International Journal of Technology Assessment in Health Care, 15:3 (1999), 458–472.

COMBINING FEEDBACK FROM SIMULATED CASES AND PRESCRIBING

Design and Implementation of an Educational Intervention in Primary Care in Sweden

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Abstract

Objectives: To develop and evaluate a new model of continuing medical education (CME) for general practitioners (GPs). The study is part of the joint European Drug Education Project (DEP). This paper presents the Swedish part regarding the design of the evaluation study, the educational methodology, and the participants' evaluation.
Methods: An educational model was developed. Two peer group discussions (facilitated by a GP/pharmacist team), including individual feedback on the GPs' judgments of written simulated cases and prescribing, were main components. The model was tested in a parallel randomized controlled study including 36 GP groups, allocated to education on asthma or urinary tract infections. Background and outcome data were knowledge and attitudes (K/A) assessed by a questionnaire and prescribing practices for actual and written simulated cases. The GPs' evaluation of the model was captured through a questionnaire.

The project was financially supported by Apoteksbolaget's Fund for Studies and Research within Health Economics and Social Pharmacy, the EU BIOMED I Program (contract no. BMH1-CT93-1377), and PECO-NIS Program (contract no. ERB-CIPD-CT940231). We thank all participating general practitioners and pharmacies. We thank the specialists within different areas with whom we had contact during the development and testing of the written simulated cases. A special thanks to Olle Staf, general practitioner, for his indispensable contribution as facilitator during the intervention. We also thank the core members of the European Drug Education Project in the other participating countries for their input: F.M. Haaijer-Ruskamp (international coordinator), P. Denig, and C.C.M. Veninga, The Netherlands; M. Andrew, I. Matheson, M. Loeb, and P. Lagerlov, Norway; M.M. Kochen and E. Hummers-Pradier, Germany; M. Muskova and Z. Kopernicka, Slovak Republic.

Results: All 36 groups completed the program. The mean participation rate in the group discussions was 75%. The response rates were 82–98% regarding background, 60–83% regarding outcome data (K/A questionnaire and written cases), and 80% regarding the evaluation questionnaire. Prescribing data were captured for 99% of the GPs. Both group discussions were considered important by 84–89%. Eighty-seven percent wished to take part in similar CME activities for other conditions. About 80% reported that their purpose in participating had been fulfilled.
Conclusions: It was feasible to evaluate the developed educational model by using a two-armed parallel study design. The model was well received by the participants.

Keywords: Medical education, continuing, Family practice, Prescribing feedback, Written simulated cases, Group randomization

Prescribing, one of the most common interventions in health care, has in many cases been described as inappropriate (25) or not in accordance with accepted treatment guidelines (18;30). The problem of translating guidelines into changes in clinical practice has been recognized (15;42;45). Ways have been sought of improving prescribing through various kinds of noncommercial interventions (9;20). The methods of influencing prescribing can be divided into: a) educational; b) managerial/administrative; and c) regulatory interventions.

Providers of commercial drug information typically use various kinds of educational interventions, including emotional persuasion (24). Independent noncommercial authorities have stronger means to enforce their objectives, such as through various kinds of regulatory or administrative restrictions, but increasingly they also use educational interventions. Through managerial/administrative or regulatory interventions, the physician can be forced to prescribe in line with the formulary of the health care organization. Through educational interventions, which is our focus, the prescriber becomes convinced by intellectual or emotional arguments to change behavior (7).

Paradoxically, noncommercial educational interventions have often lacked an understanding and recognition of the learner's perspective (45), although several models and theories have been put forward in the domain of learning in a professional context. Schön (34) and Fox (16) emphasize that professional practitioners (e.g., doctors) in their decision making often depend less on factual knowledge than on their capacity to reflect in action, that is, learning by doing, and on developing the ability for continued learning and problem solving throughout their careers. Such conclusions are supported by research in educational psychology (3;29;33), for example, that a) a learner must adapt new knowledge to what he or she already knows; b) it is important for a learner to be in control of his or her learning process, to be motivated, and to perceive meaningfulness; c) any training or communication on factual knowledge (often called information) ought to stress comprehension and application; and d) it is beneficial for learning when the social climate is supportive and appropriate and when learning involves the learner's emotions and facilitates elaboration of the material to be learned. However, the practical application of the abovementioned theories and models in the field of continuing medical education (CME) has been relatively limited.

