
Knowledge, leadership and quality in the medical school curriculum

PERSPECTIVES

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Knowledge management, leadership and quality improvement – abbreviated «KLoK» – was introduced as a separate subject in the medical school curriculum at the University of Oslo in 2011. This subject will provide the students with the skills to exercise their medical vocation professionally, as experts and as participants in groups and teams.



During the simulation exercises «Student-BEST», the students practise managing acutely ill patients, accompanied by nursing students and nurses undergoing further education in anaesthesiology. Illustration: Supernøtt popsløyd

The knowledge base in medicine is rapidly expanding. Doctors must master methods and strategies for obtaining and implementing valid and updated knowledge (1). Increased specialisation and cooperation also require competencies in management, organisation and teamwork, to provide coordinated and safe health services that are responsive to the needs of the patients (2). Doctors must understand the systems within which they are working, and have the knowledge and skills required to contribute to quality assurance and improvement of these systems (3).

These aspects of the doctors' vocation have traditionally been given scant attention in undergraduate medical education, even though they are currently emphasised as a required part of their competencies (4, 5). The subject

knowledge management, leadership and quality improvement – abbreviated «KLoK» – is intended to provide medical students with the necessary knowledge and skills in these areas.

Background to the KLoK subject

Since the 1990s, The Norwegian Medical Association and the Board of Health Supervision have been involved in quality improvement efforts (6, 7). This field attracted increased attention when the American Institute of Medicine in 2000 published its estimates of the number of annual fatalities caused by quality failure in the health services (8, 9). Peter F. Hjort was one of the first to point out the need for reinforced efforts to prevent unwanted incidents in Norway as well (10, 11). Attention has increasingly focused on systems and management, rather than on the individual doctor or health worker.

In 2005, the health authorities launched a new national strategy for quality improvement in the health services (12). One of their five main recommendations was to strengthen the knowledge about quality improvement in educations within health care. One year earlier, in 2004, two recommendations had been submitted to the Faculty of Medicine in Oslo, one about knowledge management and another on patient safety and quality improvement in undergraduate medical education. The faculty wished to relate these subjects to the field of leadership. Hence, a commission was appointed to submit a proposal for an integrated teaching programme for quality improvement, knowledge management and leadership. Representatives of the faculty, clinical institutions, the Knowledge Centre for the Health Services and the Norwegian Institute of Public Health all participated in these efforts. The report on the new subject was finalised in 2006. The subject was implemented on a trial basis during 2006 – 2009. Financial support from the Directorate of Health and the initiative of Per Brodal, then Dean of Studies, were key preconditions. In 2011, the KLoK subject was introduced on a permanent basis as one of 30 subjects included in the undergraduate medical curriculum.

Subject content

The present academic content is reflected in the formulations of expected learning outcomes, which covers basic topics related to knowledge management, leadership and quality improvement (Box 1) (13). Good textbooks are available for knowledge management, but for quality improvement and leadership the teaching has mainly been based on articles, reports and websites. A separate website for the subject has been established to ensure the availability of updated information (14).

Box 1

The expected learning outcomes are that the student should be able to:

Knowledge

- explain what types of studies/designs are appropriate for answering various types of questions
- describe the functions and tasks of leaders at various levels of the health services
- describe leadership challenges related to quality improvement and organisational change
- explain what characterises well-functioning and poorly functioning groups/teams
- explain what is meant by the concepts of quality, patient safety and clinical microsystems
- explain the requirements of a good quality indicator and provide examples of various types of quality indicators
- describe how adverse events should be managed and how adverse events reports can be used as a basis for improvement of service quality
- explain how the experiences of users and patients can be mapped out
- explain principles for funding and financial prioritisation in the health services

Skills

- formulate precise academic questions and undertake effective searches for research-based information
- interpret results of primary studies, systematic reviews and meta-analyses
- assess the quality of various types of studies and other academic information
- assume leadership of an interdisciplinary team in provision of medical emergency treatment
- analyse the causes of quality failure, divergence and adverse events
- use methods (Langley/Nolan, Deming's circle) and tools for quality improvement (fishbone diagram, flowchart and simulation)

General competence

- combine research-based knowledge, clinical expertise and patient preferences in the encounter with individual patients
 - reflect on various management styles and his/her own strengths and weaknesses as a leader and participant in groups/teams
 - explain how adverse events and errors can be perceived by the doctor, the patient and the next of kin, and how society and the media address such events
 - explain how a project for quality improvement can be implemented
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In Oslo, undergraduate medical education extends over 12 semesters, and the KLoK subject is being taught in six of these, from the beginning of medical school to immediately before the final exam taken in the final year of study. The teaching programme includes 30 hours of knowledge management, 13 hours of leadership/health economics and 15 hours of quality and quality improvement. This is supplemented by a total of 12 hours of seminar training in handling of adverse events and adverse event reports, and six hours of simulation exercises. During the first and sixth term, the students are introduced to basic concepts related to quality, patient safety and leadership. The seventh term includes a one-week course in knowledge management, which is intended to prepare the students for their work on an individual project assignment. The bulk of the teaching has been allocated to the three final semesters with lectures, seminars and assignments.

