

Why change a medical curriculum

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Introduction

Curriculum change, especially in a medical school which has previously followed a traditional curriculum is always traumatic, for there is no universal acceptance by all stake holders of the need to overhaul and change a familiar and comfortable curriculum whose end products are of a reasonable standard. However from the mid twentieth century increasing numbers of medical schools have changed curricula with good reason.

Objectives

To trace the broad trends in scientific medicine and medical education from its early beginnings, and to focus on circumstances that have led to change.

To describe the changes that have been made to the medical curriculum of the University of Colombo, Faculty of Medicine (UCFM).

Early beginnings of scientific medicine and medical education and the developments up to the 18th century

The credit for the start of rational medicine is often given to Greek physicians. However, Imhotep of Egypt and the Ayurvedic tradition in India should be mentioned although unfortunately these did not progress and develop into systems of medicine with a scientific basis, as accepted in modern times.

Imhotep (3150 BC) lived more than 2000 years before Hippocrates. He was a physician, poet, priest, astronomer, architect and vizier to King Zoser. There are papyri containing his descriptions of clinical histories, diseases and treatment regimes. After his death he was glorified and deified and ultimately identified as the God of medicine in Egypt, similar to Aesculapius in Greece (1).

During the reign of Emperor Asoka in India, (3rd century BC) epidemics were studied, surgery progressed, a physicians oath was introduced and three classical medical treatise were written: *Charaka, Susruta and Vagbhata*, all based on the *Ayur-veda*, "the supreme document of Hindu medicine".

Two great systems of medical philosophy blossomed in Greece around the 4th Century BC. Temple medicine based on religious suggestion and psychotherapy and empirical medicine based on rational thought as expounded by Hippocrates of Cos. He is said to have taught his pupils while examining his patients under the famed plane tree. "Hippocrates of Cos has passed into history as the Father of Medicine. Like Homer, Christ and Socrates, Hippocrates never wrote a word, yet the *Corpus Hippocraticum* consists of no less than seventy-five volumes and contains an exposition of the knowledge of this great physician, the first to treat *patients* instead of disease and to prepare clinical case histories with a modern biographical approach" (1). Perhaps his greatest legacy is the Hippocratic oath, which lays down for students of medicine and medical educationists through the ages, the golden rule that to be a good physician one must first be a good and kind person. He contributed to medical education the concept of objective observation of the patient, of disease as a process of natural cause and of physicians who had to be humanists and humanitarians.

Greek Physicians carried their knowledge and expertise to Rome where students of medicine listened to the lectures of distinguished physicians such as Galen in the atrium of the temple of peace. Galen's medical teaching centered around the science of anatomy and physiology studied through experiments on dogs, swine, horses, birds, fish and even an elephant as Roman law prevented the use of human cadavers.

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In the 5th Century AD the focus of history changed from Rome to Byzantine later called Constantinople whose contribution to medicine and medical education was the creation of hospitals and the compilation of existing medical knowledge. From here we pass to Arabian medicine, and great physicians such as Avicenna, and their translations of texts from the Greco-Roman civilization, which helped to span the period between the Roman empire and the Renaissance.

In the middle ages medical education was centered in monasteries, but the church prohibited it. A significant milestone was the school of Salerno south of Naples organized into a University by some students and a group of physicians comprising a Faculty; the first Faculty of Medicine. Thereafter followed the Universities of Bologna, Montpellier, Paris and Oxford. Thus medical teaching passed from monasteries to lay schools and universities and hospitals. Another great force that revolutionized life, thought and education was the invention of the printing press in the 15th century.

The influence on medical education of developments in scientific medicine in the 19th century

The 19th century bequeathed to the 20th century, the rapid development of the basic sciences and other specialties. Medicine was transformed into a science based on anatomy, histology and pathology. Physiology became a natural science, the giant of the era being Claude Bernard. The Darwinian theory of evolution gave a new perspective on man's relationship with other species. Genetics began with Gregor Mendel, the germ theory of disease with Louis Pasteur and Robert Koch, and the seeds of immunology were sown by Pasteur and von Behring. The principles of antisepsis and asepsis were established and a brilliant period was seen in surgery and obstetrics and gynaecology.

