Objectives, methods and content of patient education programmes for adults with asthma: systematic review of studies published between 1979 and 1998

Philippe Sudre, Stéphane Jacquemet, Christophe Uldry, Thomas V Perneger

Abstract

Background—Education programmes for adults with asthma vary widely. Such variability suggests a lack of consensus on what works and what does not. The objectives of this paper are to describe asthma education programmes and assess their variability.

Methods—A systematic review of reports published between 1979 and 1998 was conducted. Medline, the CINAHL database, the PsycINFO database, the Cochrane collaboration database, the Dissertation Index database, and cross referencing were used to identify educational interventions; 77 projects including 94 interventions that involved 7953 patients were analysed. A standard form was used to record characteristics of studies (design, setting, size, year, and country of publication), projects (theoretical framework, objectives), and education (methods, duration, intensity, educator, and content).

Results—Most reports did not specify the general (56%) and educational objectives (60%) of the intervention. Important training characteristics were often not available: duration of education (45%) and number of sessions (22%), who delivered education (15%), whether training was conducted in groups or was individualised (28%). When this information was available there were wide variations in training methods and content: training duration ranged from 0 (self-education) to 58 hours and the number of sessions from 0 to 36; training tools such as peak flow meters, diary cards or books were used in various proportions of interventions (19%, 27%, and 23%, respectively). The content of education also differed widely between programmes.

Conclusions—Insufficient documentation of asthma education programmes for adults precludes their replication. This, together with excessive variability, reduces the possibility of identifying their most effective components. A more systematic description of asthma training programmes should be promoted.

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Education programmes for people with asthma have existed for a long time but what exactly "patient education" stands for remains elusive. Even a cursory overview of education programmes for asthma patients reveals that programmes vary widely in objectives, educational methods, intensity and duration, educator, and content. Such variability suggests a lack of consensus on what works and what does not in patient education.¹ It precludes a meaningful evaluation of the overall effectiveness of educating asthma patients such as could be achieved by a meta-analysis. Intervention variability has been a minor concern of previously published reviews.²⁻³ We therefore conducted a systematic review of published educational interventions for adults with asthma with the objective of describing asthma education programmes and assessing their variability.

Methods

IDENTIFICATION AND SELECTION OF STUDIES

To identify relevant studies we applied the algorithm "asthma and (education or training or self management)" to the Medline database (1966-98), the Dissertation Index database (1966-98), the Nursing and Allied Health (CINAHL) database (1983-98), the PsycINFO database (1967-98), and the Cochrane collaboration database (fig 1). Titles of 2528 articles archived and of 110 dissertations were screened to select relevant studies and the abstracts of 633 possibly eligible articles were read. Editorials, reviews, and guidelines were kept for cross referencing. After reading 181 potentially relevant articles, 87 studies were excluded because they involved children less than 18 years old exclusively, provided no evidence that an educational intervention was implemented, or were not written in either English, French, Dutch or German. The 94 studies which remained eligible referred to 77 projects as nine projects were described twice,⁴⁻²¹ two were described in three publications,²²⁻²⁷ and one in five publications.²⁸⁻³² The most complete article in multi-publication projects was kept for this analysis leaving a total of 77 studies.^{4 6 8 10 12 14 16 18 20 22 25 28 33-97} These studies included a total of 138 intervention groups. Groups that received no or only minimal education (n = 44) were excluded, leaving a total of 94 active educational interventions.

Institute of Social and Preventive Medicine, University of Geneva, CMU, CH-1211 Geneva 4, Switzerland
P Sudre
T V Perneger

Division of Therapeutic Education for Chronic Diseases, Department of Internal Medicine, Geneva University Hospital, CH-1211 Geneva 14, Switzerland
S Jacquemet

Policlinique Médicale Universitaire, Division of Pneumology, CH-1005 Lausanne, Switzerland
C Uldry

Correspondence to:
Dr P Sudre.

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Table 2 Training characteristics of asthma education interventions (*n* = 94)

	No. (%) *	Not stated (%)
Education delivered by		14 (15)
Physician	34 (36)	
Nurse	36 (38)	
Physiotherapist	10 (11)	
Health educator	9 (10)	
Multi-disciplinary team	1 (1)	
Others**	25 (27)	
Teaching setting		26 (28)
Individual	35 (37)	
Group	26 (28)	
Both	7 (7)	
Training tools		12 (13)
Book	22 (23)	
Leaflet/handout	27 (29)	
Diary card	25 (27)	
Self-management card	20 (21)	
Peak flow	18 (19)	
Video tape	14 (15)	
Audio tape	8 (9)	
Telephone	6 (6)	
Others***	4 (4)	
Training methods		7 (7)
Lecture	83 (88)	
Discussion with teacher	36 (38)	
Practical exercise	24 (26)	
Discussion between patients	17 (18)	
Problem solving	8 (9)	
Role play	5 (5)	
Others"	12 (13)	

*For each characteristic the total adds up to more than 100% as more than one answer is possible.

