


A systematic review to examine the impact of psycho-educational interventions on health outcomes and costs in adults and children with difficult asthma

JR Smith,^{1*} M Mugford,¹ R Holland,¹ B Candy,^{1†} MJ Noble,² BDW Harrison,³ M Koutantji,^{1‡} C Upton³ and I Harvey¹

 School of Medicine, Health Policy and Practice, University of East Anglia, Norwich, UK

² Acle Medical Centre, Acle, Norfolk, UK

³ Norfolk and Norwich University Hospital NHS Trust, Norwich, UK

* Corresponding author

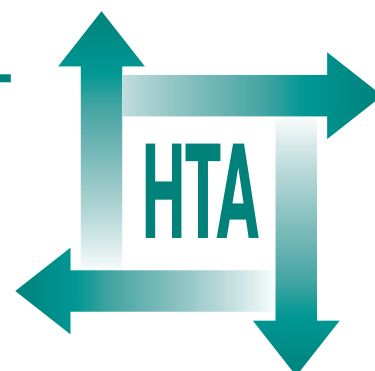
† Present address: Psychiatry Department, Institute of Community Health Sciences, Queen Mary University of London, UK

‡ Present address: Department of Surgical Oncology and Technology, Imperial College, London, UK

Executive summary

Health Technology Assessment 2005; Vol. 9: No. 23

Health Technology Assessment
NHS R&D HTA Programme





INAHTA

How to obtain copies of this and other HTA Programme reports.

An electronic version of this publication, in Adobe Acrobat format, is available for downloading free of charge for personal use from the HTA website (<http://www.hta.ac.uk>). A fully searchable CD-ROM is also available (see below).

Printed copies of HTA monographs cost £20 each (post and packing free in the UK) to both public **and** private sector purchasers from our Despatch Agents.

Non-UK purchasers will have to pay a small fee for post and packing. For European countries the cost is £2 per monograph and for the rest of the world £3 per monograph.

You can order HTA monographs from our Despatch Agents:

- fax (with **credit card** or **official purchase order**)
- post (with **credit card** or **official purchase order** or **cheque**)
- phone during office hours (**credit card** only).

Additionally the HTA website allows you **either** to pay securely by credit card **or** to print out your order and then post or fax it.

Contact details are as follows:

HTA Despatch
c/o Direct Mail Works Ltd
4 Oakwood Business Centre
Downley, HAVANT PO9 2NP, UK

Email: orders@hta.ac.uk
Tel: 02392 492 000
Fax: 02392 478 555
Fax from outside the UK: +44 2392 478 555

NHS libraries can subscribe free of charge. Public libraries can subscribe at a very reduced cost of £100 for each volume (normally comprising 30–40 titles). The commercial subscription rate is £300 per volume. Please see our website for details. Subscriptions can only be purchased for the current or forthcoming volume.

Payment methods

Paying by cheque

If you pay by cheque, the cheque must be in **pounds sterling**, made payable to *Direct Mail Works Ltd* and drawn on a bank with a UK address.

Paying by credit card

The following cards are accepted by phone, fax, post or via the website ordering pages: Delta, Eurocard, Mastercard, Solo, Switch and Visa. We advise against sending credit card details in a plain email.

Paying by official purchase order

You can post or fax these, but they must be from public bodies (i.e. NHS or universities) within the UK. We cannot at present accept purchase orders from commercial companies or from outside the UK.

How do I get a copy of HTA on CD?

Please use the form on the HTA website (www.hta.ac.uk/htacd.htm). Or contact Direct Mail Works (see contact details above) by email, post, fax or phone. *HTA on CD* is currently free of charge worldwide.

The website also provides information about the HTA Programme and lists the membership of the various committees.



