THE NEW ARMENIAN
MEDICAL JOURNAL
Vol. 2 (2008), N.2, pp.67-73

www.ysmu.am

Education

RECENT MEDICAL EDUCATION REFORMS AT THE YEREVAN STATE MEDICAL UNIVERSITY

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Abstract

Since 2005 the Yerevan State Medical University has begun the implementation of reforms related to Bologna Declaration and suggested an educational model for bachelor's and master's system in medicine, which will facilitate transfer from the previous educational system to the new one. Curriculum development is being done, where horizontal integration in undergraduate curriculum has been introduced. The curriculum for the first year has been unified for all the faculties of the University. Credit system has been established, similar to the European Credit Transfer System. The examinations have been changed from oral to written, using multiple choice questions, the frequency of assessment has been increased and the content being assessed is decreased. The necessity of faculty development is being stressed as of utmost importance.

Keywords: medical education, Bologna Process, curriculum development, integrated curriculum, assessment, faculty development.

Introduction

It has been already a few years since the Yerevan State Medical University (YSMU) is undergoing major reforms at all the levels of medical education. The necessity of reforms was obvious; however, the driving force for them became the adoption of Bologna Process in 2004 by the Government of the Republic of Armenia (RA). Since then, all the higher education institutions in RA endeavour to reform their education systems according to new rules. But what are these rules? What is Bologna Declaration? What is so special about the Bologna Process in Medicine? How far is YSMU in the Bologna Process?

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The Bologna Declaration

In 1999, Ministers of Education of 29 European states met in Bologna, Italy, with university leaders from all over the Europe to discuss the further development of higher education in Europe. The vision to develop a European Higher Education Area (EHEA) by the year 2010 was stated in their post-summit declaration: the Bologna Declaration. This development process is known as the Bologna Process.

The Bologna Declaration has defined 6 action lines [*The Bologna Declaration, 1999*], which are:

1. Adoption of system of easily readable and comparable degrees;
2. Adoption of a system essentially based on two main cycles;
3. Establishment of a system of credits;
4. Promotion of mobility for students and academic and administrative staff;
5. Promotion of European cooperation in quality assurance;
6. Promotion of the European dimension in higher education.

After the Bologna meeting, the Ministers met every other year: in Prague (2001), Berlin (2003), Bergen (2005), and in London (2007). At these meetings the Ministers added more action lines:

7. Lifelong learning;
8. Higher education institutions and students;
9. Promoting the attractiveness of the European Education Area;
10. Doctoral studies and the synergy between The European Higher Education Area and The European Research Area.

The members of the Bologna Process almost doubled since then – 46 states in 2007 – almost every state in Europe!

As it was already mentioned, in 2004 the Republic of Armenia has also signed the Bologna Declaration and its Higher Education Institutions began the implementation of reforms.

Degrees in Medicine and the two-cycle system

According to Bologna process the terminology across Europe needs to be harmonized. Today the degree that is awarded upon graduation at YSMU is MD Physician. According to Bologna Process there has to be clearly defined Bachelor and Master. Where is Medical Doctor (MD) left then? Is it the same as Master? Why do we still need to keep "MD"? MD Physician is officially accepted by the Medical Councils of some countries as a "degree awarded by YSMU". What if we change the degree to e.g. "Master of Surgery", will it still be accepted in other countries or the degree will not be valid anymore? Not only YSMU confronts this problem. The European countries did not come up with the degrees by themselves. Some of the countries refuse the division to Bachelor and Master and still award MD at the end, whereas in the United Kingdom medical schools award MBBS – Bachelor of Medicine, Bachelor of Surgery. There is still no common terminology decided.

Why is Bologna Process so special when it comes to medical education? It is recommended that teaching system is based on two main undergraduate cycles: Bachelor and Master (BA/MA). Nevertheless, each country has its own rules and requirements to the medical curriculum depending on the needs of the nation. The BA/MA system would facilitate paths between different areas of higher education and student mobility. However, there are only few other areas of higher education that can be bridged with Medical Education.

