Basic sciences in South Asia now and then: A personal perspective

P.Ravi Shankar

Abstract:

The late 1980s was a period of change and continuity. The preclinical subjects of Anatomy, Physiology and Biochemistry were taught during the first one and half years of the course. Dissection, histology, osteology, animal experiments, hematology practicals, biochemistry practicals were the different exercises. The internet and computers were still in the future during my student days and traditional anatomical specimens were used to study the subject.

These days a number of simulations and computer programs are available. Multimedia has made the learning of the subject easier and online support websites are a great help to both students and teachers.

Animal experiments and pharmacy practicals were carried out in pharmacology during my student days. Pathology and Microbiology practicals were microscope based. Community Medicine was not taught in the community.

Nepal is a relatively new entrant to medical education. In Nepal, the basic science subjects are taught in an integrated, organ system-based manner during the first four semesters. Teaching and learning rational use of medicines is emphasized in pharmacology in our institution. Assessment has become more structured and is carried out using checklists. Adult learning strategies are more commonly used and the student-teacher relationship is becoming more democratic and egalitarian. Technology has invaded the classroom.

The number of private medical schools has increased and the importance of the undergraduate medical degree (MBBS) has decreased. The next twenty years will definitely see more changes and promises to be an exciting time in medical education.

The late 1980s were a period of change and continuity. India was firmly wedded to socialist principles but a young prime minister was just beginning to initiate change. Medical schools were still traditional places of learning. Massive buildings, overcrowded hospitals, milling crowds.

Being a first year medical student

Learning continued in the time honoured way. 'I was educated in this way, so why should I teach you in any other', said a few teachers. The taught acquiesced not that they had any say in the matter. The preclinical sciences of Anatomy, Physiology and Biochemistry were our first introduction to the world of Medicine. We continued to dissect cadavers, go to bed with dissect cadavers, go to bed with dried and laterally with clavicle and scapula, as put varnished bones and hit ourselves medially by one of my classmates. In Physiology we used to pith frogs and 'sacrifice' guinea pigs, peer intently at soot darkened kymographs and varnish the tracings preserving them for posterity. Biochemistry was a colourful subject and we used to mix solutions together, heat them and sometimes end up with delightful colours.

Department of Pharmacology
Manipal College of Medical Sciences
Deep Heights
Pokhara, Nepal

World Wide Web and multimedia, then and now

The World Wide Web was still in its infancy and the only web we were familiar with was those spun by spiders in various God forsaken corners of our vast campus. Our only source of information was library books and manuals. CD-ROMs, multimedia, DVDs and computers were conspicuous by their absence. We used to spend hours in the Anatomy museum looking at the preserved specimens, models and slides from different directions. Out artist was very talented and some of the specimens were a delight. These days students are more likely to log on to virtual museums on the World Wide Web. Today's students have programs which let them dissect three dimensional virtual bodies in detail. Medical Informatics is becoming an important in basic medical science education.[1] Certain applications of Medical Informatics are model building, theory development and innovative experimentation. The aim should be building new knowledge from existing ones, structuring and assimilating the knowledge in terms of cause-process effects. Standardization of the approaches for reaching a decision is also required. (Sarbharbhad, 2004).

Programs let you trace the entire course of arteries, veins and nerves. The software lets you study different muscles involved in a particular movements and makes the study of complicated movements for example circumduction easy. Simulations can be very helpful in Embryology where the students can visualize the various stages in the development of the human embryo. We had a very difficult time studying Embryology as the development sequence had to be visualized in the 'mind's eye'. The CD-ROM atlases are helpful for studying histology. The ADAM Multimedia series is a wonderful tool for studying Physiology. Physiology with its description of processes and events lends itself easily to animations and video models.

Textbooks on CD-ROM and online support sites

These days many text books come with an attached CD-ROM and multiple choice questions (MCQs) and short answer questions (SAQs) for self-assessment. The internet has revolutionized the learning of many subjects. Many textbooks have created support sites on the web which lets you download updates, videos, animations, MCQs and contact the authors. Many textbooks are available in a CD-ROM format. Flesh and Bones (www.fleshandbones.com) is a site for medical students and faculty members. The site contains MCQs, SAQs, online support for textbooks and lets teachers order inspection copies of textbooks and download slides and images from the 'image bank'.

'Paraclinicals' during my student days

The paraclinical subjects of Pharmacology, Pathology, Microbiology and Community Medicine were tackled by us after the first MBBS (1 1/2yers) spent studying the preclinical subjects. Pharmacology practical during our time was divided into pharmacy practical and animal experiments. Pharmacy was just remembering a long list of complicated ingredients like a recipe for an exotic dish and making strange preparations like Whitfield's ointment and carminative mixture. The compounded preparations were usually poured down the drain. The department used to be a terror for animals. Frogs, rabbits, guinea pigs, rats were routinely sacrificed. Adding drugs to the organ bath and studying their effects on the guinea pig ileum and frog rectus took up most of our time and the results were mostly disappointing.