Executive summary

Background

Despite effective treatments and management guidelines, there are a significant minority of asthma patients who suffer from severe or poorly controlled disease. When persistent, this is sometimes referred to as 'difficult' asthma. Research highlights the association of psychosocial factors with difficult asthma and its related adverse consequences (e.g. fatal and near-fatal attacks). It is suggested that psycho-educational interventions designed to address these factors might improve outcomes in at-risk patients. Existing reviews of programmes involving interactive education, training in self-management and/or targeting specific psychosocial issues resulting from or impacting on asthma, suggest that **some** psycho-educational interventions are effective and potentially cost-effective in **general** asthma populations. However, findings are unlikely to be generalisable to patients with **difficult** asthma in whom a complex interplay of factors complicate management and who are therefore often excluded from or fail to attend standard programmes.

Objectives

- Do psycho-educational interventions improve outcomes for patients with difficult asthma?
- Do psycho-educational interventions constitute an efficient use of healthcare resources for patients with difficult asthma?

Methods

Data sources

Asthma terms combined with complex permutations for describing interventions were used to search 32 electronic data sources (including research registers, grey literature and non-English language databases) and guide handsearching of reference lists, conference proceedings, current contents and three key journals up to the end of 2002.

Study selection

Abstracts and/or titles were assessed in duplicate, against definitions developed at the start of the

review, to identify potentially eligible interventions targeting patients with forms of or one or more risk factors/outcomes associated with difficult asthma. Final inclusion decisions were made on the basis of viewing full texts. Two reviewers classified the studies initially included by patient group (child, adult) and graded them along dimensions related to study design and relevance in terms of the degree to which they were judged to target difficult asthma (insufficient, possible, probable, definite). A third reviewer resolved disagreements or uncertainties.

Data extraction

Descriptive, methodological, outcome and cost data were extracted from studies meeting a minimum design (having a control group) and relevance (at least 'possible' targeting of difficult asthma) threshold. Authors were contacted for additional information as necessary.

Data synthesis

Characteristics of studies in children and adults selected for in-depth review were tabulated separately and results qualitatively synthesised. Where sufficiently similar studies reported adequate data about comparable outcomes, quantitative syntheses (meta-analyses) of results were undertaken using a random effects approach to calculate pooled relative risks (RRs), or standardised mean differences (SMDs) with 95% confidence intervals (CIs).

Results

Extent of research

From over 23,000 citations identified, 4240 abstracts and/or titles were considered for further review. A total of 278 citations reporting on 188 different studies were initially included and classified. Of these, 57 (35 in children, 21 in adults and one including child and adult subgroups) were considered suitable for in-depth review.

Study characteristics

There has been a rapid and continuing growth of research in this field, with several important UK studies being recently completed or in



progress at the time of this review. The largest proportion of research to date has been conducted in the USA.

The delivery, setting, timing and content of interventions varied considerably even within broad types. Reporting of interventions and methodological quality was often poor but studies demonstrated some success in targeting and following up at-risk patients. The range of outcomes assessed and variations in the ways they were measured and reported precluded quantitative synthesis for most. Studies reporting data suitable for calculation of summary statistics were of higher quality than those that did not.

Effectiveness

There was evidence that, compared with usual or non-psycho-educational care, psycho-educational interventions reduced admissions when data from the latest follow-ups reported were pooled across nine studies in children (RR = 0.64, 95% CI = 0.46 to 0.89) and six studies with **possible** targeting of difficult asthma in adults (RR = 0.57, 95% CI = 0.34 to 0.93). In children, the greatest and only significant effects were confined to individual studies with limited targeting of difficult asthma and no long-term follow-up. Limited data in adults also suggested that effects may not extend to those most at risk. There was no evidence of pooled effects of psycho-educational interventions on emergency attendances from eight studies in children (RR = 0.97, 95% CI = 0.78 to 1.21) and four in adults (RR = 1.03, 95% CI = 0.82 to 1.29).

There were overall significant reductions in symptoms, similar in different sub-groups of difficult asthma, across four paediatric studies that could be combined (SMD = -0.45, 95% CI = -0.68 to -0.22), but mixed results across individual adult studies. A small number of individual studies in children showed mainly positive effects on measures of self-care behaviour but, with respect to all other outcomes in adults and children where sufficient data allowed conclusions to be drawn, studies showed mixed results or suggested limited effectiveness of psycho-educational interventions. No studies of psychosocial interventions were included in any quantitative syntheses and it was not possible to draw clear conclusions regarding the relative effectiveness of educational, self-management and multifaceted programmes.

