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Research paper

Teaching geriatrics using evidence based educational methods – a Danish case study

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ABSTRACT

Introduction: Part of the postgraduate training in Denmark is theoretical courses organized by the scientific societies. Traditional educational methods like lecturing including questions and answers sections are commonly used.
Methods: A traditional 4-days theoretical course was changed into 2-days traditional course and 2 days of self-study. Three self-study modules were developed and included study-guides into the themes of gastroenterology, urology, and electrolytes and water metabolism. Participants had to choose one of the modules and in this module they had to choose one of three possible assignments. The assignments were assessed by two teachers who gave written, specific feedback. The educational effects of course and self-study modules were evaluated using a modified form of Kirkpatrick's 4-level model for evaluating training programs.
Results: The composite score for educational effect of the self-study modules compared to traditional course days was higher ($P = 0.006$). When the effect was split into specific components there was a trend for self-study modules to be superior concerning acquisition of knowledge ($P = 0.09$), use of knowledge ($P = 0.24$) and passing on of knowledge ($P = 0.09$). The trainees spent approximately a mean of 4 days working with the self-study modules and the teacher spent approximately 30 min assessing each assignment. The scores from the assessors correlated well with a Pearson's coefficient of 0.745.
Conclusion: The study shows that it is feasible to use evidence based educational methods in planning postgraduate theoretical training and supports existing evidence that didactic programs using predominantly lectures are less effective than interactive and student-centred methods.

1. Introduction and background

In 1998, the Ministry of Health in Denmark established the Commission on Medical Specialist Training with the purpose of reforming the postgraduate medical training. The aim of the Commission was to make recommendations on how to improve the quality of education and to secure that specialist education could be adapted to changing demands in the society and changing structures in the health system.

In 2000, the Ministry of Health published a report written by the Commission on Denmark's future medical specialists and specialties [1]. The report contained recommendations on the future organization of specialist training and need for specialties. The training period in the nine internal medicine specialties, of which geriatric medicine is one, all consist of 6 years of mainly practical training but also contain approximately 30 days of theoretical courses. The theoretical courses are mandatory. The scientific society of a specialty is responsible for content and practical planning of theoretical courses.

The national board of health has developed a guideline [2], which states that a theoretical course in specialty training should:

- be closely related to practice;
- contain themes that are difficult to learn in daily clinical practice;
- have clearly stated aims and specific learning objectives;
- be described in terms of educational methods;
- contain assessment of the participants;
- contain evaluation of the course content, educational methods and other practical circumstances.

This guideline is not fully implemented. Traditionally postgraduate courses organized by the scientific societies have been using lectures as the predominant educational method. Although educationalists agree that lecturing is of very limited value and that student-centred methods with various sorts of interactive educational methods are far more effective, the senior medical staff

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members who are responsible for courses seem to find it difficult to change from lectures into other educational methods [3,4].

In a recent review, six principles that can be used to plan formal educational activities are proposed [5]. One important principle is that physicians learn best by doing and therefore the educational methods used should foster learner activity. Active student participation gains educational effect among other reasons due to the provision of opportunity to practice and feedback, which is essential for learning and transferring learning into action [6]. Another important point is that participants in a formal course will be on different stages and active learning gives learners possibility to participate on their own stage. Several studies of continuing medical education (CME) activities stress the importance of learner activity [7,8]. Based on a review of systematic reviews of CME techniques, Bloom finds that the least effective method is didactic programs (predominantly lectures and presentations that may include question and answer periods) and the most-effective methods include interactive techniques such as audit/feedback, academic detailing/outreach, and reminders [9]. Based on the review, Bloom concludes that "even though the most-effective CME techniques have been proven, use of least effective ones predominates".