The close of the 19th century also saw the establishments of model institutions for the teaching of scientific medicine such as Johns Hopkins with its teaching hospital, research laboratories and brilliant Faculty including Sir William Osler.

The specialties that developed at the close of the 19th century also lead medicine on the path of clinical laboratory diagnosis and specialization and this was reflected in the curriculum of medical schools which organized their teaching around first the basic sciences, then the paramedical subjects and lastly the clinical specialties. Departments grew around these specialties and spawned more and more departments.

Developments in the 20th century which gave an impetus to changes in medical education

With the branching off of specialties that dissected the human into segments of knowledge, the content of each growing faster than the other, the need arose for relevance, meaning and more purposeful medical education. The first to experiment with a more meaningful curriculum was the Case Western Reserve University in Cleveland, Ohio in 1952, which changed to an integrated curriculum. Others followed in USA, Europe, Australia, Malaysia and Pakistan. The Faculty of Medicine Colombo, changed curriculum in 1995. These medical schools achieved integration through a number of mechanisms. Horizontal or vertical integration or both, sequencing, team teaching, and an organ system approach. The whole teaching/learning process became more objective, more focused, with the development of mission statements, core curriculum and identification of skills to be acquired. Assessments changed.

There were other changes that 20th century medical education responded to, which are of great relevance to 21st century medical education: the change in the role of the physician, the change in the global perspective of health, and a change in the concept of the patient.

The physicians role changed from one who heals to one who also plans, organizes and promotes health in the community through community medicine, family medicine, occupational medicine, environmental medicine, control of infectious disease and the prevention of non infectious disease through health education. No longer could a doctor be trained to work in isolation but as a member or leader of a team. This new role also required training in good communication skills.

The global perspective of health changed in the latter part of the 19th century.

The 30th World Assembly in 1977 adopted the concept of Health for all by the year 2000 as a common goal for its 166 members: "attainment by all citizens in the world by the year 2000 of a level of health that would enable them to lead a socially and economically productive life".

The Alma-Ata Conference in 1978 suggested that the concept of primary health care was the key strategy to achieving Health for All. This implied a more equitable distribution of resources, a multisectoral approach, community participation and a focus on prevention. Its implementation would involve a reorientation of health care services so that secondary and tertiary care would support first contact level care.

In fact the 34th World Health Assembly in 1981 endorsed the recommendations of the Alma Ata Conference by suggesting the adoption of a global strategy for reorientation of national health systems based on primary health care.

The recommendations on medical education by the General Medical Council of UK in 1993 embody these newer concepts and newer trends in medical education of the late 20th century and is our starting point in this century (2).

- Reduction in the burden of knowledge imposed on medical undergraduates.
- A move from teacher centered medical education to a student centered one, so that the undergraduate course is seen as the first stage in the continuum of medical education that extends through out professional life which will include learning through curiosity and self education.
- The inculcation of attitudes of mind and of behaviour that befit a doctor, appropriate to his/her future responsibilities to patients, colleagues and society in general.
- The acquisition of skills required by an intern

through supervision and rigorous assessment.

- The defining of a core curriculum encompassing essential knowledge, skills and attitudes and its delivery through system based and integrated teaching.
- The augmentation of core curriculum through special study modules which permit the medical students to explore areas of particular interest to him/her and which provide an insight into scientific method, critical analysis and research.
- An emphasis on communication skills and basic clinical method.
- The theme of public health medicine encompassing health promotion, and illness prevention and targeting of population needs and awareness of environmental and social factors in disease.
- Clinical teaching which should adapt to changing patterns in health care and which should provide experience of primary care, community medical services as well as hospital based services.
- Teaching/learning strategies which should be guided by modern educational theory and which should draw on the wide range of technological resources available.
- Assessments that reduce emphasis on the uncritical acquisition of facts and which encourage appropriate learning skills.
- Continuing review of the curriculum with interdisciplinary membership and adequate representation of junior staff and students.