The traditional medical curriculum has two periods of education: basic sciences during the first 2 or 3 years and clinical sciences during the next 3 or 4 years. Many European medical universities have reformed their curricula in a way to introduce clinical sciences earlier. This difference in curriculum structure may lead to non-identical implementation of a two-cycle structure in schools, which divide the curriculum traditionally and those with integrated curriculum [*Costigliola V., Creusy C., 2005*].

If bachelor's degree is giving access to labor market, what is the job description for bachelors then? Obviously they cannot practice medicine as itself and there is no profession corresponding to that level in medicine. It seems that the only thing that is left to do for bachelors is to continue their education in masters programs. However, this will give the students an opportunity to decide, whether they want to continue their career in clinical medicine or they choose to go deeper into biomedical sciences. Figure 1 reflects recommendations on how to link core medical education with complementing BA/MA curricula, suggested by the German Association for Medical Education [*Costigliola V., Creusy C., 2005*]. Nevertheless, it seems that the BA/MA system has not been fully adopted and implemented in any medical school in Germany yet [*Gerke W. et al., 2005*]

Now a model of Bachelor/Master's system at the Yerevan State Medical University is being suggested that can be discussed and implemented in YSMU and is shown as Figure 2. If we are able to successfully implement this model, then those graduates interested in biomedical research would have a chance to choose appropriate path after 3-year study for Bachelor of Medical Sciences. Therefore, those interested in clinical medicine will be able to continue their education. In this case the degree of a Medical Doctor (MD) is still awarded after the sixth year, thus no confusion

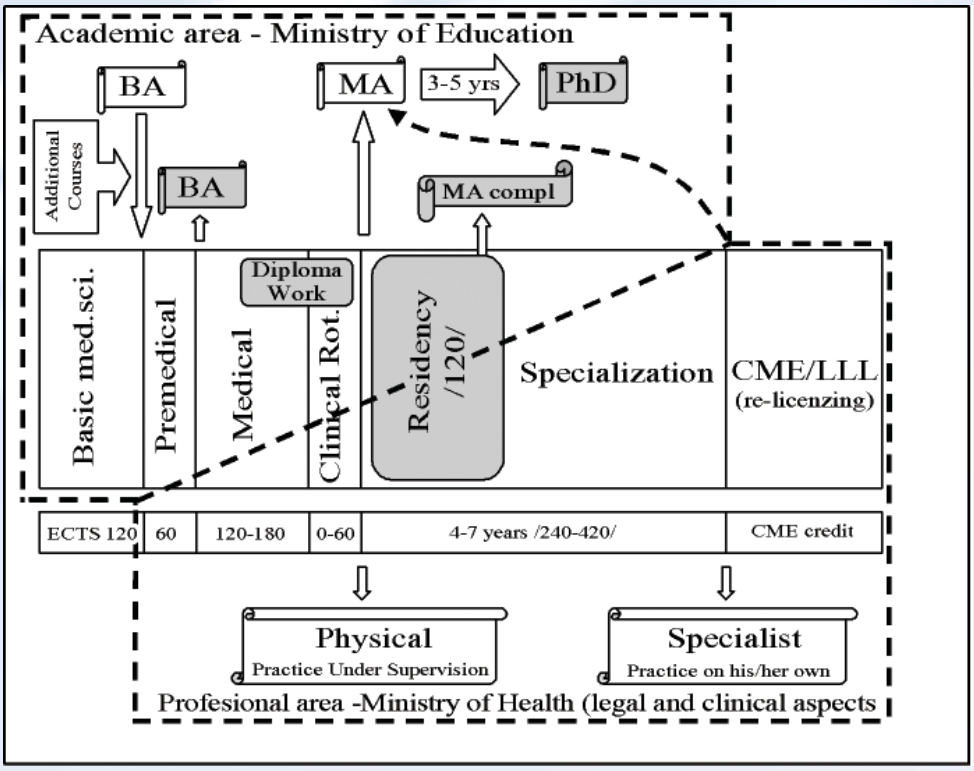

Figure 1. *Suggested BA/MA system by the German Association for Medical Education.*

