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Original Article

Evidence-based medicine for diabetes educators: a pilot study

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Abstract

Aims Health-care professionals are increasingly asked to communicate research results to patients and consumers. Diabetes educators play a decisive role in the information process of patients with diabetes. Evidence-based medicine (EBM) is not a regular part of their training in Germany. We performed a pilot study to test whether the inclusion of a short EBM module into the standard graduate programme is feasible and leads to a meaningful increase in knowledge and skills.

Methods The study group consisted of 121 diabetes educator trainees. The EBM modules were delivered in 1- to 3-day courses. Increase in knowledge and skills were assessed using a questionnaire covering three main elements: (i) general aspects of an intervention study, (ii) effect size calculation, (iii) general aspects of evidence-based patient information and communicating numbers as patient orientated statements. Two researchers independently rated the assessment sheets.

Results The majority of participants rated the course as important and useful but too short. Knowledge and skills in EBM increased after the course by 2 points out of 13.5 (mean score before course 5 ± 2 vs. 7 ± 2; $P < 0.001$). Inter-rater reliability analysis using Cohen's Kappa coefficients demonstrated substantial to almost perfect agreement for 10 of the 13 items.

Conclusions Our pilot study demonstrates that EBM education for diabetes educator trainees is feasible. However, the increase in knowledge and skills appears not to be clinically relevant. Short EBM courses are unlikely to yield important effects. More intensified course formats are necessary to meet the needs of diabetes educators.

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Keywords diabetes, education, professional training, questionnaire

Abbreviations EBM, evidence-based medicine; ISDM, informed shared decision making

Introduction

The recent paradigm shift in therapeutic counselling towards informed shared decision making (ISDM) requires new skills and competencies of the health professional team. In chronic diseases, such as diabetes, with its multifaceted interventions, ISDM may be particularly valuable [1]. Diabetes educators already play a decisive role in the information process of patients with diabetes and as mediators between patients and physicians.

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Diabetes educators are typically involved in coordinating the ongoing care of patients, education and counselling. They also provide advice on medication. Education and information are probably the most important tasks of diabetes educators [2]. Therefore, they could take over an important part in evidence-based patient information.

Ethical guidelines suggest that evidence-based, clear and unbiased information should be made available to all patients to guarantee ISDM on therapeutic and diagnostic options [3]. Patients' needs should be targeted and best available evidence should be offered using principles of risk communication [4,5]. Unfortunately, skills on evidence-based medicine (EBM) and techniques on how to present evidence-based content are

not a regular part of the diabetes educator graduate programme in Germany. Our recent survey on framing of data showed that diabetes educators largely misinterpret results of diabetes prevention studies, although their degree of understanding did not substantially differ from those of physicians with a special interest in diabetes [6].

Health professionals are targeted by aggressive marketing strategies of the pharmaceutical industry [7]. Direct-to-consumer advertising is increasingly used to encourage consumers to request advertised drugs [8]. Diabetes patient advocacy groups increase their lobbying efforts to influence decisions on drug approval. For instance, the German Institute for Quality and Economic Efficiency in Health Care has recently come under fire from patients for questioning the usefulness of short-acting insulin analogues [9]. Therefore, diabetes educators should be able to act as mediators between external evidence and patient needs.

In a pilot study, we tested whether a short EBM module included in the standard education programme for diabetes educator trainees is feasible and whether it leads to a meaningful increase in knowledge and skills [10].

Methods

Participants and the diabetes educator graduate programme

The study took place in 2003 and 2004. We enrolled all 121 participants in five diabetes educator courses carried out in two (Rheine and Jena) of the six centres accredited by the German Diabetes Association to provide the national diabetes educator graduate programme. These six centres offer 9–10 courses per year with a total of 225–250 participants. The programme started in 1983 [11]. The courses cover theoretical education (at least 480 h) and supervised practical work at an institution acknowledged by the German Diabetes Association (at least 1 000 h). The emphasis in the theoretical part is on pedagogics and didactics, psychology, communication techniques, pathophysiology, diabetes care, dietetics and nutrition [12]. Participants in our five courses were diabetes nurse specialists (65%) or diabetes counsellors without a university degree. Three per cent of participants were dieticians with a university degree.

Structure of EBM courses

Our 1- to 3-day EBM courses (two courses of eight lessons lasting 45 min each, two courses of 16 lessons, and one course of 20 lessons) introduced diabetes educator trainees with no prior knowledge of EBM to its principles.

Because published curricula [13,14] address participants with academic training, they were not applicable to our target group. Therefore, we developed a new curriculum based on previous experience with teaching of EBM to nurses, patients and consumer representatives [15–17]. We took into account that the majority of our participants have little English training. Topics, materials and methods of the courses are displayed in Table 1. Seven content modules were obligatory for all courses and five were optional, depending on the length of the course.