Student assignments

During their 10th semester, the students attend a 12-week period of work placement in hospitals and general practice, where they undertake individual assignments in the KLoK subject. They must critically assess professional guidelines and articles that provide answers to clinical questions. They must map out patients' experiences and draw a patient care flowchart. Clinical lecturers in the hospitals supervise the students' work on the KLoK assignments during the period of work placement, and are in charge of approving the work.

During the 11th semester, knowledge management, leadership and quality are integrated into the students' work on a project assignment for the KLoK subject. They work in groups of 7 – 8 students who must identify an area in which there is a potential for improvement. They must clarify the knowledge status, identify measures and choose goals or indicators for the improvements. Furthermore, the students draw up an outline of how they envisage the organisation and leadership of the project, and they describe and reflect on their own group processes. The project assignments are published online, but we have chosen not to publish the section describing the group process, to give the students more freedom to detail their observations and reflections [\(15\)](#). The project assignments reflect a wide range of topics from the primary and specialist health services. Some of the assignments have spurred practical improvements through cooperation with clinical institutions.

Health economics, adverse events and simulation

The 12th semester includes teaching of principles for funding and prioritisation. The KLoK subject cooperates with teachers from general practice and medical ethics on two one-day seminars held during the final term, focusing on how to deal with uncertainty and adverse events. The students are

trained in supervisory activity, reporting systems and contact with the press, as well as knowledge of the collegiate support apparatus for doctors within The Norwegian Medical Association.

During one day of simulation training in the 12th term, the students practise working in teams inside and outside an emergency reception setting. The teams include medical students, nursing students and nurses undergoing further education in anaesthesiology, so as to make interdisciplinary cooperation and understanding of roles a significant part of the training. The main topics are clinical leadership, collaboration and communication. This training is referred to as Student-BEST, and has been developed together with the BEST Foundation (16). The students are presented with medical emergency scenarios that require them to make use of the team's complete range of knowledge and skills in clinical subjects, with an emphasis on briefing, simulation and debriefing. The group of facilitators includes teachers from medical emergency institutions, the KLoK subject and Oslo and Akershus University College of Applied Sciences.

Evaluation

Students are tested by a multiple choice question test in knowledge management during the 7th semester. In the 10th semester, work files have been developed as training and evaluation tools to document the process from clinical questions to answers. The mandatory group project assignment that the students hand in during the 11th term must be approved prior to the final examination in the 12th semester. After each simulation exercise in the 12th semester, evaluation includes video recordings, the team's own reflections and feedback from the teachers. Assignments from the KLoK subject can also be included in the regular examinations at the end of each term.

Discussion

When the KLoK subject was implemented, there was little prior experience of how teaching of knowledge management, leadership and quality improvement could be undertaken. The initial years were characterised by trial and error, enthusiasm and resistance. Even though this subject replaced problem-based learning (PBL) groups during the two final terms, some claimed that the subject displaced the teaching of clinical skills (17), and it was obvious that some students failed to understand how the elements of the subject were interconnected.

The teaching of the KLoK subject has been evaluated on an ongoing basis using questionnaires and student interviews, and it has gradually assumed its current shape. The inclusion of student representatives on the academic planning committee has been important. The simulation exercise held towards the end of the studies, Student-BEST, is perceived as relevant and useful. With regard to the other elements of the teaching we have seen that it is necessary to show and

give grounds for the relevance of the teaching by referring to issues arising from clinical cases. The teaching is adapted to the students' level of maturity and skills. Clear descriptions of the expected learning outcome (Box 1) and relevant training activities are required to establish coherence and predictability in the teaching. At an early stage, we saw that the KLoK subject had to be subject to examination. Communication with the students and the university lecturers at the hospitals in the region has improved after the establishment of a separate website for the subject (14). Previously, the students worked on their project assignment for 24 weeks in parallel with other teaching. In 2011, the time frame for the assignment was reduced to eight weeks, and this has resulted in a better and more concentrated period of work.

Is the KLoK subject a necessary component in the medical school curriculum? Some have claimed that these areas are important, but that it is unnecessary to be exposed to them before entering the medical profession. It is our impression that the elements included in the KLoK subject are increasingly being introduced in undergraduate medical education in other countries as well (18) – (20). In the UK, the authorities require teaching of quality, quality improvement and patient safety to be included in medical studies (21). The National Health Service has contributed to developing a competency framework for clinical leadership, and has produced a separate version for the undergraduate medical education (22). Dartmouth Medical School in the US has been pioneers with regard to the teaching of quality improvement in their medical studies, and has established a core curriculum for all students and optional supplementary courses for smaller groups of students (23).

The health authorities expect health personnel to have competence in patient safety and quality improvement (24). During their work placement periods medical students have contact with patients and face complex challenges that require basic skills in knowledge management, leadership and quality improvement (25). We therefore maintain that it is appropriate to ensure that recently graduated doctors possess basic knowledge, skills and competence in these areas. Even though teachers of other clinical subjects include these topics to some extent in their teaching, we believe that there is a need for a separate subject that can provide the students with systematic and integrated teaching of knowledge management, leadership and quality improvement.

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