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Quality and impact of problem-oriented drug information: a method to change clinical practice among physicians?

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Abstract *Objectives:* Problem-oriented drug information is characterised by health professionals actively seeking drug information through various sources. In this study our objective was to determine the quality and impact of problem-oriented drug information among physicians. *Methods:* Evaluation forms accompanying 163 written answers to physicians from a drug information centre were used to examine the quality and impact of problem-oriented drug information during the period December 1996 to June 1998. Physicians were asked whether the preliminary telephone answer was useful and, furthermore, whether the written answer was fast enough, relevant, adequately comprehensive and had valuable references. Physicians were also asked whether the answer had caused any change in their clinical practice. If yes, they were then asked to describe the actual changes. *Results:* Of 163 evaluation forms, 117 (72%) were returned by physicians. Eighty-six physicians received a preliminary telephone answer and 83 (97%) stated that this was useful. Among the physicians, 92 (79%) found that the answer was fast enough, relevant, adequately comprehensive and with valuable references, while 19 (16%) found that the answer satisfied three of these four quality criteria. Seventy-one evaluation forms stated that the answer had caused a change in clinical practice. Sixty-eight (96%) of these contained a description of the change. Thirty-five evaluation forms that stated that the answers did not cause any change in clinical practice showed the same quality score as for the total group. Thus, 28 (80%) of these satisfied four and 5 (14%) satisfied three of the quality criteria. Improved routines for and control of ongoing pharmacotherapy was the most common change in clinical practice reported by physicians.

Conclusion: The results show that, in general, physicians found problem-oriented drug information to be of high quality, and that it had an impact on their clinical practice. Problem-oriented drug information could be a method to change clinical practice among physicians.

Keywords Drug information · Physicians · Quality · Impact

Introduction

Compliance to evidence-based pharmacotherapy could increase the quality of health care in our society [1, 2]. Thus, various public drug information sources produce and disseminate large amounts of written material on rational drug therapy to physicians. Furthermore, effort is put into production of comprehensive treatment guidelines, which is both expensive and time consuming. However, the apparent lack of a public information policy in several countries results in parallel production of guidelines with varying quality from several sources that probably only confuses physicians [3, 4]. Furthermore, failure of implementation could be influenced by physicians' attitudes to the guidelines and their concern about the intent and validity of these documents [5, 6]. There are also several methodological problems associated with dissemination and implementation of guidelines [7, 8]. One of the major difficulties for physicians is to deal with the modern information society [9]. Thus, it is impossible to be updated even within limited pharmacotherapeutic topics and to know where to find the most relevant information. Physicians are also faced with the challenge of the informed patient which influences the physician–patient relationship and medical decision making [10, 11]. Thus, several factors relating to both the information available and the methods used to communicate it could explain the lack of impact on clinical practice [1, 12, 13, 14].

Problem-oriented drug information is characterised by health professionals actively seeking drug informa-

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tion through various sources, and this represents a communication form with the potential to influence clinical practice among physicians. In the present study we examined the quality and impact of problem-oriented drug information from a drug information centre to evaluate whether this could be a method to change clinical practice among physicians.

Materials and methods

Drug information centre

RELIS Vest is a regional drug information centre that serves the southwestern region of Norway. It is organised in the Section of Clinical Pharmacology and RELIS Vest in the Laboratory of Clinical Biochemistry at Haukeland University Hospital in Bergen. The centre has a staff of three persons including a clinical pharmacologist and two pharmacists. A main aim of this multidisciplinary approach is to answer all types of questions concerning drugs from health professionals, mainly physicians and pharmacists. The written answers are short, preferentially summarised with references on one side of a size-A4 sheet of paper and written in a problem-oriented fashion. They are also accompanied by preliminary telephone answers if requested. Furthermore, the answers are provided within a timeframe defined by the inquirer. Our library with reference textbooks and journals, as well as our access to several drug information databases gives us the opportunity to find up-to-date and evidence-based medical information. More complex problems are discussed in regular staff meetings with personnel from the Department of Pharmacology at the University of Bergen. All the questions and answers are documented in a web-based, full-text, question-answer database available to the individual RELIS units serving the five regions of Norway. Thus, retrieval of previous answers from our own or other RELIS units is easy

with the possibility of adding new information on the subject and avoiding unnecessary double work.