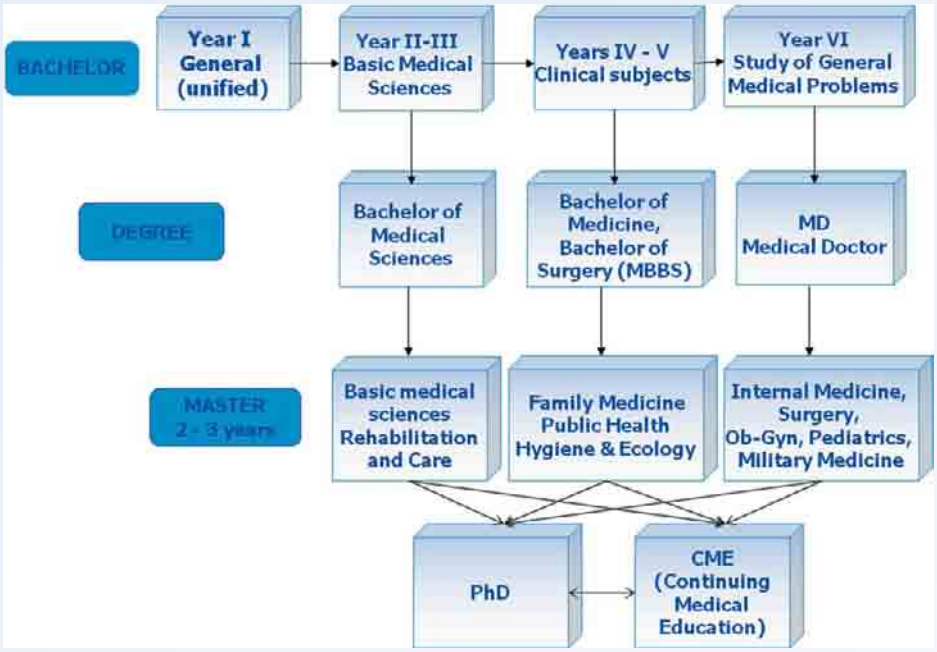

Figure 2. *Education System Model suggested at the Yerevan State Medical University.*

will be encountered by YSMU foreign graduates in the countries that are not in the Bologna Process. Upon obtaining the MD degree, graduates are free to choose one of the 5 fundamental medical master's programs for 2 or 3 years, due to which they will gain the basics and necessary skills of general medical specialties. For narrower medical specialties the graduates can apply to Residency Programs following the corresponding Master Programs. The duration of Residency Programs will depend on the chosen specialty.

Curriculum Development

Modern medicine is a collection of specialties, including the first-contact specialties of family and general practice. There is a certain belief that has strengthened recently, i.e. specialties whose expertise ought to be narrow but deep should have limited exposure to general medical theory and practice and then focus primarily on learning their specialties. On the other hand, those specialists that are going to be front-line will need to know how to diagnose and manage the broad range of health problems and should spend much less time dealing with advanced and complex diseases [*Flegel K. et al., 2008*]. To follow and fit in the modern medicine every now and then it is necessary to revise the existing curriculum.

The revision of YSMU curriculum has not been performed as often as desirable. In order to promote the mobility of our students and assure the quality of education, transformation of YSMU study programs has to be done. Another reason for curriculum development is the modification of medical education provided by YSMU to the global standards of World Federation for Medical Education (WFME). According to these standards for basic medical education, the medical school must identify and incorporate in the curriculum contributions of the basic biomedical sciences to create understanding of the scientific knowledge, concepts and methods fundamental to acquiring and applying clinical science. The basic biomedical sciences would - depending on local needs, interests and traditions - typically include anatomy, biochemistry, physiology, biophysics, molecular biology, cell biology, genetics, microbiology, immunology, pharmacology, pathology, etc. [*Basic Medical Education WFME, 2003*]. All these basic biomedical sciences are included in the medical program of YSMU and are taught during the first 3 years of education. Recently the following curricular reforms have been performed at YSMU:

1. Unification of the 1st year curriculum at all the faculties (General Medicine, Dentistry, Pharmacy). As a result, the 1st year students of all the faculties learn the same fundamental subjects as Biology, Chemistry, Physics, as well as First Aid, Personal Care, History of Medicine, etc. Previously, in order to change the faculty for some reasons, students had to take the mismatching exams and catch up with missed classes due to differences in curricula. This reform facilitates transfer of students to other faculties at the end of the 1st year, if necessary.