A commonly used method to evaluate learning outcome is the Kirkpatrick model [10]. This model suggests that the results of a training program can be evaluated at four levels:

- Reaction/satisfaction. A measure of the participants' immediate reactions: did they enjoy the activity? Were the teachers inspiring? Did the participants find the presentations good?
- Learning. Learning has taken place if knowledge is increased, attitudes are changed, or/and skill is improved.
- Behaviour. This level describes the extent to which change in behaviour has occurred due to participation in the course/training program.
- Results. At this level the results of training in a broader context should be measured. It could for example be better diabetes control in a society due to a physicians' training program on this subject.

The aim of learning in postgraduate training is to change behaviour of the trainee. Assessment should therefore ideally be testing what the trainee does. However, many commonly used assessments are testing what the trainees know (knowledge) and what he/she can demonstrate (shows how). This way of understanding assessment was first proposed by George Miller and is commonly referred to as the Miller pyramid, where the lowest and broadest level in the pyramid is knowledge (knows), followed by competence (knows how), performance (shows how) and action (does) on the top of the pyramid [11].

1.1. Purpose

The aim of this study was to test the feasibility and effect of a student-centred educational method, directed self-study as part of the theoretical education in geriatric medicine.

1.2. Method

One of the geriatric theoretical courses was changed from 4 days of traditional teaching with predominantly lectures and short discussions into 2 days of the traditional course and 2 days of directed self-study. The traditional 4 days contained lessons in dermatologic diseases, nutrition, water and electrolytes balance, rheumatologic diseases, gastroenterology, urology, and falls diagnostics and intervention. When the course was changed into 2 days of traditional didactic teaching and 2 days for self-directed study, all themes were kept. During the 2 days of traditional teaching, dermatology, rheumatology, nutrition and falls were covered. For the directed self-study we developed three self-study modules from which the participants had to choose one module. The self-study modules were intended to be study guides. They should give a brief review of the theme, point to some important topics included in the theme, and give some directions for further self-study. A self-study module contained a short written introduction to the theme, three to five scientific articles and three assignments of which the trainee had to choose one.

The choice of assignments given were:

- writing an abstract and designing a power point show on a specific part of the theme (for instance faecal incontinence, dehydration etc.);
- writing a clinical guideline on a specific theme;
- writing a case report concerning a specific theme.

Three of the authors were responsible for development of the self-study modules: EH for "Common disorders of electrolytes and water metabolism", MH for "Gastrointestinal problems in the geriatric patient", and HP for "Urologic problems in the geriatric patient". The developer of a module was also responsible for reading the assignments and for mailing feedback to the trainee concerning "their" module. In order to secure a fair and consistent assessment all assignments were assessed by EH as well as by MH (Gastrointestinal module) or HP (Urology module). Assignments in the electrolytes and water metabolism module were assessed by EH and PD. EH received all assignments by mail from the trainees and in an anonymous form passed the assignments on to one of the other three assessors. When reading an assignment, the assessor had to judge a number of items on a 9-point scale and make an overall decision of accepting the assignment or rejecting it (Table 1). Rejection was always followed by written and specific feedback on how to improve the assignment for renewed assessment. If the assignment was rejected, only one assessor (EH) assessed the following versions of the assignment.

The course was evaluated using a modified version of level 2 and 3 in Kirkpatrick's model. Level 2 (learning) was evaluated using the participants' own perception of learning. Level 3 (behaviour) was tested by asking the participants to what extent they had used their new knowledge and to what extent they had passed on their knowledge to colleagues in their departments. These questions were answered 3 months after the traditional course, when all assignments had been accepted. The time lapse of 3 months was used in order to leave the participants time to observe to what extent they used knowledge from the course in their daily practice. The questionnaire contained a number of statements, and the trainees were asked to mark on a 9-point scale to what extent they agreed in the statements (1 = absolutely disagree and 9 = absolutely agree). The questionnaire contained one question concerning time spent on working with the module.

1.3. Statistical method

Participant's perception of differences between traditional course and self-study were tested with paired 2-sided *t*-test. The correlation between assessments from different assessors was tested with Pearson's correlation coefficient.

2. Results

2.1. Assessment of the assignments

Twenty-three trainees took part in the course. Three trainees decided to make their assignment as a common project, which was