Evaluation forms

Evaluation forms accompanying 163 written answers to physicians were used to examine the quality and impact of the answers during the period December 1996 to June 1998. The evaluation forms contained no names, only the number of the corresponding query to the drug information centre. Thus, it was possible to associate the response on the evaluation form to characteristics of the inquiring physician in our documentation system for queries. No selection of queries that should be accompanied by evaluation forms was performed, except that the question should require a written answer. Thus, simple questions that could be answered directly on the telephone were not included.

The evaluation form was a small card (size-A5 format) with several categorical questions that could be answered with yes or no and some additional questions that required descriptive answers (Table 1). It asked in particular whether the physician had received a preliminary telephone answer and whether this was useful. Furthermore, it asked whether the written answer was fast enough, relevant, adequately comprehensive and had valuable references. These four questions were used as quality criteria for the written answer. The evaluation form also asked whether the answer had caused any change in clinical practice, and this was used as an indicator of impact. The physician was also asked to describe the change in clinical practice.

Data analysis

Pearson Chi-squared tests were performed to examine associations among categorical variables in the evaluation forms and between them and the corresponding categories in the documentation system for queries. If univariate analysis showed significant associations, a multivariate logistic regression analysis was subsequently performed. *P* values less than 0.05 ($P < 0.05$) were accepted as statistically significant.

Table 1 Questions and answer options on evaluation forms accompanying written answers to physicians from a drug information centre

Question	Answer options				
How did you learn about the drug information centre?	Colleague	Brochure or advertising	Journal	Conference, seminar or meeting	Other
Have you contacted it previously?	Yes	No	If yes, how many times?		
Why did you contact the drug information centre?	Patient	Colleagues	Drug committee	Education or own interest	Other
Did you receive a preliminary telephone answer?	Yes	No	If yes, was it useful?	If not useful, why?	
How satisfied are you with the written answer you received?					
a) Fast enough?	Yes	No	If the answer is no on one or several of the questions a–d, could you describe why?		
b) Relevant?	Yes	No			
c) Adequately comprehensive?	Yes	No			
d) Valuable references?	Yes	No			
Has the answer caused any change in your clinical practice?	Yes	No	If yes, could you describe how?		
Have you contacted other information sources before us?	Yes	No	If yes, which information sources?		
Have you presented the answer to colleagues or others?	Yes	No			

Results

Physicians

Of 163 physicians, 117 (72%) returned the evaluation forms. Of the physicians, 60 (51%) worked in hospitals and 55 (47%) worked as general practitioners (GPs). Psychiatry, internal medicine and gynaecology were the most common medical specialities among the hospital doctors with 20 (33%), 14 (23%) and 8 (13%) physicians, respectively. Six physicians (5%) worked in positions not associated with any clinical medical speciality, four in and two outside hospitals, and they were categorised as others. Ninety-seven (83%) of the physicians contacted the drug information centre on behalf of their patients, while fourteen (12%) contacted it for education or for own interest. Thirty-two physicians (27%) learned about the centre through brochures or advertising, thirty-two (27%) through colleagues and thirty-two (27%) from other sources. Of the physicians, 65 (56%) had not used the drug information centre previously. Among the physicians with previous contact with our drug information centre, one (46%) or two (41%) were the most frequent number of previous contacts. Thirty-eight (33%) of the physicians had used other information sources before contacting our drug information centre. There were no differences between responders and non-responders with regard to the above-mentioned characteristics.

Questions

Forty-two (36%) questions from the physicians concerned adverse effects, twenty-three (20%) concerned pregnancy and twenty (17%) concerned therapy, and these were the three most common categories of questions. According to the Anatomical Therapeutic Chemical Classification System (ATC system) [15], 38 (33%) questions concerned drugs related to the central nervous system (group N), 13 (11%) concerned drugs related to blood and blood-forming organs (group B) and 11 (9%) concerned general systemic anti-infective agents (group J). These were the three most common groups in the ATC system associated with the questions.