Research on how to improve CME has been reported during the last decades, and an increasing awareness has developed of the importance of the learning process (26;45) and the complexity of the prescribing decisions (10;31;32). Among components of CME that have been shown to change behavior (9) are: a) use of multifaceted interventions; b) use of outreach visits; c) involving representatives of

the target group in the development process; d) use of guidelines; e) defining clinical needs; f) use of audit and feedback; g) addressing specific barriers to change; and h) peer group discussions.

Fox (16) has pointed out that physician-learners progress at their own rate, depending on their motivation and their perception of a gap between their current knowledge and skills and those needed. Cognitive feedback, in this case so-called clinical judgment analysis (CJA), could be one means of increasing doctors' ways of understanding their own decisions and identifying gaps in their own knowledge and skills. Cognitive feedback is feedback on the decision process, i.e., why or how a decision is made and not on the decision itself, i.e., which decision is taken (outcome) (6). CJA was developed within the social judgment theory with the theoretical background in the lens model (21). CJA has mainly been used within medicine to show how different physicians vary in their use of information factors when dealing with a common medical problem (23).

Given the abovementioned background, a new CME model, including educational packages for two conditions (asthma and uncomplicated urinary tract infections [UTI]), was developed. The aim of the study was to develop, implement, and evaluate this new form of CME in primary care in Sweden. This study is part of the European Drug Education Project. The design, the educational program, and the instruments used in this study were developed jointly by the members of this international project. In this article we focus on the methodologies used and the implementation in Sweden, including the participating general practitioners' evaluation of their experiences of the model.

METHODS

Study Design and Rationale

The study was randomized and controlled, with a two-armed parallel design. Randomization was performed with the group as a unit of randomization (12). In order to detect a prescribing difference of 10% between intervention and control arms with a power of 90% at a significance level of 5%, it was decided to include at least 15 groups of 3–5 general practitioners (GPs), each with at least 25 observations, in each study arm (11). Asthma in adults and uncomplicated UTI in adult women were chosen as tracer conditions because: a) both are common in primary care; b) national treatment guidelines produced by the Medical Products Agency (MPA) were available (39;40); and c) drug statistics (28) indicated that improvements were possible vis-à-vis the recommendations in the guidelines. Half of the participating GP groups were to participate in CME on asthma and the other half on UTI (the two study arms). The GP groups participating in the asthma intervention served simultaneously as the control groups for UTI, and vice versa. This design was chosen to control for the Hawthorne effect, i.e., that attention in itself brings about change (27). An overview of the study design, including the time schedule, is shown in Figure 1.

Study Population

Groups of GPs were recruited using a procedure with seven inclusion criteria and two exclusion criteria. The inclusion criteria were: a) GPs had to be fully qualified and permanently employed or subject to a long-term contract covering the duration of the project; b) GPs had to join as groups; c) groups had to be pre-existing; d) the preferred group size was three to six; e) the decision to participate had to be