**Pharmacist (7), self (8), psychotherapist (3), hockey player (1), community health worker (1), yogi (1), experimenter (1), social worker (1), lung technician (1), social scientist (1), unknown (1).

***Training log (1), yoga exercise (1), written contract (1), horn in inhaler (1).

"Homework (3), demonstration (2), focus group (1), game (1), training (2), written cues (1), pictorial information (1), asthmatic partner (1).

patient health such as "to improve patient's condition and symptoms"⁴ were explicit in 34 studies (44%) and learning objectives stated in terms of knowledge, skills or complex behaviours such as "to improve knowledge about

asthma"⁶⁶ or "to improve self management skill"²⁵ were given in 31 studies (40%).

EDUCATION CHARACTERISTICS

Even basic descriptive information was often missing (table 2). For example, information about who delivered the education (15%), whether education was conducted individually or in a group (28%), and what teaching tools were used (13%) was missing in a substantial proportion of reports. When information was available it revealed important variability in training characteristics. Education was most often delivered by nurses and/or physicians; the patients educated themselves using a book or some other training tool 9% of the time. Delivery of education by a multi-disciplinary team was mentioned in one intervention only,⁴ although more than one health professional was involved in 30 interventions (32%). Individual education was slightly more common (37%) than group settings (28%). Most interventions relied on vertical teaching (defined as the unidirectional delivery of an educational message from a teacher to a student without reference to any interaction), and about half used interactive approaches (i.e. discussion).

The duration of formal interaction with educators was missing for 42 interventions (45%); when available, duration ranged from 0 to 58 hours (mean 6.8 hours, median 3 hours, 0 hour denotes self-education only). The number of days over which the educational intervention was delivered was missing for 23 interventions (25%); when specified, the period ranged from 0 (self-education) to 1080 days (mean 108.8 days, median 30 days). The number of education sessions was missing for 21 interventions (22%); when specified, the number ranged

Table 3 Content and level of integration of 94 asthma education interventions

Content	Level of integration*				
	Knowledge No. (%)	Skills No. (%)	Integration No. (%)	Any No. (%)	Personalisation No. (%)
Asthma disease				64 (68)	
General knowledge of asthma	44 (47)	—	—	44 (47)	—
Physiopathology	41 (44)	—	—	41 (44)	—
Symptoms (general)	28 (30)	—	—	15 (21)	4 (4)
Symptoms monitoring	13 (14)	11 (12)	—	24 (26)	3 (3)
Experience of asthma	11 (12)	—	—	11 (12)	3 (3)
Symptoms management and control	22 (23)	5 (5)	5 (5)	32 (34)	7 (7)
Drugs				78 (83)	
Use of drugs in general	54 (57)	—	—	54 (57)	—
Type of drugs (BD/AI)	55 (58)	—	—	55 (58)	15 (16)
Inhalation devices, general	17 (18)	31 (33)	—	48 (51)	14 (15)
Compliance (chronic)	18 (19)	—	1 (1)	19 (20)	2 (2)
Self-adjustment (acute episode)	23 (24)	—	8 (9)	40 (43)	11 (12)
Triggers				28 (30)	
List, general	37 (39)	—	—	37 (39)	2 (3)
Avoidance/eviction	25 (27)	1 (1)	4 (4)	30 (32)	9 (10)
Peak flow				45 (50)	
Peak flow practice	24 (26)	4 (4)	—	28 (30)	4 (4)
Peak flow use	20 (21)	15 (16)	6 (6)	41 (43)	8 (8)
Self-management (SM)				52 (55)	
SM in general	32 (34)	—	—	32 (34)	6 (6)
SM plan	26 (28)	—	4 (4)	30 (32)	18 (19)
Others				52 (55)	
Disease perception/psychological	14 (15)	—	4 (4)	18 (19)	8 (9)
Social support	4 (4)	—	1 (1)	5 (7)	0 (0)
Relaxation, self-control, yoga, etc.	11 (12)	7 (7)	3 (3)	21 (22)	5 (5)
Smoking	8 (9)	1 (1)	0 (0)	9 (10)	3 (3)

— = not applicable; BD/AI = bronchodilator/anti-inflammatory.