Answers on the evaluation forms

Assessment of the quality of the preliminary telephone answer and the written answer is shown in Table 2. We also analysed the number of physicians from different medical specialities who found that the answers satisfied some or all of the quality criteria (Table 3). Assessment and description of the impact of the written answers are shown in Table 4. Thirty-five evaluation forms stated that the answers did not cause any change in clinical practice. However, these showed the same quality score as for the total group (data not shown). Thus, 28 (80%) of these satisfied four and five (14%) satisfied three of the quality criteria. Furthermore, the answers in this group were presented to colleagues or others with the same frequency as in the total group (66% vs 62%, respectively). There were no differences between hospital doctors and GPs or the individual medical specialities with regard to assessment of quality or impact of the answers. Furthermore, assessment of quality or impact of the answers was not related to any other category in the evaluation form in either univariate or multivariate analysis among the physicians. An exception was that a

Table 3 Number of physicians from different medical specialities who found 1–4 quality criteria satisfied in the written answers from a drug information centre. The four quality criteria were if the answer was: (a) fast enough, (b) relevant, (c) adequately comprehensive or (d) had valuable references

Medical speciality	Physicians <i>n</i>	Number of quality criteria satisfied			
		1	2	3	4
General practice	55	2	2	10	41
Hospital doctor	56		1	8	47
Psychiatry	20		1	4	15
Internal medicine	14			2	12
Gynaecology	8				8
Neurology	4			1	3
Anaesthesiology	3				3
Ear-Nose-Throat	3				3
Dermatology	2			1	1
Surgery	2				2
Others ^a	6	1		1	4
Total	117	3	3	19	92

^aPhysicians who worked in positions not associated with any clinical medical speciality, 4 in and 2 outside hospitals

Table 2 Physician's assessment of the quality of the preliminary telephone answer and the written answer from a drug information centre

Answer	Preliminary telephone answer		Written answer			
	Received?	Useful?	Fast enough?	Relevant?	Adequately comprehensive?	Valuable references?
Yes	86	83	112	112	110	99
No	24		4	1	2	3
Missing ^a	7	3	1	4	5	15
Total	117	86	117	117	117	117

^aNot answered

higher proportion of hospital doctors than GPs discussed the answers with their colleagues (74% vs 55%, $P < 0.05$).

Discussion

Clinical pharmacologists and pharmacists have an important role in providing drug information to both hospitals and primary health care facilities [16]. The primary health care facility is of particular importance, because this is where most of the drugs are prescribed [17]. The quality of information activities in drug information centres has traditionally been assessed by establishment of internal quality assurance criteria [16, 18, 19]. Thus, drug information centres record key data in the course of the answering process. This includes, among others, type of inquiry, time and method of communication of the answer as well as sources used. The use of responsible staff and co-signature is also favoured [16, 18]. Furthermore, a high rate of permanent and repeated users is taken as a quality measure [18]. Importantly, the activity of a drug information centre is possible with a fairly limited number of sources [18, 20]. Our drug information centre has also developed internal quality assurance criteria and analysed key data such as number and types of questions in a similar fashion [21]. The methods and results are similar to those reported by other drug information centres [16, 18].

In this study we focused on external quality assurance. A main objective of drug information centres is to improve the quality, appropriateness and cost-effectiveness of drug therapy. Thus, it is important that physicians and other health professionals find the service to be of high quality. Furthermore, it must be a goal to influence their clinical practice. Several approaches have been used to change physicians' behaviour [22, 23]. Continuing medical education, academic detailing, use of paper and electronic reminders, audit and feedback approaches, evidence-based guidelines and economic incentives are examples, but disparate results may be

found for any single method evaluated [24]. Furthermore, a common problem for several of the methods is that the information is communicated to physicians who have not asked for it [9]. Moreover, patient-level variables are typically not represented in the evidence bases supporting clinical recommendations [6, 25]. In the contact between physicians and a problem-oriented drug information centre, such variables are typically discussed during the process of problem solving. The interaction between a physician and the drug information centre is also characterised by equality, an informal atmosphere and common motivation to solve a problem. The answer response of 72% for the evaluation forms supports this perception of a mutual binding in the relationship. Thus, problem-oriented drug information could represent a useful bridge between the more general information in pharmacotherapeutic guidelines and rational drug therapy at the level of the individual patient.

The results show that that physicians found the information to be of high quality and that problem-oriented drug information has an impact on and could change clinical practice. The high quality score given to the answers irrespective of the impact indicate that they in some instances provide support to solutions already suggested by the physicians. Several voluntary statements on the evaluation forms and discussions with physicians when giving preliminary telephone answers confirmed this. Furthermore, the answers were presented to colleagues or others irrespective of the impact on clinical practice.

