	29 (16 to 132)
	5	PB PEF vs UC	15% vs 20%	34% (9 to 52)	23 (12 to 318)
	9	ICSs and OCSs vs UC	9% vs 13%	61% (22 to 56)	27 (17 to 67)
ED visits	5	PP PEF vs UC	11% vs 12%	13% (–0.18 to 36)	Not significant
	4	PB PEF vs UC	36% vs 48%	22% (5 to 36)	9 (6 to 26)
	9	ICSs and OCSs vs UC	22% vs 23%	19% (4 to 31)	72 (28 to 128)

*ED = emergency department; PEF = peak expiratory flow; PP = percentage predicted; PB = personal best; ICSs = inhaled corticosteroids; OCSs = oral corticosteroids. Other abbreviations defined in Glossary; weighted event rates, RRR, NNT, and CI calculated from data in article using a fixed-effects model.

COMMENTARY

Many patients with asthma resent their reliance on health professionals, and most national guidelines now encourage a WAP that allows patients to respond flexibly to the variability of their disease. A recent Cochrane review (1) indicated that it was possible for WAPs to reduce hospital admissions (40%) and ED visits or days off work (20%). In their review, Gibson and Powell have dissected WAPs and identified the components that contribute to their efficacy: PEF monitoring, ≤ 4 action points, and use of ICSs and OCSs.

The most interesting aspect of the review was the reliance of almost all plans on increasing the dose of ICS. The traditional doubling of ICS dose early in an exacerbation is not based on rigorous evidence, and 2 recent studies failed to show clear benefits from doing so (2, 3). The review by Gibson and Powell shows that incorporating increasing doses of ICSs and use of OCSs are consistently beneficial but acknowledges that insufficient evidence exists to determine whether ICS or OCS alone is the effective component. Thus, considerable reservations arise about the standard advice on doubling ICS dose. Unfortunately, that advice is an integral part of almost all WAPs.

We now recognize that poorly controlled asthma is not the same as an exacerbation and that it probably responds better to increasing the dose of ICSs. More liberal use of short- and long-acting β-agonists, even higher doses of ICSs, earlier introduction of OCSs, and perhaps leukotriene antagonists may be more effective for aborting viral-induced exacerbations, and will need to be tested in the future.

The reasons for the disappointingly low uptake of WAPs might include patient reluctance, time constraints, and perceived lack of efficacy. Accumulating evidence now suggests that WAPs are more effective when accompanied by intervention in the early stages of an exacerbation.

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References

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2. **Harrison TW, Oborne J, Newton S, Tattersfield AE.** Lancet. 2004;363:271-5.
3. **FitzGerald JM, Becker A, Sears MR, et al.** Thorax. 2004;59:550-6.