*Level of integration: content category is rated according to levels of learning as either the simple transmission of knowledge, teaching of instrumental skills, or the integration of knowledge and skills for self-management of asthma.

Table 4 Characteristics of asthma education studies ($n = 77$) and interventions ($n = 94$) by year

Study characteristics	Year			<i>p</i> value*
	1979–89 ($n = 22$)	1990–94 ($n = 25$)	1995–98 ($n = 30$)	
Mean (SE) no. of patients studied	68 (17)	170 (37)	79 (11)	0.01
Randomised study (%)	10 (46)	13 (52)	19 (63)	0.19
Intervention characteristics (%)	$n = 28$	$n = 31$	$n = 35$	
Hours of training				
Mean (SE)	8.4 (3.6)	4.3 (1.5)	7.8 (2.6)	0.51
n	13	17	22	
Duration of training period (days)				
Mean (SE)	48.7 (24.6)	78.5 (28.1)	173.2 (45.3)	0.05
n	20	22	29	
Training tools (%)				
Book	6 (21)	6 (19)	10 (29)	0.48
Diary card	4 (14)	5 (16)	16 (46)	0.01
Self-management card	3 (11)	5 (16)	12 (34)	0.02
Peak flow	1 (4)	6 (19)	11 (31)	0.01
Others	4 (14)	3 (10)	6 (17)	0.71
Mean (SE) number of tools	1.3 (0.2)	1.3 (0.2)	2.3 (0.2)	<0.01
Training methods (%)				
Lecture (vertical)	23 (82)	29 (93)	31 (89)	0.48
Interaction**	17 (60)	11 (36)	20 (57)	0.89
Content (%)				
Self-management	10 (36)	15 (48)	27 (77)	<0.01
Peak flow	6 (21)	12 (39)	27 (77)	<0.01
Trigger	5 (18)	18 (58)	25 (71)	<0.01
Personalisation	13 (46)	12 (39)	18 (51)	0.65

* χ^2 for trend (proportion) or ANOVA (means).

**Either problem solving, discussion with teacher or between patients, practical exercise, or role play.

from 0 (self-education) to 36 sessions (mean 4.2 sessions, median 3 sessions).

CONTENT OF PATIENT EDUCATION

Education content was often insufficiently described. Available information indicated that interventions varied widely (table 3). At least some aspect of training was personalised in 46% of interventions. The most common content categories included asthma as a disease and drugs. Few interventions went beyond transmission of knowledge.

TRENDS OVER TIME

Programme characteristics changed little over time (table 4). Studies grew bigger in the 1990–4 period and a slight tendency toward more randomised evaluations in recent years was not statistically significant. The mean duration of the training period increased from

less than two months to almost six ($p = 0.02$), suggesting that one-time interventions are falling out of favour. More recent programmes were more likely to use diary cards and peak flow meters as training tools, and to include a discussion of triggers of asthma attacks, peak flow use, and self-management. Neither interactive teaching methods nor personalised training became more common in recent years.

GEOGRAPHICAL DIFFERENCES

Training was more often individualised in programmes from North America, Australia or New Zealand and relied more often on nurses to deliver education in North America and the UK. All programmes from Oceania addressed the use of peak flow meters while this component was included in only about one third of interventions conducted elsewhere (table 5).

Discussion

This systematic review identified 77 projects describing or comparing 94 educational interventions for adults with asthma. The main findings are that important information about the educational programmes is often lacking in the published sources, and that educational interventions vary widely in their methods and content. Furthermore, far too many programmes are potentially ineffective as they rely on mere transmission of knowledge in the hope of modifying behaviour and resort to vertical teaching methods which may lack effectiveness when educating adults.^{98 99}

VARIABILITY IN PRACTICES

The variations between programmes were often impressive. For instance, patient education could consist of a 10 minute encounter with a physician⁶⁵ or a 24 hour, week long, programme involving several trainers²⁹; it may have been a single session or a series of classes spread over two years.²⁰ Training could be individual, in groups, or both and use any combination of tools and education methods. Even the content of patient education varied widely: only 58% of the interventions addressed the difference between anti-

