Research Journal of Medical Sciences 7 (2): 65-69, 2013
ISSN: 1815-9346

Experience of Central Nervous System and Special Senses Module Establishment in the Integrated Medical Curriculum at King Abdulaziz University

[1, 2]Enayat Hashem, [1, 3]Nasra Ayuob, [1]Hussian Malibary and [1, 3]Bassem El-Deek
[1]Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia
[2]Faculty of Medicine, Alexandria University, Alexandria, Egypt
[3]Faculty of Medicine, Mansoura University, Mansoura, Egypt

Abstract: Faculty of Medicine at King Abdulaziz University created a new discipline-based curriculum integrated curriculum to be implemented in the academic year of 2006/2007. This study aimed to describe how Central Nervous System and Special Senses (CNS&SS) module was designed as a part of this integrated curriculum. The steps that were undertaken by the CNS&SS module committee included assessing the needs for the CNS&SS module, determine the learning outcome, use evidence based medicine to develop the contents, insuringthe availability of accommodation, select teaching and active learning strategies, plan for assessment, obtaining student feedback on effectiveness of teaching, use data in an interactive way. The module had been successfully implemented for the last 6 years with continuous auditing and improvement based on both students and faculty feedback and recommendation for improvement.

Key words: Module, construction, medical curriculum, plan, King Abdulaziz University

INTRODUCTION

Recognizing the limitations of its own traditional, discipline based curriculum, the Faculty of Medicine (FOM) at King Abdulaziz University (KAU) challenged both the clinical and basic science faculty members to create a new integrated curriculum to be implemented in the academic year of 2006/2007. The curriculum at KAU consists of two phases. In phase I (the pre-clinical phase) the basic sciences are taught in the form of a few core courses and system-based modules such as central nervous system module. Phase II (clinical years) includes the major four clerkships, in addition to some sub-specialties and a professionalism course.

There is a body of knowledge originating out of what researchers know about physician and adult learning and change that can be helpful in designing short courses that will have impact. For example, it is known that in naturalistic settings, people learn gradually and in stages (Fox *et al*., 1989). New learning involves awareness, consideration of the new idea and its merit, testing the new idea and then adoption and even adaptation (Prochaska *et al*., 1992). Reflection is an integralcomponent of the change process (Fox *et al*., 1989) and it is reflection that helps to shift surface learning of new information into deeper learning and understanding (Moon, 1999).

Effective course design strategies use multiple and active teaching and learning strategies in combination with enabling and reinforcing techniques instead of those facilitate or transmit information (Davis *et al*., 1995). When needs analyses are done to establish the focus on the gap between current and desired practice, outcomes are more likely to accrue (Davis *et al*., 1995).

This study aimed to describe how CNS&SS module was designed as a part of an integrated system based medical curriculum at a faculty transformed from traditional to developed curriculum.

METHODOLOGY

The committee of Central Nervous System and Special Senses module (CNS&SS) was established 3 years before running the module. The head of committee was an ex-dean expert in neurology with five expert members from physiology, anatomy, clinical biochemistry and pediatric departments in addition to a representative from Medical Education Department (MED). The committee members conducted several meeting to decide how to begin to design the module. They examined the documents of program specification of the old and new curricula and conducted focus group discussion with the chairman and members of the curriculum committee, teaching faculty assigned to teach in the CNS module from different discipline basic science and clinical departments.

Corresponding Author: Enayat Hashem, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia

STEPS OF CNS&SS MODULE CONSTRUCTION

Assess the needs for the CNS module: A group of graduate students were met by the module committee and this aimed to involve the stockholders in determination of the needs of the modules in addition to its objectives and themes. Kern *et al.* (1998) said that general needs assessments are required to establish the initial needs for the short course and begin the design work. While the need may be generated by a new approach to care meriting attention, new research findings or media generated content, it should be verified through an examination of objective evidence obtained through local or regional quality improvement studies or government health studies. It was found that where such data do not exist, techniques such as questionnaires and focus groups can be used as well as interviews with key informants to gain a general understanding of professional practice. Strategies such as the Delphi technique, task analysis, critical incident surveys and examinations of errors in practicecan also be helpful (Dunn *et al.*, 1985). This assessment should be sufficiently focused to determine whether there is a real population based need for the course, the potential of a short course strategy to influence change and the marketability of the course.