Pathology was peering through a microscope at colourful bits of tissue. We had to guess which organ or tissue was on display and the pathology the organ was afflicted with. We had to make our own hematology slides, fix it, stain it and then diagnose the pathology, if any. In Microbiology, we closely studied 'stool', sputum and other specimens trying to identify helminth ova and bacilli under the microscope. Gram staining and acid fast staining were the practical exercises. Learning 'community medicine' was something of a disappointment for me! We were never really in the Community. Most of the time was spent looking at various organisms under a dissecting microscope or looking at dried specimens of leaves and twigs or at mosquito larvae and strange animalcules.

Medical schools in Nepal

Nepal is a relatively new entrant to the field of medical education. The Institute of Medicine (IOM) the first medical school in the country was started in the 1970s. IOM stressed a community based approach to learning and

has the goal of creating 'community doctors'. Recently a number of medical schools have been opened. Medical schools in Nepal generally do not have animal houses or the facilities for animal experimentation.

I teach at the Manipal College of Medical Sciences (MCOMS), a private medical school affiliated to Kathmandu University. Kathmandu University follows an integrated problem-based approach to learning the basic science subjects is followed. The curriculum is integrated, community-based and electives-embodied. (Shandar, 2004) The curriculum gives enough freedom to individual medical schools to create effective learning sessions.

Learning pharmacology at our institution

The department of pharmacology teaches students how to use essential medicines rationally. We do not carry out animal experiments or pharmacy practicals. Exercises on personal or P-drug selection, prescription writing, solving simple clinical problems, communicating non-drug and drug information to patients, critical analysis of pharmaceutical promotion and investigating common drug use problems are the common exercises carried out. (Kathmandu University, 2004) Students are taught to critically analyze published literature and health websites on the internet.

Recently rational use of medicines (RUM) has gained a lot of importance and the World Health Organization (WHO) and other organizations are concentrating on improving the teaching of pharmacotherapy as a means towards promoting the more rational use of medicines. WHO publications are freely available and the WHO Medicines Bookshelf can be installed on computers and gives access to the electronic versions of various publications.

Teaching and assessment, then and now

The increased emphasis on problem-based and self-directed learning is an important change which has occurred between my student and teacher days. The assessment system has also seen changes. Problem-based learning (PBL) adopts learner-centered method where students learn by working on real life problems and activities, where teacher acts as a facilitator. The problems are used as a focus for learning basic science and clinical knowledge along with clinical reasoning skills in an integrated manner. (Barrows & Tamblyn, 1980) Ziauddin Medical University in Pakistan has successfully made the transition from traditional to innovative self-learning. (Barakzai, 2004) A study in Pakistan had shown that students supported problem-based learning (PBL) as an effective method of learning. Majority of students were motivated towards self- learning. They were convinced that PBL helped them in building up communication skills, interpersonal relationship and problem solving capacity. (Habib et al., 2006) During my student days, the number of practical exercises was more in the basic sciences. Dissection, teasing and mounting various tissues, animal experiments and hematology practical in physiology, pharmacy practical and animal experiments in pharmacology the list goes on. Assessment was global and we sometimes felt it was arbitrary. These days, we use more of objective structured practical examinations (OSPEs) during practical assessment and students are marked using structured checklists. (Shankar & Mishra, 2002) Student opinion regarding OSPEs and structured assessment was positive.

Students and the student-teacher relationship

The students today are more familiar with computers and the internet. Question papers, revision classes, slides, animations, resources are all available on the internet and access to information has become easier compared to my student days. The student teacher relationship has become more egalitarian and democratic. The younger generation of teachers is more comfortable with relinquishing the traditional authority associated with a teacher and acting as facilitators during problem-based learning sessions.

Adult learning strategies

There has been an information explosion in medicine in the last two decades and the emphasis of medical education is slowly changing from acquisition of factual knowledge and recall of information to conceptual knowledge, solving problems and knowing 'where' to find information. Learning is slowly becoming activity-based (in a different sense from the activities emphasized during the good old days), problem-stimulated or problem-based and carried out in small groups in concordance with the principles of adult learning.

Advantages and disadvantages of the new system of learning

The new system of learning is needed to prepare doctors to fulfil the expectations of society, to cope with the exponential growth of medical and scientific knowledge, to inculcate physicians' ability for lifelong learning, to ensure mastery in information technology, and to adjust medical education to changing conditions in the health care delivery system. (Majumder et al., 2004) Problem-based learning can better prepare graduates to deal with problems of practice. Learning is made more interesting and relevant to the needs of the students. PBL also promotes greater interaction between the students and the faculty. (Mennin & Martinez, 1986) This has been observed in our medical school also. In Pharmacology problem-based curricula linked to essential medicine lists and standard treatment guidelines has been mentioned as a key intervention towards promoting the more rational use of medicines (Ro et al., 2001). Traditional teaching had not concentrated much on rational use of medicines.