Cost-effectiveness

Data on costs were very limited in quantity and quality for children and adults. Of the two well-

designed economic evaluations identified, both of multifaceted interventions, one in children suggested that, from the health provider's viewpoint, there would be an additional cost of achieving health gain in terms of symptom-free days. Provisional data from the other study suggested that in adults the significantly increased costs of providing an intervention were not offset by any short-term savings in use of healthcare resources or associated with improvements in health outcomes. Several relevant well-designed UK studies which plan to assess cost-effectiveness are yet to be published.

Conclusions

There was some evidence of overall positive effects of psycho-educational interventions on hospital admissions in adults and children, and on symptoms in children, but limited evidence of effects on other outcomes. The majority of research and greatest effects, especially in adults, were confined to patients with severe disease but who lacked other characteristics indicative of difficult asthma or likely to put them at risk. A lack of quality research limits conclusions regarding cost-effectiveness. Limited findings, trends in the evidence base and theoretical developments suggest that multidisciplinary, multifaceted interventions incorporating formal self-management and medical care may be the most promising broad-based approaches warranting further evaluation, but an alternative conceptualisation of interventions in the light of the ways in which psychosocial factors and asthma interact may be necessary.

Implications for healthcare

With the aim of reducing asthma morbidity and mortality, based on the evidence in this review, we suggest that:

- In adults and children with **severe** asthma, provision of psycho-educational interventions (especially those incorporating formal self-management) may reduce hospital admissions and, in children, improve symptoms, but potentially at increased overall cost. There is currently a lack of evidence to warrant significant changes in clinical practice with regard to care of patients with more **difficult** asthma.
- Better identification and recognition of patients with difficult asthma, taking into account the different pathophysiological, clinical, ▶

compliance and psychosocial risk factors, might improve their care, enhance the value of future audit, and aid in the targeting of any new interventions.

- Until further research is available, the emphasis should be on optimisation of medical care, taking account of potential complicating psychosocial factors, for patients with difficult asthma, to ensure that the number of patients continuing to experience poor control of symptoms and frequent exacerbations is minimised.

Recommendations for research

In priority order, reflecting the reviewers' viewpoint, our findings suggest there is a need for further research in the following areas.

In general:

1. Standardisation of reporting of complex interventions.

In asthma/difficult asthma:

2. An update of this review incorporating the results of the good-quality randomised controlled trials (RCTs) with economic evaluations that were in progress or remained unpublished.
3. Primary and secondary research to clarify key risk factors and develop tools for identifying patients susceptible to adverse asthma outcomes.
4. Secondary research extending this review to examine psycho-educational interventions aimed **solely** at those providing care for patients with difficult asthma, and potentially asthma more generally (e.g. family members, school teachers, health professionals).
5. Further development, validation and standardisation of patient-focused, clinically relevant and age-appropriate measures of intermediate (self-management behaviour and its correlates) and final health outcomes (especially symptom-based and quality of life scales), plus measures of benefit suitable for

inclusion as end-points in economic studies, for use in research on asthma and particularly, severe and difficult asthma.

6. Further work on the conceptualisation of interventions, particularly with a view to the development of individualised, multidisciplinary interventions, incorporating application of psycho-educational theories, which can be delivered to a broad spectrum of patients, potentially in primary care or community settings.
7. Development and conduct of pragmatic RCTs to evaluate and compare different well-defined, theory-based interventions in practice which should:
 - (a) take account of guidance on the development and conduct of complex interventions;
 - (b) be piloted or based on prior modelling of possible effectiveness and cost-effectiveness to inform sample-size calculations and feasibility of full-scale evaluations;
 - (c) focus on broad-based multifaceted approaches adapted to individual needs for a wide spectrum of at-risk patients or evaluate specific interventions matched to the needs of particular groups, especially in areas where evidence is lacking (e.g. psycho-social interventions, adults, complex patients);
 - (d) have sufficient power and length of follow-up (preferably ≥ 12 months) to assess all important health and intermediate outcomes using validated measures;
 - (e) incorporate, where possible, assessment of relevant costs and end-points suitable for inclusion in economic analyses.