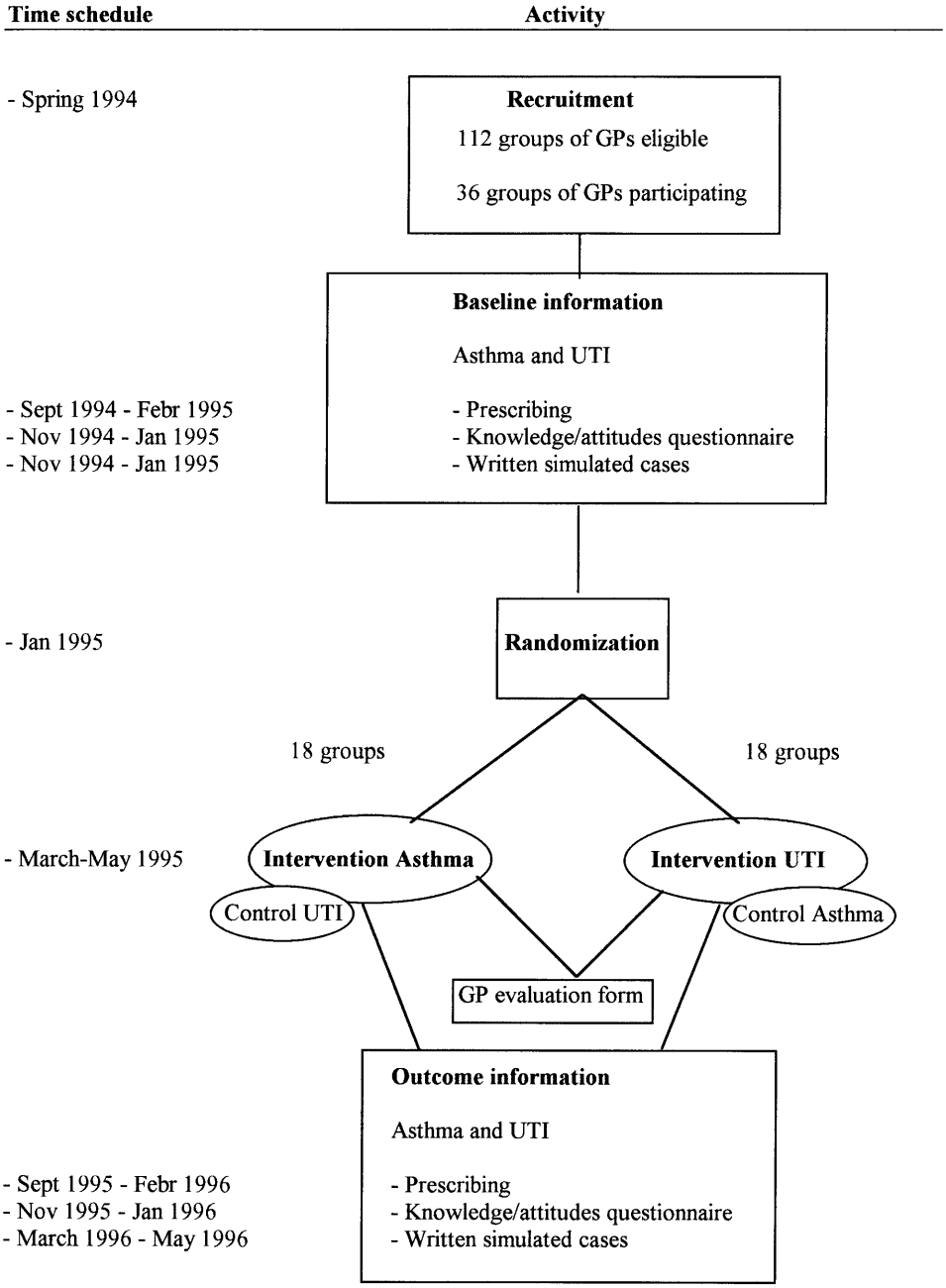

Figure 1. Study design, including time schedule.

reached by group consensus; no GPs were to be forced; f) it had to be geographically feasible to visit participating health centers (less than 400 km from our department); g) it had to be possible to collect prescribing data without involving on average more than two pharmacies per GP group. The exclusion criteria were: a) previous participation in extensive research or educational activities concerning asthma or

https://doi.org/10.1017/S0266462399315324 Published online by Cambridge University Press

UTI; and b) linkage to or geographic proximity to a department of family medicine or general practice.

Individual invitation letters were sent to GPs working in groups in eight counties in central Sweden, presenting the objectives of the study and the inclusion/exclusion criteria. Later, one county was excluded due to an administrative reorganization, giving 112 eligible GP groups. In all, 39 groups (204 GPs) consented to participate in the study. The 39 groups were, for practical reasons, merged to 36 groups with 3–10 GPs in each.