2. Curricula of the 2nd and 3rd years have been revised in a way to implement integrated teaching. *Horizontal integration* is introduced, i.e. subjects that have been taught as independent and unrelated courses are coordinated and unified now, presented together as parallel disciplines, making up a meaningful whole, e.g. anatomy, histology, physiology, and biochemistry. Representatives from respective chairs met regularly discussing their syllabi, confronting the topics and their content. As a result of these meetings the architecture of an integrated curriculum has been achieved. The integration is system-based, e.g. students discuss the anatomy of the nervous system (NS) during the anatomy class, then its histological structure is observed at the histology class, with NS functioning tackled during the physiology class, - all aspects are introduced during the same period of time, i.e. various aspects of the same issue are learnt simultaneously. The feedback to this reform so far has been extremely positive, minor issues have been noted and are being corrected, however a deeper observation of the reform results is yet to be done.

Vertical integration refers to the interweaving of clinical skills and knowledge into the basic science years and, in turn, reinforcing and conti-

nuing to teach basic science concepts as they apply during the clinical years. Although "horizontal" and "vertical" integration appears to offer an advance over traditional approaches, it still does not engage students sufficiently in an active process of learning the material under consideration. This weakness is being addressed in many institutions by the inclusion of small group Problem Based Learning (PBL) exercises. Carefully selected clinical problems proposed as exercises are intended to develop in students:

1. Understanding the relevance of acquired theoretical knowledge to the practice of medicine;
2. Understanding that they will need to actively seek out information, not only through their school years but also throughout their careers;
3. Understanding that those skills are necessary to get the right information in problem solving;
4. Necessary capability to put pieces of information from different sources together in a meaningful way, etc. [*Vidic B., Weitlauf H., 2002*].

The establishment and implementation of PBL-course at the Yerevan State Medical University is currently being discussed and the first steps are being done.

When doing curriculum revision, it is necessary to decide first what will be the final outcome, i.e. what are the main competencies that a graduate of medical university should have? WFME has defined a standard on educational outcome, according to which the medical school must define the competencies that students should exhibit on graduation in relation to their subsequent training and future roles in the health system [*Basic Medical Education WFME, 2003*]. However, at YSMU clearly defined list of competencies for graduate students is lacking. Once the list has been compiled, the learning objectives for each course must be defined.

According to WFME standard on curriculum structure, composition and duration, the medical school must describe the content, extent and sequencing of courses and other curricular elements, including the balance between the core and optional content, where core and optional content refers to a curriculum model with a combination of compulsory elements and electives or special options [*Basic Medical Education WFME, 2003*]. YSMU has now balanced curriculum content with compulsory and elective courses. However, there is no description of course content, i.e. clearly stated objectives of subject courses are lacking. Having a list of learning objectives for each course will make it easier to prepare student assessment tests and questionnaires, make the examinations more objective, unbiased and help to prevent misunderstandings between students and faculty. All the courses have syllabi, but the syllabus does not clearly define to which extent the student must have knowledge about a certain topic. This leads to certain problems when it comes to preparing Multiple Choice Questions (MCQ) as an assessment tool, because very often the MCQs contain questions that have been neither mentioned during the lectures nor discussed during the seminars. Hence, one way to solve this issue will be the precise and clear definition of learning objectives for each course taught at YSMU and proper training of the faculty.

The curriculum development process is a permanent one now and is being revised by faculty members and experts from leading European and American universities.

Establishment of a system of credits

Implementation of the European Credit Transfer System (ECTS) at YSMU has been done for a few years now. One academic year comprises 60 ECTS-credits, with workload of 1500-1800 hours (one credit stands for 25-30 working hours). The establishment of credit-system has been done according to requirements stated at the ECTS user's guide [*ECTS User's Guide, 2004*].