Publication

Smith JR, Mugford M, Holland R, Candy B, Noble MJ, Harrison BDW, *et al.* A systematic review to examine the impact of psycho-educational interventions on health outcomes and costs in adults and children with difficult asthma. *Health Technol Assess* 2005;**9**(23).

NHS R&D HTA Programme

The research findings from the NHS R&D Health Technology Assessment (HTA) Programme directly influence key decision-making bodies such as the National Institute for Health and Clinical Excellence (NICE) and the National Screening Committee (NSC) who rely on HTA outputs to help raise standards of care. HTA findings also help to improve the quality of the service in the NHS indirectly in that they form a key component of the 'National Knowledge Service' that is being developed to improve the evidence of clinical practice throughout the NHS.

The HTA Programme was set up in 1993. Its role is to ensure that high-quality research information on the costs, effectiveness and broader impact of health technologies is produced in the most efficient way for those who use, manage and provide care in the NHS. 'Health technologies' are broadly defined to include all interventions used to promote health, prevent and treat disease, and improve rehabilitation and long-term care, rather than settings of care.

The HTA programme commissions research only on topics where it has identified key gaps in the evidence needed by the NHS. Suggestions for topics are actively sought from people working in the NHS, the public, consumer groups and professional bodies such as Royal Colleges and NHS Trusts.

Research suggestions are carefully considered by panels of independent experts (including consumers) whose advice results in a ranked list of recommended research priorities. The HTA Programme then commissions the research team best suited to undertake the work, in the manner most appropriate to find the relevant answers. Some projects may take only months, others need several years to answer the research questions adequately. They may involve synthesising existing evidence or designing a trial to produce new evidence where none currently exists.

Additionally, through its Technology Assessment Report (TAR) call-off contract, the HTA Programme is able to commission bespoke reports, principally for NICE, but also for other policy customers, such as a National Clinical Director. TARs bring together evidence on key aspects of the use of specific technologies and usually have to be completed within a limited time period.

Criteria for inclusion in the HTA monograph series

Reports are published in the HTA monograph series if (1) they have resulted from work commissioned for the HTA Programme, and (2) they are of a sufficiently high scientific quality as assessed by the referees and editors.

Reviews in *Health Technology Assessment* are termed 'systematic' when the account of the search, appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.

The research reported in this monograph was commissioned by the HTA Programme as project number 01/16/02. As funder, by devising a commissioning brief, the HTA Programme specified the research question and study design. The authors have been wholly responsible for all data collection, analysis and interpretation and for writing up their work. The HTA editors and publisher have tried to ensure the accuracy of the authors' report and would like to thank the referees for their constructive comments on the draft document. However, they do not accept liability for damages or losses arising from material published in this report.

The views expressed in this publication are those of the authors and not necessarily those of the HTA Programme or the Department of Health.

Editor-in-Chief: Professor Tom Walley
Series Editors: Dr Peter Davidson, Professor John Gabbay, Dr Chris Hyde,
Dr Ruairidh Milne, Dr Rob Riemsma and Dr Ken Stein
Managing Editors: Sally Bailey and Caroline Ciupek

ISSN 1366-5278

© Queen's Printer and Controller of HMSO 2005

This monograph may be freely reproduced for the purposes of private research and study and may be included in professional journals provided that suitable acknowledgement is made and the reproduction is not associated with any form of advertising.

Applications for commercial reproduction should be addressed to NCCHTA, Mailpoint 728, Boldrewood, University of Southampton, Southampton, SO16 7PX, UK.

Published by Gray Publishing, Tunbridge Wells, Kent, on behalf of NCCHTA.

Printed on acid-free paper in the UK by St Edmundsbury Press Ltd, Bury St Edmunds, Suffolk.