Table 5 Characterisation of asthma education intervention ($n = 91^*$) by region

	North America ($n = 41$)	Australia & New Zealand ($n = 9$)	United Kingdom ($n = 19$)	Mainland Europe ($n = 22$)	<i>p</i> value**
Hours of training					
Mean (SE)	6.6 (2.2)	6.2 (1.7)	2.9 (1.9)	8.4 (3.8)	0.70
n	20	6	9	15	
Education delivered by (%)					
Physician	7 (17)	3 (33)	12 (63)	10 (46)	0.01
Nurse	19 (46)	1 (11)	9 (47)	7 (32)	0.18
Training tools (%)					
Diary card	12 (29)	4 (44)	4 (21)	4 (18)	0.44
Peak flow	5 (12)	3 (33)	7 (37)	3 (14)	0.09
Self-management card	7 (17)	2 (22)	8 (42)	3 (14)	0.11
Mean (SE) number of tools	1.9 (0.2)	1.9 (0.4)	1.7 (0.3)	1.9 (0.1)	0.74
Training methods (%)					
Vertical	38 (93)	7 (78)	16 (84)	19 (86)	0.56
Interaction***	26 (63)	6 (67)	5 (26)	8 (36)	0.01
Content (%)					
Peak flow	16 (39)	9 (100)	7 (37)	12 (55)	0.01
Self-management	22 (53)	6 (67)	14 (74)	8 (36)	0.10

*Three studies from India (1) and Brazil (2) are excluded from this table.

** χ^2 test for proportion or ANOVA (means).

***Either problem solving, discussion with teacher or between patients, practical exercise, or role play.

inflammatory drugs and bronchodilators, and only one third proposed a complete self-management plan to the participants.

This finding suggests a lack of consensus on effective patient education in asthma. Either effectiveness data are not available, or they are but people are not using them. Establishing a formal consensus on what works in patient education in asthma and encouraging research about what is unknown should be a priority for physicians, educators, purchasers, and policy makers. Historically, the description of variations in clinical practice has provided a useful impetus for fostering consensus, encouraging relevant outcomes research, and eliminating care of uncertain effectiveness.¹⁰⁰ However, until consensus is reached and effectiveness demonstrated, education programmes for patients with asthma will face low credibility, limited funding, and limited eligibility for reimbursement by purchasers and health insurance funds.

The variability in educational interventions implies that a meta-analysis of the overall effectiveness of patient education in asthma is hardly feasible; the heterogeneity of the interventions precludes meaningful pooling of the results. A meta-analysis to identify predictors of effectiveness among educational interventions would be more useful but even that endeavour would be hampered by the variability in outcome variables used in the various studies (unpublished observation based on randomised trials included in our analysis).

We are concerned that many of the educational interventions that we reviewed may lack effectiveness because they conflict with leading theories of adult education.⁹⁹ Most interventions had no clear theoretical foundation, nor were they based on empirical evidence of patient needs. Most aimed at transmitting knowledge about asthma instead of focusing on the patient's ability to deal with her or his illness, but ample evidence suggests that a wide gap often separates knowledge and behaviour.⁹⁸ Educational methods were also often ill suited, favouring the vertical teaching format, while interactive methods and problem based learning were often woefully absent. Even though these a priori arguments do not demonstrate lack of effectiveness, they raise serious concerns about the current state of patient education for subjects with asthma.

INCOMPLETE DOCUMENTATION

This systematic retrieval of information from published reports uncovered another difficulty: many programmes are so poorly described that, even if they were effective, one could not replicate them in another setting. Thus, educational interventions are not up to the standard routinely applied to pharmacological treatments for which the indication, dosage, route of administration, number of administrations per day, duration of treatment, etc must be specified. Furthermore, studies often failed to describe what types of patients were recruited or the participation rates among eligible patients, which prevents the reader from assessing the applicability of the findings to another patient population. Incomplete pro-

gramme description may be due to the limited space that journals provide for authors and programme manuals might have been available for several studies. In general, however, the article length allowed in most journals should be sufficient to present the information required for reproducing an intervention. Lack of transmissibility obviously hampers progress and our observation that little has changed over time in patient education suggests that, indeed, educators are not able to benefit from the experience of others. We recommend that a consensus be developed about what information should appear in published descriptions and evaluations of educational interventions (akin to the CONSORT statement for clinical trials¹⁰¹) to promote the sharing of experience and facilitate the replication of evaluation studies. In our opinion the standard description should specify a theoretical framework for the intervention, distinguish between general objectives (in terms of patient health) and specific objectives (referring to the educational process), and provide a detailed account of what was done.

As all systematic reviews, our study is subject to a possible publication bias and our conclusions cannot apply to programmes that have not been published. However, even if published interventions were not representative of the rest, the variability between interventions and their insufficient documentation would remain a valid observation which requires prompt corrective action.

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