Assessment in Medical Education

Recent reforms in almost all the spheres of medical education are applied also to the assessment methods used at the Yerevan State Medical University. Medical knowledge of students for many years has been tested by oral examinations, which are subjective, time-consuming and require more than one examiner. The students were taking the examinations at the end of the course, and the

course content was sometimes too extensive to be tested with 3 or 4 questions. It is well-known that assessment may influence learning, since students tend to study what they expect to be tested on. Hence, the frequency of assessment has been increased and the content being assessed at time is decreased. Now the students are being tested for all the subjects by the end of each semester (only the course content of the respective semester is being tested), which keeps the students' pace on studying and acquiring knowledge evenly, as opposed to intensive learning right before the examination. Assessment methods have also been changed from oral examinations to written examinations, using multiple-choice questions. Multiple-choice questions seem to be more accurate and reliable assessments of the competence, because they encompass many content areas, require shorter period and can be graded by computer. The Multiple-choice questions format being used at the Yerevan State Medical University is choosing the best answer from the list of possible answers.

However, switching to written examinations has led to problems as well. First of all, multiple-choice questions that are rich in context are difficult to write, and sometimes certain topics that cause dilemmas are avoided [*Frederiksen N., 1984*]. There might be situations that the examinee can answer a question by recognizing the correct option, but if the options are absent, he/she could fail to answer. This effect is called cueing and can be minimized by having open-ended short answer questions or short essays [*Epstein R., 2007*].

Faculty Development

All the positive changes that have been performed at YSMU within the past 2 years are obvious. And yet there are still uncountable goals to achieve. The quality of undergraduate medical education at the University has been undoubtedly improved; however, in the course of all the reforms the necessity of faculty development is urgent. In fact, faculty development must be the basis of the reforms. Faculty development must include but not be limited to the following programs:

1. Improvement of presentation skills. Some of the faculty must be trained in using Power-Point presentations during the lectures. There is always room for improvement of the presentation skills for everyone, designing class instructional materials and presentations.
2. The faculty must learn to use Evidence-Based Medicine in the teaching process. Best publications must be carefully selected and presented to students as an important part of their education, for them to be able to analyze the research papers in medicine. The achievement of this goal is related to some problems, such as:
   a. The faculty should improve their reading skills in English, since the majority of publications worldwide are in English. Hence, special courses of English directed on scientific literature comprehension must be organized.
   b. The faculty should be trained to use modern electronic library resources. This is connected to having proper libraries, equipped with computers, provided with Internet and having access to biomedical information databases, such as e.g. Medline. The Yerevan State Medical University is planning to rebuild the library facilities and have a library that will correspond to all the needs. Meanwhile, proper trainings on using electronic biomedical resources may be organized for the faculty with the facilities available at the moment.
3. Since the Yerevan State Medical University has almost completely switched to written MCQ examinations, it is evident that the faculty must be trained on MCQ test construction.
4. As it has been mentioned above, the proper composition of examination questions is based on the availability of learning goals and objectives for each course. Since they are not available at YSMU and are yet to be written, the faculty must be trained in writing learning goals and objectives.

Conclusion

The implementation of Bologna Process in Medical Education seems to be challenging, thus requiring the University, Ministry of Education and Ministry of Health to join their efforts. The health care system in the Republic has to be thoroughly explored. Ministry of Health should work closely with the University on establishing links with the labor market and creating working places for graduates with appropriate degrees. When we talk about increasing the mobility of the students, it will be possible only when the majority of the countries agrees on and already implements BA/MA systems in a similar way. However, this seems not to be happening quite soon and does not seem to be implemented in medicine as easy as it may be done in other disciplines.

The suggested BA/MA model at the YSMU makes it more flexible to switch from previous system to the new one. It allows also making the new structure acceptable in countries, which are not in the Bologna Process. Finally, the reforms in course assessment, implementation of credit system, curriculum development, course requirements, - all these initiatives are directed to medical education quality improvement at the Yerevan State Medical University.

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