Randomization

The randomization process was performed through the SPSS 6.0 random generator (37) after collection of the baseline data (see below). The 36 GP groups were stratified into three blocks, depending on the group size (3–4, 5–6, and 7–10 GPs, respectively). In each block the groups were randomly allocated into two subarms. The subarms, from the respective blocks, were merged together to two study arms of 18 GP groups each. It was then randomly decided which of these two arms were to receive the respective education (asthma or UTI).

Data Collection Methods

Data regarding both asthma and UTI were collected from both study arms.

Three types of pre-intervention data were collected prior to the randomization. First, the pre-intervention data included the doctors' responses to a questionnaire on knowledge and attitudes regarding asthma and UTI, comprising 42 questions on asthma and 21 questions on UTI. The questionnaire was left with the doctors during a pre-intervention visit, individually completed later, and sent to the project team. Feedback was not prepared from these data, but the results were used to find gaps in knowledge for preparing the intervention. Second, the doctors' treatment decisions for series of written simulated cases were collected (see below). The series were completed individually by each GP during the pre-intervention visit by a member of the intervention team who initiated the method. The series of clinical judgments were analyzed and individual feedback was prepared. Third, the participants' prescriptions were collected through local pharmacies during six months (September 1, 1994 to February 28, 1995). Data on prescriptions for the following defined drug groups were sent to the research team: urinary antiseptics and anti-infectives (ATC[1] group G04A), glucocorticoids (H02AB), antibacterials for systemic use (J01), and anti-asthmatics (R03). The pre-intervention prescribing data were analyzed to prepare individual feedback.

The individual participants' evaluations of the educational intervention were collected after the intervention through a specifically designed questionnaire (see below).

Outcome data of the same kind as the pre-intervention data were collected after the intervention period using similar methods, for later evaluation of change.

Written Simulated Cases

In order to address the messages to be conveyed during the intervention (see below), three series of written simulated cases were constructed, two for asthma and one for UTI. The series were developed in an interdisciplinary process involving opinion-leading physicians, for asthma and UTI, respectively, outside the research team. The series were constructed to be analyzed using CJA for preparing cognitive feedback, i.e., feedback on factors triggering a specific decision (6). In each series

there were 26 case presentations. Asthma series 1 dealt with the treatment of an exacerbation, Asthma series 2 with dose adjustments in a patient with maintenance therapy, and the UTI series with drug choice and duration of treatment.

Within each series the same background information was presented for all cases. A number of information factors (cues), e.g., for the UTI series, age, previous episodes of distal UTI, severity of symptoms, and circumstances (week day and whether the patient was the GP's own) were varied at two to three levels, resulting in different case presentations. Questions were presented for each case presentation. In each of the series, the questions were the same for all case presentations.[2]

The Educational Intervention

The intervention was multifaceted and used a combination of feedback material discussed during outreach visits by a GP and a pharmacist[3] (the intervention team/facilitators) to GP peer groups. The presented messages were based on the content of the national guidelines (40;41). For asthma the messages were:

- Do not hesitate to use oral corticosteroids in short term courses when needed;
- No routine use of antibiotics in asthma exacerbations;
- If inhaled β2-agonists are used more than twice weekly, more aggressive treatment is indicated; and
- Reduce periods on a high dosage of inhaled corticosteroids ($\geq$ 1,600 μg/day).

For UTI the messages were:

- Fluoroquinolones are not first-line drugs;
- Switch between alternative first-line drugs (for ecological reasons);
- Nitrofurantoin can be used as a first-line drug in all young women with UTI, not only in pregnant women with UTI (side effects are more common in women $>$ 50 years of age);
- Use 7-day courses (or less) for uncomplicated UTI; and
- Use local estrogens in postmenopausal women (when needed).

The intervention comprised several elements, of which the major were the provision of individual feedback on the series of simulated cases (process [cognitive] and outcome) and on actual prescribing, use of outreach visits, use of peer group discussions, and use of existing guidelines. Because the feedback was at individual level, the sessions were especially tailored for each group. Each group was to be visited twice by the intervention team. The intention was to have at least 3 weeks between the two meetings, in order to give the GPs opportunity to reflect on the first discussion in their patient contacts. When presenting the feedback, the GPs were to be identified through code numbers known only to the GP personally and to the intervention team.