Determine the learning outcome: The analysis of the general needs assessment should lead naturally into a list of key ideas and concerns. At this point, it is appropriate to begin to identify the learning outcomes or the end points to be achieved by participants (Harden *et al.*, 1999) outcomes based objectives. The committee of the CNS&SS module phrased the learning objectives CNS&SS module learning objectives. By the end of the module the students will be able to:

- Demonstrate a systematic and coherent knowledge of the anatomical and physiological functioning of the Central Nervous System and Special Senses (CNS&SS)
- Describe the biochemical importance of the neurotransmitters and brain metabolism
- Discuss and analyse structure-function relationships of the central nervous system and critically appraise the implications of any alteration in the normal control points with respect to pathology and drug treatment
- Explain the basic physiological processes involved in nociception and the possible mechanisms involved in endogenous analgesia
- List the pharmacological control of pain, the sedatives and the hypnotics
- Describe the anatomical structure of the eye and ear and explain the function of each
- Describe the mechanism of voluntary movements, recognise the important centres involved and explain the effects of their lesions
- List the higher intellectual functions, discuss the mechanism of each and explain the effects of oxidative stress, demyelination and degenerative diseases on the integrity of the nervous system
- Describe the different parasitic diseases affecting CNS and special senses system
- Critically evaluate knowledge from a range of sources (lectures, tutorials, practical, problem based learning, clinical presentation and self directed learning) and utilise it to exercise judgement to evaluate altered functions and drug therapy
- Accept accountability for achieving personal and/or group outcomes by developing a variety of professional skills (self-directed learning, PBL and practical sessions)

Use evidence-based medicine to develop the content: The evidence is based on which the educational program is developed should be defensible. Better outcomes can be achieved when educational programs are based on evidence of clinical effectiveness (Grol and Grimshaw, 2003).

The committee of CNS module had revised the content of old traditional educational program of King Abdulaziz University, in addition to revising the contents of basic science core courses of anatomy, histology and embryology and the contents of medicine, pediatrics and surgery clerkships. They had determined the prerequisites of CNS module and what other courses and clerkship required from CNS modules, pre-requisites for CNS&SS module. Before the students begin the CNS&SS module they should demonstrate the ability to:

- Describe the basic topography of the head and neck and its development
- Recognize the mechanism of action potential and its conduction
- Identify synaptic transmission-neurotransmission and receptor in the CNS, PNS and ANS and the role of drugs
- Discuss the neuromuscular junction-structure and function and the neuromuscular disorders
- Describe the mechanism of muscle contraction
- Illustrate muscle structure and mechanism of locomotion
- Describe connective tissue structure

Identify the resources: The committee members had prepared a list of the resources that were needed to implement the process of teaching and learning in CNS&SS module. They visited the library to know the updated references that might help the student. They went to lecture rooms and tutorial rooms. They send a suggested teaching load to the head of representative departments that are responsible for teaching and learning to confirm the feasibility of it to the teaching staff. They visited the skill laboratory to determine the learning material that suited for CNS&SS module. Arrangements for availability of faculty members for individual student consultations and academic advice were achieved. All teaching staff was available for student consultations during the whole period of the module during the office hours which was announced at the start of the module.

Insure availability of accommodation (lecture rooms, laboratoires, etc.): Each teaching classroom in the faculty is large enough to accommodate >100 students at one time and it includes enough number of comfortable seats arranged in rows with spaces between them. These classrooms are supplied with audiovisual equipments, data show, a large screen, screen pointers and other equipments needed for the power point presentation of lectures and the clinical presentations. The lecture duration is 50 min with 10 min breaks to prepare for the next lecture.

The teaching laboratory classes in the faculty usually accommodate about 60 students at each time. These labs are supplied with wide study benches, specimens, data show, large screens, good lighting sources and other equipments needed for the conduction of them experiments for the students.

All students have an access to a large space computer library rooms. Each computer room accommodates about 60 desk computer. Students can attach themselves to the electronic management educational system of the medical college using their given passwords. This will enable the students to revise their lectures that they have already had from the teaching staff ask questions and review their doubts.

Other resources include >20 rooms used for the PBL study. Each study group is a small class of about 10 students with their tutor. Most of the rooms are equipped with slide and data show projectors used during the PBL sessions. During these sessions the student become familiar with the new ways of learning which is student cantered and practice how to develop their skills (critical thinking and communication skills).

Select teaching and active learning strategies: The module committee discussed the teaching strategy that had used guided by the learning outcomes, the content of the program. They decided to adopt the teaching format that foster the self directed learning as problem based learning, problem solving tutorials and seminars. The students had sufficient time to go to library to read, search and critically select their learning material under guidance and supervision of their tutor in the module. The strategy for self directed learning represented about 28% of contact teaching hour of the module.

The selection of teaching strategies should be guided by the learning outcomes, the content of the program, the back-ground of the anticipated participants and the resources (teachers, learning aids and materials) available. Every attempt should be made to use a variety of active learning strategies. In large groups, there are a number of techniques available to ensure active learning such as asking participants to work in groups of two or three or having participants respond to questions using different colored voting cards (Steinert and Snell, 1999).

The module committee decided to adopt problem based strategy that foster the concept of reflection. During seminar the student could express their feeling toward the process of learning and teaching in problem solving cessions also interactive discussion between the student and their tutor. The chairman of module and module committee meet the student at the end of each week to discuss with student and know their opinion toward the teaching, learning and assessment process.

After examining the document of course specification of core courses and module that are taught to the students, the module committee decide a gap in the knowledge that must be managed in the CNS module. So, they determine lectures for basic science core course in physiology, anatomy, histology and embryology and clinical biochemistry. During the course, mini lectures can summarize the key messages, provide concrete information and ensure that participants have a common base for their discussions and other work. Ideally this served to either summarize learning from an interactive activity or set the stage for a subsequent interactive exercise. Towards the end of the course, it was often helpful to provide an evidence-based summary of key learning points (Table 1).