Assessment

Two experienced teachers in EBM developed a knowledge and skill assessment sheet based on a tool formerly used in a large group of non-medical students [17]. Participants completed the assessment sheet at the beginning of the course (before test) and at the end of the course (after test). Participants were informed about the experimental character of the test, that participation was voluntary, and that results would be kept confidential. Data collection and analysis was carried out anonymously. Each participant received a code number on the initial assessment sheet. Participants were asked to remember the number and to record it on the after-test sheet.

The assessment sheet comprised 13 items on three subscales. Participants were asked (i) to outline design, target population, intervention, control, and outcome parameters of a study on the prevention of myocardial infarction and stroke by statin therapy in Type 2 diabetes (subscale 'study characteristics': four items totalling 5 points); (ii) to calculate event rates, absolute risk and relative risk, risk reductions and number needed to treat by 2×2 table using data from the Anglo-Scandinavian Cardiac Outcomes Trial—Lipid Lowering Arm (ASCOT-LLA) study [18] (subscale 'computation': six items totalling 3 points); (iii) to outline general aspects of evidence-based patient information and to express numbers as meaningful patient-orientated statements (subscale 'communication': three items totalling 5.5 points).

Two researchers (SK and ML) independently rated the assessment sheets. Discrepancies were resolved by consensus.

Participants' satisfaction with the course was assessed using a short multiple-choice questionnaire which included questions on the appropriateness of the course duration on a three-point Likert scale (too short, appropriate, too long) and the perceived usefulness for personal development and professional career on a five-point Likert scale ('very' to 'not at all').

Statistical methods

Because of the pilot character of this study, we did not perform a power calculation. The main outcome measure was change in mean score after the intervention (absolute score difference). Because the data were not distributed normally, we compared before and after scores with Wilcoxon tests for dependent samples. We considered as significant a P-value of < 0.05. Cohen's Kappa coefficients were used to examine inter-rater reliability.

Results

The assessment sheets were completed by all 121 diabetes educator trainees participating in the five courses. The majority of participants judged the course as important or very important, and useful for their work, although participants felt that the course formats were too short.

Interrater reliability was almost perfect for four items ($\kappa = 0.81$–0.94), substantial for six items ($\kappa = 0.65$–0.8) and moderate for three items ($\kappa = 0.41, 0.56, 0.58$). Participation

Table 1 Topics, materials and methods of the EBM courses

Topics	Materials	Methods	Obligatory or optional content
Information on treatment benefit and safety provided to consumers through public media	Sections from two video-taped TV features showing expert discussion on strength of evidence of hormone replacement therapy; worksheet with key questions	Observation and plenary discussion	Obligatory
Fallacies of observational research	Abstract and Tables of the Nurses Health Study [19] on cardiovascular risk reduction through hormone replacement therapy; English-German vocabulary list and critical appraisal sheet	Critical appraisal in small groups. Plenary discussion of bias and potential confounders. Computing relative risk reduction	Obligatory
Evidence necessary to draw conclusions about efficacy and safety of an intervention: randomized controlled trial	Powerpoint slides (PPS) displaying a fictitious observational study on associations between short skirts and beautiful legs	Presentation and plenary discussion	Obligatory
	Fictitious story about a woman with acne; development of an experimental study design	Presentation and plenary discussion. Computing benefit and lack of benefit of a fictitious treatment for acne compared to placebo	Obligatory
	PPS displaying study flow, baseline data, and results of the Women's Health Initiative study on primary prevention of cardiovascular disease through hormone replacement therapy [20]	Presentation and plenary discussion	Optional
Framing of data: presenting relative risk reduction to exaggerate reception of treatment benefits	PPS displaying an advertisement on Simvastatin; worksheet comprising basic information and raw data from the 4S-study [21]; 2×2 table sheets and pocket calculators	Presentation, individual work and plenary discussion. Computing event rates, absolute and relative risk, risk reductions, and number needed to treat by 2×2 table	Obligatory
	Misleading patient information sheet on hormone replacement therapy distributed by gynaecologists in private practices	Analysis in small groups or pairs and plenary discussion	Optional
Communicating benefit and lack of benefit of interventions to consumers and patients	Worksheet with questions on balanced reporting of benefit, lack of benefit and adverse effects of interventions	Work in pairs and plenary discussion	Obligatory
Critical appraisal of a randomized controlled trial	STOP-NIDDM study [22] (German translation provided by the funding pharmaceutical company), glossary and critical appraisal sheet	Work in pairs and plenary discussion	Obligatory
Additional topics in courses with 16–20 lessons			
Systematic search for evidence: drafting a searchable question; introduction to databases, e.g. MedPilot (http://www. Medpilot.de; German), PubMed (http://www.pubmed.gov)	Computer for each participant; worksheets comprising general information on biomedical databases and relevant Internet addresses	Presentation and individual work	Optional
Accuracy and validity of diagnostic tests and techniques	Worksheet with questions on validity criteria for diagnostic tests; German consumer information on the accuracy and practicability of blood pressure devices [23]	Work in pairs and plenary discussion	Optional
	Abstract and tables of a validation study on a blood pressure self-measuring device [24]; English-German vocabulary list and critical appraisal sheet	Work in pairs and plenary discussion	Optional
Validity of patient information brochures on diabetes	German patient or consumer information brochures on diabetes; German version of the DISCERN instrument [25]	Analysis in pairs, presentation and plenary discussion	Optional