The first visit concerned feedback regarding the written simulated cases (asthma or UTI). Material from the cases was presented in several ways, including feedback on actual decisions taken on the simulated cases, the extent of use of the information factors (cues), and the agreement on decisions between individual members within the group. The second visit concerned feedback on prescribing data from the pre-intervention period (asthma or UTI). For asthma, data regarding men and women of age 18–49 years were used, and for UTI, data regarding women 18–75 years of age were used. Asthma patients treated by GPs in the asthma intervention arm were categorized according to the steps in the asthma treatment "staircase" in the guidelines (41). Some patients, where problems regarding drug treatment according

to the research team could be anticipated, were identified from the prescriptions. The GPs were asked to bring copies of the records for these patients to the meeting. During the meetings, the treatment of these specific patients was discussed, especially differences between what was prescribed according to the records and what was actually dispensed.

The facilitators presented the feedback in a stepwise manner and restricted their own talking time to encourage discussion among the GPs and to give them the opportunity to be the main actors. One to two hours were reserved for each group meeting during working hours. All feedback data were presented at individual level; no group means or other aggregated material was presented. On both occasions, and for both asthma and UTI, the content of the respective guideline was brought into the discussion.

GP Evaluation Form

To evaluate the participants' views on and experiences of the education, a specifically designed GP evaluation form was left with each participant at the second intervention meeting, together with a return envelope. The evaluation form was based on previous experiences within the research group and included statements about the content and structure of the meetings and questions regarding the project (in total, 62 items). For each statement the GP had to mark, on a six-point scale, whether he or she agreed or disagreed. The GPs were free to formulate their own main purpose/expectation regarding the project and to indicate whether this purpose had been achieved.

Statistical Analysis and Methodologic Considerations

All data were entered and analyzed using SPSS (37). The use of 26 scenarios within each series of written simulated cases was a compromise between keeping the numbers low to encourage the GPs to answer the questionnaire and the need for an adequate sample size in order to calculate the decision policy for each GP. The cases were generated through an orthogonal design, with exclusion of clinically unrealistic cases using a predefined exclusion algorithm for each series. To calculate the extent of use of the cues, discriminant analysis was used when the outcome variable was dichotomous and multiple regression analysis when the outcome variable was continuous. The estimated fit of the model was given by the lambda value (discriminant analysis) or by R^2 (multiple regression).

The data from the GP evaluation form were analyzed at the group level, since the group was the unit of randomization. For each item a weighted mean (for group size, actual participants) percentage regarding agreement was calculated per GP group. This was done to avoid overestimation of responses by individual members in smaller groups.

Ethical Considerations

The ethical problem in controlled educational studies lies mainly in withholding education from the control group (11;45). In this project two parallel educational programs were used. The education was based on generally available and previously distributed guidelines (40;41). Each participating GP gave written consent that stipulated that we could process his or her prescriptions for feedback and outcome. After the outcome period, feedback regarding the control condition was also offered.

The study was approved by the Ethics Committees at Karolinska Institutet and Uppsala University Hospital.

Table 1. Characteristics of Participating Groups and GPs, including Response Rates (Presented as Pre- and Postintervention Data) for the Asthma and UTI Intervention Arm Separately

	Asthma intervention arm (*n = 18 groups*)	UTI intervention arm (*n = 18 groups*)
Number of GPs	100	104
Average no. of GPs per group, SD	5.6 (1.7)	5.8 (1.3)
Female GPs, percentage per group, SD	44 (19)	40 (22)
Average years of experience per GP, SD	9.7 (6.5)	10.0 (6.0)
Average no. of patients per GP, SD	1,859 (480)	1,813 (492)
Percentage of city practices	50	39
Response rates, pre-intervention data, percentage, SD		
K/A questionnaire[a] pre-intervention, SD	82 (23)	93 (13)
Written simulated cases, asthma series 1, SD	98 (7)	96 (8)
Written simulated cases, asthma series 2, SD	96 (9)	96 (7)
Written simulated cases, UTI series, SD	97 (9)	98 (6)
Response rates, postintervention data, percentage, SD		
GP evaluation form, SD	79 (25)	83 (22)
K/A questionnaire, SD	75 (26)	83 (23)
Written simulated cases, asthma series 1, SD	61 (30)	67 (34)
Written simulated cases, asthma series 2, SD	60 (31)	67 (34)
Written simulated cases, UTI series, SD	60 (31)	80 (24)

Abbreviations: SD = standard deviation; GP = general practitioner; UTI = urinary tract infection.
[a] K/A questionnaire refers to knowledge and attitudes about UTI and asthma. The questionnaire also gave information on GPs' characteristics.