Plan for assessment: The module committee designed a plan for students' assessment to include specific tasks as seen in Table 2.

Table 1: Teaching modalities that were used in the CNS&SS module

Departments	Lect.	Tutor	Clinical presentation	Practical	PBL	SDL	SPP	Total
Anatomy	17	2	-	5	-	4	1	27
Physiology	20	5	-	5	-	4	3	35
Biochemistry	5	2	-	1	-	2	2	11
Pathology	5	-	-	1	-	-	-	6
Pharmacology	5	-	-	-	-	-	2	7
Medicine	-	1	1	-	-	-	-	3
Parasitology	4	1	-	-	-	-	-	5
Total contact hours	56 (47%)	11 (9.3%)	2 (1.7%)	24 (20.2%)	8 (6.7%)	10 (8.4%)	8 (6.7%)	119 (100%)

Table 2: Schedule of assessment tasks (e.g., essay, test, group project, examination, etc.) for students during the semester

Assessment task	Week due	Final assessment (%)
One mid module exam (MCQ)	3rd week	25
Final written exam (MCQ)	At the 1st week of the next course	40
Final practical exam (OSPE)	At the 1st week of the next course	15
PBL	At the end of the cessions	15
SPP and SDL	At the end of the cessions	5

Enhance the teachers skills: Teacher enhancement is a critical element to course success. Teachers must review course objectives, needs assessment data, learning strategies and course content prior to an educational session in order to visualize the course and anticipate questions. They also understand the rationale for the course's design. Both process (i.e., how to teach and run the educational session) and content may be equally important parts of teacher preparation. The MED at King Abdulaziz University has a faculty enhancement program for all faculty members that shared in teaching, learning and assessment. The committee members of CNS and faculty members shared in this module had attended many workshops and seminars regarding course design, strategy of teaching and learning and assessment plan.

Obtaining student and faculty feedback on effectiveness of teaching: A student questionnaire feedback is carried out on the quality and effectiveness of teaching at the end of the course and the result of this questionnaire was not declared except after the final result of the course exam was announced. Other strategies for evaluation of teaching by the students included focus group discussion during and after module conduction.

A focus group discussion with those faculty members participating in system based modules teaching was facilitated by MED. Ten faculty members from the basic science departments and three from the clinical departments had participated in the discussion. The results of these evaluations were included in a final evaluation report at the end of the course by the module organizers for improvement of module.

Verifying standards of student achievements: Compare the standards of students' achievements' with standards archived elsewhere by checking the marking of a sample of some student work: tests, course work and assignment by an independent member of teaching staff.

Use data in an interactive way: Based on the feedback from the students and tutors that are involved in teaching the module any recommendation and comments will be critically studied in order to be implemented, e.g., emphasizing on SDL and small group teaching, gradual implantation of the clinical skill lab as part of the practical course, introduction of different methods of assessment of student learning gain such as weekly report, concept map, interview, introduction of thinking based learning in order to stimulate the student cognition and expanding the time of the course which seemed to be emerging requirement.

CONCLUSION

This study could be of value to the new medical stools that start designing their integrated system based curriculum or those intend to develop their traditional system based curriculum into new integrated one. It looks like a road map for the task force group in such schools.

REFERENCES

Davis, D.A., M.A. Thomson, A.D. Oxman and R.B. Haynes, 1995. Changing physician performance: A systematic review of the effect of continuing medical education strategies. JAMA, 274: 700-705.

Dunn, W.R., D.D. Hamilton and R.M. Harden, 1985. Techniques of identifying competencies needed of doctors. Med. Teach., 7: 15-25.

Fox, R.D., P.E. Mazmanian and R.W. Putnam, 1989. Changing and Learning in the Lives of Physicians. Prager, New York.

Grol, R. and J. Grimshaw, 2003. From best evidence to best practice: Effective implementation of change in patients care. Lancet, 362: 1225-1230.

Harden, R.M., J.R. Crosby, M.H. Davis and M. Friedman, 1999. AMEE Guide No. 14: Outcome-based education: Part 5-from competency to meta-competency: A model for the specification of learning outcomes. Med. Teach., 21: 546-552.

Kern, D.E., P.A. Thomas, D.M. Howard and E.B. Bass, 1998. Curriculum Development for Medical Education: A Six-Step Process. Johns Hopkins University Press, Baltimore.

Moon, J., 1999. Short Courses and Workshops: Improving the Impact of Learning. Training and Professional Development, London, Kogan.

Prochaska, J.O., C. Di Clemente and J.C. Norcross, 1992. In search of how people change: Applications to addictive behavior. Am. Psychol., 9: 1102-1114.

Steinert, Y. and L.S. Snell, 1999. Interactive lecturing: Strategies for increasing participation in large group presentations. Med. Teach., 21: 37-42.