Table 2 Gain in knowledge and skills after the EBM courses

Subscale (maximum score)	Before test	After test	Difference (no. of valid before–after pairs)
Study characteristics (5)	1.9 ± 1.1	2.7 ± 1.2	0.8* ± 1.3 (n = 116)
Computation (3)	2.3 ± 0.9	2.7 ± 0.5	0.4* ± 1.0 (n = 117)
Communication (5.5)	0.4 ± 0.6	1.4 ± 1.0	1.0* ± 1.2 (n = 94)
Total (13.5)	4.6 ± 1.9	6.8 ± 1.8	2.2* ± 2.1 (n = 93)

Values are means ± SD.
*Two-sided P-value < 0.001.

in the course was associated with a mean improvement of 2 points out of the total score of 13.5, a significant increase in knowledge and skills ($P < 0.001$). As the degree of knowledge and skill gain did not significantly differ by course duration, we present the combined results of the before and after tests of different course formats (Table 2). Analysis of the communication subscale was based on only 94 valid before–after comparisons. This subscale improved most, but the achieved mean score remained low. The first item of the communication subscale assessing basic requirements of patient communication accounted for the increase of the subscale, while competencies in patient-orientated explanation of data (second and third item of the subscale) did not change significantly.

Discussion

We piloted the inclusion of an EBM module into existing courses for diabetes educator trainees. External validity of our study is highly likely as the target group was not self selected by particularly motivated trainees. We demonstrated that EBM education for diabetes educator trainees is feasible and accepted. Before and after scores showed a statistically significant absolute difference in knowledge and skills. However, it is unclear if the increase of 2 points is relevant. We conclude, therefore, that short courses on EBM cannot enhance knowledge and skills in an important way.

Our assessment sheet covers only short-term learning effects on knowledge and skills. There is evidence from earlier trials that courses on EBM have positive effects on participants' knowledge [26–29]. However, EBM courses should not only equip participants with knowledge and skills but should foster their attitudes and particularly encourage the practice of EBM. It remains unclear if the participants in our courses benefited in terms of practical skills.

A recent systematic review [28] comparing stand-alone teaching in EBM with integrated teaching shows that only the latter is likely in bringing about changes in skills, attitudes, and behaviour. The optimal teaching approach would be to bring teaching out of classrooms into clinical practice. However, this will require great effort [28]. Teachers of EBM should at least encourage participants to bring clinical problems into classrooms. Our EBM pilot course might lack transferability and applicability. More intensified course formats distributed over the whole diabetes educator training programme seem to be necessary to meet the complex needs of diabetes educators.

Our pilot study is one step within the framework of design and assessment of complex interventions as suggested by Campbell *et al.* [30]. High-quality controlled trials to evaluate EBM teaching interventions have been repeatedly requested [31,32]. Currently we are planning a randomized controlled trial not only investigating the effects of EBM education on knowledge and skills but also on counselling behaviour. An intensified EBM education module provided over the 1-year course duration will be implemented, accompanied by EBM counselling support via the Internet. EBM communication and presentation skills will be focused on explicitly. The counselling behaviour of diabetes educators will be assessed by standardized simulated patients blinded to group allocation of the diabetes educator [33]. Further details will be published within the study protocol and announced through trial registration.

Competing interests

None to declare.

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Contributions

G. Meyer will act as guarantor for the paper. G. Meyer designed the assessment sheet, interpreted the data, and wrote the paper. G. Meyer, S. Köpke and M. Lenz taught the courses. S. Köpke and M. Lenz rated the assessment sheets. J. Kasper developed the database and undertook data analysis. G. Meyer and I. Mühlhauser developed the curriculum. I. Mühlhauser and S. Köpke commented on paper drafts.

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