RESULTS

Participants and Response Rates

There were no significant differences between the two study arms in the collected background characteristics or in response rates to the various questionnaires (Table 1). The range of pre- and postintervention response rates for the questionnaires, calculated on group level, is shown in Table 1. Prescribing data were captured for 99% of the participating GPs.

Intervention Including Feedback Material

The intervention was completed for all participating groups, i.e., all groups were visited twice. At 34 of the 36 health centers (94%), the interval was at least 3 weeks between the first (feedback on simulated cases) and the second meeting (feedback on prescribing). The interval varied between 1 week (one group), and 25 weeks (one group), with a median of 7 weeks (mean, 10.3 in asthma groups and 7.2 in UTI groups). The time spent on the meetings was similar for both meetings and in both study arms (mean, 1.4 hours). The mean participation rate in the meetings on the simulated cases was 80% in the asthma groups and 78% in the UTI groups. For the meeting on the prescribing, the corresponding figures were 74% and 77%, respectively.

There was wide variation within each group in decisions about the simulated cases, as well as in the use of the cues both for asthma and UTI. In the discussion of the feedback data, the differences and similarities in the use of cues were discussed, as was the agreement/disagreement among the doctors.

Table 2. The General Practitioners' Evaluation of the Developed Educational Program Regarding Content of the Meetings[a]

	Feedback on simulated cases		Feedback on prescribing	
	A[b] (%)	U[c] (%)	A[b] (%)	U[c] (%)
Positive statements				
Important	87	84	85	89
Useful	79	73	81	83
Learned content	64	67	73	77
Overall valuable	74	70	76	84
Negative statements				
Felt a "dictate" how to work	9	6	8	17
Superficial	21	19	13	14
Work-related statements				
Increased understanding of my own way of working	62	70	71	79
Good guidance for future clinical work	62	71	67	78
The group made use of my knowledge and experiences	58	65	66	66

[a] Results presented as weighted means percentages agreeing with statements. Weighting performed for actual group size.
[b] A = asthma intervention arm, n = 18.
[c] U = urinary tract infections intervention arm, n = 18.

There was usually a wide variation within each group regarding prescribing. For UTI the usually high use of the nonrecommended drugs was stressed and was related to the similarly high use in the simulated cases and the cues that triggered these decisions. In almost all the meetings the identity of the individual doctor was disclosed at the request of the participating GPs.

GP Evaluation

The overall response rate for the GP evaluation form was 80% (Table 1). The results were calculated as weighted mean (for group size) percentages and are, when applicable, presented separately for each study arm and each intervention session. For all items there was a wide range between the GP groups, in many cases between 0 and 100% agreement. There was 25% agreement with the statement "I am content with the frequency with which patient care questions are professionally discussed in normal practice." About 80% agreed that "the project gave opportunities to discuss issues relevant to daily work," and 87% in both study arms agreed to "wanting or probably wanting to participate in the same type of educational intervention for other topics." Eighty percent felt that they had achieved the purpose of their participation in the project. About 80% also agreed with the statement that the educational program, including the facilitators, showed a capacity to adjust to the reality in general practice. Ninety percent agreed that both the GP and the pharmacist functioning as facilitators had the appropriate knowledge, and 80% or more in all GP groups said they were both able to stimulate the discussion in a fruitful way. About 50% clearly stated that external facilitators are needed in an educational activity like this, while about 25% considered it possible to carry out the group discussions within their peer group without external facilitators.