Certain practical skills like dissecting skills, conducting animal experiments, and preparing slides for microscopic examination may not be learnt under the new system. Also, while there is both theoretical support and anecdotal evidence that PBL enhances motivation and helps in the development of interpersonal skills, these effects have never been proven. Another possible disadvantage of PBL is its relative inefficiency -- some research suggests that PBL curricula cover about 80% of what might be accomplished in a conventional curriculum in the same period. (Albanese & Mitchell, 1993) There are particular concerns about students' grounding in the basic sciences, with some evidence (although confounded by uncontrolled variables, including the effects of admission policies) that students from PBL-based schools do less well than those from traditional schools in the basic science component of the US National Board Examinations. (Vermon & Bake, 1993).

Technology invades the classroom

Technology has invaded the classroom in the form of computers and LCD projectors, overhead projectors, cordless mikes and sound systems making the life of the teacher easier. During my student days, the classrooms only had blackboards and nothing else. In some medical schools in South Asia there are even facilities for students to plug in their laptops and connect to the class intra network and download the slides, notes and resource materials of the teacher. The number of students has increased in many medical schools and batches of 150 or 200 students are not uncommon these days.

Other changes

These days, students start preparing for postgraduate entrance examinations, United States Medical Licensing Examination (USMLE), Professional and Linguistics Assessment Board (PLAB) and other exams right from the first year of medical school. Long answers and essay questions have become less common and short answer questions (SAQs) have become the predominant assessment modality in theory papers. The use of MCQs has increased. Privatization of medical education is another important and noticeable change. During the 1980s, privately run medical schools were uncommon and most medical schools were run by the government. In the last 20 years there has been an explosion in the number of medical schools and most of these new schools are in the private sector. (Supe & Burdick, 2006) (Shankar & Mishra, 2006) Students moving across countries to study medicine have become more common. These days, Nepalese go to India, Indians come to Nepal, Sri Lankans go to India and Nepal to study medicine.

MBBS gets devalued

There has been steady erosion in the value of the basic medical (MBBS) degree and an increasing trend for specialization and super specialization. The amount of time allotted for the pre clinical sciences (Anatomy, Physiology and Biochemistry) in the curriculum has been reduced to one year in India while in Nepal two years are devoted to the basic science subjects. Passing examinations has become easier and the students are marked more liberally these days compared to the 1980s and 1990s.

The last twenty years has seen a lot of change in the field of medical education. I have restricted myself to the basic sciences. Who knows what the next twenty years will bring? One thing is however certain. It promises to be an exciting time for medical students and medical educators alike.

References

Albanese, M.A. & Mitchell, S. (1993) Problem-based learning: a review of literature on its outcomes and implementation issues, *Academic Medicine,* 68, 52-81.

Barakzai, Q. (2004) Transition from traditional to innovative teaching in and beyond pharmacology at Ziauddin Medical University. *Acta Pharmacologica Sinica,* 25, 1220-1232.

Barrows, H.S & Tamblyn, R. (1980) Problem-based Learning: An Approach to Medical Education, Springer, New York.

Berkson, L. (1993) Problem-based learning: Have the expectations been met?, *Academic Medicine,* 68, S79-S88.

Curriculum for Bachelor of Medicine and Bachelor of Surgery Part-one Basic Medical Sciences (Third Version), University of Kathmandu (2001) Dhulikhel, Nepal

Habib, F., Baig, L. & Mansuri, F.A. (2006) Opinion of medical students regarding problem based learning, *Journal of Pakistan Medical Association,* 56, 430-432.

Majumder, A., D'Souza, U. & Rahman, S. (2004) Trends in medical education: Challenges and directions for need-based reforms of medical training in South-East Asia, *Indian Journal of Medical Science,* 58, 369-380.

Mennin, S.P. & Martinez-Burrola, N. (1986) The cost of problem-based vs traditional medical education, *Medical Education*, 20, 187-194.

Ro, Laing, Hogerzeil, H.V. & Ross-Degnan, D. (2001) Ten recommendations to improve use of medicines in developing countries. *Health Policy and Planning* , 16, 13-20.

Sarbhadhikari, S. N. (2004) Basic medical science education must include medical informatics. *Indian Journal of Physioogy & Pharmacology*, 48, 395-408.

Shankar, P.R. & Mishra, P. (2002) Student feedback on the objective structured component of the practical examination in Pharmacology. *Journal of the Nepal Medical Association,*;41, 368-374.

Shankar, P.R. (2006) Pharmacology at the Manipal College of Medical Sciences, Pokhara, Nepal: New roles and new challenges. *Journal of Pharmacology,* 4, e. 2.

Shankar, P.R., Mishra, P. & Dubey, A.K. (2006) Modern medical education in Nepal. *The Clinical Teacher,* 3, 65-68.

Supe, A. & Burdick, W.P. (2006) Challenges and issues in medical education in India, *Academic Medicine,* 81.

Vernon, D.T. & Blake, R.L. (1993) Does problem-based learning work? A meta-analysis of evaluative research, *Academic Medicine,* 68, 550-563.