There are marked differences in the working environments of physicians in hospital and in general practice. The hospital doctor communicates with numerous colleagues, they can consult senior physicians in their own or other departments and work in a more teaching-oriented setting. GPs often work alone and have to rely on printed information sources and visits from pharmaceutical representatives. Thus, preferences with regard to drug information could be different between these groups. However, we observed no differences between hospital doctors and GPs with regard to quality and impact of the answers. Thus, problem-oriented drug information could have a quality of importance to both groups, and our results support the recent observation that transfer of information through the medium of personal contact is preferred among physicians [26]. This is supported by our observation that the use of preliminary telephone answers was highly appreciated and suggests that investment in elaborate written answers should be confined for particular problems in agreement with inquirer. The description of the impact of the answers showed that the information resulted in improved routines for and control of ongoing pharmacotherapy, as well as improved basis for advice to patients and colleagues. In the latter case, the problem-oriented drug information could be of particular importance for the patient. We have reported two cases in which the decision to take an abortion was avoided because of our problem-oriented drug information. The benefit of such

Table 4 Physician's assessment and description of the impact of the written answers from a drug information centre

Assessment/description	<i>n</i>
Change in clinical practice (yes)	71
Change in routines and control of ongoing pharmacotherapy	32
Improved basis for advice to patients and colleagues	22
Current medication stopped	10
Adverse effects reported to Norwegian Medicines Control Authority	2
Abortion avoided	2
No statement	3
Change in clinical practice (no)	35
Missing ^a	11
Total	117

^aNot answered

a service is the possibility to receive up-to-date information on a subject because traditional written drug information, such as that in reference textbooks, could be outdated and actually wrong [27].

For practical and ethical reasons, it is often difficult to use the classical randomised controlled trial methodology to assess the effect of drug information [28]. Thus, the responders in our results may not be representative of the general population of physicians. However, we could not find any difference between hospital doctors and GPs with regard to the quality and impact of the information, and in the latter group we would expect a reduced risk of being influenced by colleagues with previous experience with the drug information centre. Furthermore, in either group, we observed no differences between physicians who had used our drug information centre previously and those who had not. A weakness of the present study was that we had only indirect evidence of each physician's adherence to our information on rational pharmacotherapy. Furthermore, the information could affect clinical handling in a particular situation and not clinical practice in a broader sense. However, statements on the evaluation forms and discussions with individual physicians when giving preliminary telephone answers gave us no reason to doubt that the information could influence clinical practice. GPs commented that the information was useful for subsequent patients with similar problems, and hospital doctors commented on a change in routines in their departments based on the information. However, although physicians adhere to our information on rational drug therapy we know too little on the effects at the patient level or among a population of patients.

The costs of drug-related morbidity and mortality is substantial [29, 30] and, in the United States, it has been estimated to cost more than US \$136 billion per year [29]. Interestingly, the economical and health benefits of drug information activities have recently been proven by several studies [31, 32]. The service provided by all RELIS units is free of cost for the users with a budget of about NOK 2 million per unit. In Denmark the drug industry used about DK 500 million on drug advertising and drug information in 1999, while cost of the industry-independent services was about DK 2 million [33]. Based on these figures, our service seems inexpensive in a broader, health economical perspective. However, the usefulness of problem-oriented drug information could be confined to the individual physician with a clinical problem and with a motivation to actively seek drug information. Thus, finding proper strategies to efficiently disseminate information and to measure cost-effectiveness represents a challenge.

We believe that problem-oriented drug information based on actual cases of prescribing may be particularly attractive to other physicians because they are written in a specific patient- or problem-oriented form. This is supported by the observation that in more than half of the cases the answers were discussed with colleagues or

others. Currently, we use several strategies to disseminate problem-oriented drug information. This includes oral presentations at meetings with physicians, publishing of cases of common interest in selected national medical journals and making our web-based, full-text, question-answer database available online to health professionals.

We conclude that, in general, physicians found problem-oriented drug information to be of high quality, and that it had an impact on their clinical practice. The results suggest that this could be a method to change clinical practice among physicians. However, strategies to efficiently disseminate such information to physicians represent a challenge in the future.

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