The results of the evaluation of the meetings were separated into the content of the meetings, including their usefulness for practice (Table 2), and the process

Table 3. The General Practitioners' Evaluation of the Developed Educational Program Regarding Process of the Meetings[a]

	Feedback on simulated cases		Feedback on prescribing	
	A[b] (%)	U[c] (%)	A[b] (%)	U[c] (%)
Positive statements				
Stimulating meetings	69	77	84	86
Many opportunities to take part in the discussion	89	97	97	97
Felt free to take up questions and ideas	94	94	97	95
Well-structured meetings	81	85	84	85
Meetings worth the time	68	77	84	88
Negative statements				
Discussion dominated by a few persons	18	23	23	19
Too much time spent on irrelevant issues	6	5	8	8
Someone got unjustified criticism	3	5	3	4
Boring	13	15	10	9

[a] Results presented as weighted mean percentages agreeing with statements. Weighting performed for actual group size.
[b] A = asthma intervention arm, n = 18.
[c] U = urinary tract infections intervention arm, n = 18.

of the meetings, which includes the climate in the group (Table 3). Regarding content of the meetings (Table 2), 84% or more of the participants in both meetings agreed in both study arms with the statement that the educational activity was important and about 80% agreed that it was "useful in daily work." There was somewhat less agreement and more variation for the statements: "the meeting increased my understanding of my own way of working" and "the meeting gave good guidance for future clinical work," although the difference between the two meetings or between the study arms was not statistically significant. About 65% agreed with the statement that the group made use of their knowledge and experience. About 90% did not feel that the facilitators dictated how they should work. Regarding the process of the meetings (Table 3), about 80% found the meetings stimulating and 95% agreed that they had "many opportunities to take part in the discussion" and that they "felt free to take up questions and ideas." The meetings were well structured, according to 84% of the GPs, and 80% agreed that the meetings were worth the time spent. About 20% thought that the discussions were dominated by a few persons. An average of 4% agreed with the statement that "someone was unjustly criticized."

The GPs were asked whether they thought the project would result in any changes in the treatment of asthma or UTI, respectively. In the asthma intervention arm, 62% thought there would be changes in asthma management and 41% thought there would be changes in UTI management. In the UTI intervention arm, 25% thought there would be changes in asthma management and 69% thought there would be changes in UTI management.

DISCUSSION

A new model of CME, based on existing knowledge on professional learning in general and for physicians in particular (3;7;9;10;16;20;23;26;29;31;32;33;34;45), was

developed and implemented. The main characteristics of the model were peer-group discussions, facilitated by an outreach team, on individual feedback on both process and outcome regarding clinical decisions. Previous experiences in educational experiments (1;10;13;45) and work on quality improvement by peer review and audit (19;35) were used when developing the model.

When studying how physicians learn and change their medical practice, disposing, enabling, and forcing factors can be identified (17). These are a mix of professional factors, such as the desire for competence, social factors such as working climate, and personal factors such as curiosity (26). In this study, the three kinds of factors were taken into consideration throughout planning and implementation.

In a review on the effect of CME strategies, Davis et al. (9) pointed out the problem that, in most articles, neither the randomization process nor the educational intervention are described in detail. They also ask for innovative interventions and rigorous evaluations. In carrying out and presenting this study, we followed their points as close as possible, both by developing an innovative intervention, evaluating it rigorously in a randomized controlled trial, and by describing the randomization process and the educational intervention in detail.

In education, the attention effect (Hawthorne effect) (27) is present. In a way, the attention effect resembles the placebo effect. It can be utilized, but to be able to calculate the effect of the specific intervention it is important to be able to separate the "true" effect from the attention effect, i.e., to study the educational method while controlling for the attention effect. We have good reasons to believe that this was achieved through our study design with two parallel intervention arms. Similar attention was given to the control arm, as to the intervention arm, but a different topic was addressed.

A design with two parallel interventions in a randomized controlled study, with pre- and postintervention data, to our knowledge has not previously been applied to study the effects of new forms of CME. Because a randomized controlled study is the most unbiased method of evaluating effects, we argue that this method should be applied to educational interventions used within the health care system as well, given the importance of the subject and the awareness of the problem of using resources efficiently. There are few randomized controlled studies on educational outreach methods to improve health professionals' practice. In a recent Cochrane review only 18 randomized controlled studies on this issue were found (43), including a previous study from the Swedish research group (13).

Participation in this study was voluntary, which is a limitation regarding the generalizability of our findings to groups of doctors not participating in the study. The sample, however, represents GPs working in common public health centers, suggesting that the results are probably more or less true for many groups of GPs in Sweden. The concept of group-based CME activities can be applied in most contexts, at least within the public sector. It might be more complex, however, if doctors are working far apart or if they are competitors in private practices. It is also important that the doctors involved feel ownership of the data, and that confidentiality outside the concerned group of practitioners is maintained (8). However, it should usually be possible to produce some kind of material for discussion, such as record notes or prescribing data, from the doctors' own practice, regardless of the conditions and contexts.

The acceptance of the method used and the level of appreciation of various educational methods, including the participants' perception of its meaningfulness, are not often reported in detail in research reports. However, according to theories

on adult learning, such factors would be of crucial importance in order to induce change of behavior (3;29;33;34).

Before the intervention, the response rates to the various questionnaires were very high, usually above 90%, but decreased afterwards. Nonetheless, even the lowest response rate after the intervention (60%) is above the mean response rate of doctors to mailed questionnaires in published studies, which in one review was found to be 54% (2). The high response rate in the baseline period may be an expression of interest in the new approach, whereas the drop in the response rate in the outcome period could be interpreted as an expression of questionnaire overload. This overload was a result of our aim to study the outcome on judgment of simulated cases as well as on knowledge, attitudes, and prescribing. Each participating GP was to complete a total of nine extensive questionnaires in 18 months, requiring a total time of at least 4 to 5 hours.

In previous Swedish studies, prescribing data as feedback have been presented on health center level (14;44). However, as the variation usually is wide within groups, aggregated data do not show the complete picture. It has previously been suggested that GPs would be reluctant to expose their prescribing and prefer anonymity because their integrity would be threatened by presenting individual material (8;44). However, this study found that the GPs were willing to discuss their own material openly in peer groups with external facilitators. The wide variation in prescribing and in judgments of simulated cases generated possibilities for fruitful discussion among the group members in each of the participating groups.

One advantage of complementing prescribing feedback with data from simulated patients in educational activities is that, in the latter case, all doctors in a group have made decisions on the same "patients." A common experience when data for discussion are derived from records or prescriptions is that doctors commonly refer to patient variation to explain why they treat patients differently. If, however, all doctors in a group have made decisions on the same written cases, the differences in decisions are more explicit and evident. The combination of the written simulated cases with actual prescribing allows the GPs to reflect on their decisions as well as the background for these decisions, and is in line with suggestions to make drug utilization studies closer to the reality of practice (36).

That the GPs appreciated this way of training is evident in their agreement that they would like to participate in similar activities in other medical areas as well. The exact meaning of this agreement cannot be interpreted with our design, but would need a study design where several different forms of CME are compared regarding appreciation. This question was outside the scope of this study.

When GPs are asked about the time available for discussing clinical problems with their peers, they typically consider it too limited (38). Given this limited time, it is important that the time spent be optimally used, that the method used for structuring this discussion have proven educational efficacy, and that it be appreciated by the target group.

Recently the need for applying theories on adult learning and the learner perspective in CME has been emphasized (5;22). The value of randomized controlled trials in the area of behavioral research has been pointed out, as has the need for standardizing complex interventions. Finally, the combination with qualitative research for exploratory research into factors that determine behavior related to health (39) has been described as the key to the design and implementation of promising interventions. Future work from this project will apply this approach to

the evaluation of the effects on GPs' prescribing, knowledge, attitudes, and clinical judgment, and explore GPs' experience with asthma management.

NOTES

[1] ATC= Anatomical Therapeutic Chemical classification system according to WHO Collaborating Centre for Drug Statistics Methodology, Oslo, 1996.

[2] Copies of the cases and the 26 case variations are available on request from the corresponding author.

[3] The pharmacist is also one of the researchers (CSL), with previous experience in conducting outreach visits.

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