Thus trends in medical education went a full circle, passing through teaching in the community, under a tree in the time of Hippocrates, and the atrium of the temple in the time of Galen, to the monastery, and teaching hospitals, to a call in the 21st century to return to community and community based medicine.

Emerging global trends that need to be addressed by medical educationists

Mental illness: The World Health Report of 2001 (3) is devoted to Mental Health. According to this report, mental and behavioural disorders are estimated to account for 12 per cent of the global burden of disease and is influenced by a combination of biological, psychological and social factors. It explains how new information in the fields of neuroscience and behavioural medicine has advanced our understanding of mental functioning. Of how social perceptions of mental health have changed, and the current trend of de-institutionalising the care of the mentally ill. However the report warns of the dangers of closing mental institutions without implementing a solid network of community alternatives. It refers to countries such as Italy, which by implementing Law 180 in 1978 closed down mental hospitals. Other countries too have made this paradigm shift from care of the mentally ill in institutions and hospitals to the community.

The report provides three scenarios for action. For countries such as Sri Lanka with modest levels of resources, scenario B is suggested. Among other actions scenario B suggests closure of custodial mental hospitals and the integration of mental health care with general health care.

These concepts and developments need to be woven into modern medical curricula. Students need to be trained in the skills of recognizing, diagnosing and treating mental illness, in primary health care settings in addition to secondary and tertiary health care settings. Furthermore they must be able to harness related support systems to rehabilitate such patients in the community.

Rural Health: The Australians pioneered a flying doctor service. Telemedicine is seen as a tool towards better rural health care. Some Australian medical schools such as Victoria and Monash have established Rural Health Academic Units. Several have substantially increased the proportion of rural origin students and included rural clinical placements.

Medical care of the elderly: Care of the elderly is becoming increasingly difficult with the social trend of increase in the number of nuclear families and the decrease in the functional importance of the extended family. In Japan for instance, there is a new approach to the care of the elderly by way of providing through insurance and governmental institutions "care intensive institutions" and "short stay ambulant care institutions" rather than "cure intensive institutions".

Family medicine: This area concentrates on family welfare, the status of women, nutrition of children and pregnant mothers, immunization, use of oral rehydration fluid and health education has developed into a separate speciality in medicine.

The medical care of war affected and displaced persons: Refugees, orphaned children, people suffering from shell shock and mental disease, and other conditions precipitated by war – venereal disease, vector borne, disease, malnutrition and under nutrition have expanded the sphere of community medicine.

Scientific discovery, inventions and ethics

Watson and Crick could not have predicted the explosion of knowledge, diagnostic techniques and ethical issues that would follow their description of the structure, function and coding miracle of DNA: Polymerase chain reaction for diagnosis, recombinant technology, DNA fingerprinting for crime detection and paternity identification, detecting the genes controlling inherited diseases such as cystic fibrosis and Huntington's disease. The possibility of future xenotransplants with the same human HLA antigens and even the prospect of increasing the level of intelligence of a nation or an individual. These genetic discoveries bring ethical problems, e.g. should abortion be offered if inherited disease is diagnosed before birth? – another dimension to the ethics of abortion. Would people wish to know or should they be informed for instance that they carry the gene for Huntington's disease and very little can be done about it. This is difficult enough, but how ethical is it to deny (as is done in the USA) insurance to those who possess genes that may affect them later?

Research in the field of assisted reproduction has opened unexpected doors. Should the totipotent stem cell of the human embryo be used for gene therapy and to create organs for people who would die without them? Is this, as some perceive tantamount to killing human beings for organs? Who has patent rights of these stem cells and genes? – The donors or the scientists? The ethical issues are numerous.

There are many other ethical issues the world of medicine e. g. the ethics of resource allocation, confidentiality, voluntary euthanasia, and the non-voluntary euthanasia of the coma patient.

The doctors of tomorrow will be called upon to decide on the rights and wrongs of such issues and medical education of the 21st century should aim to acquaint students with such current issues and create in him/her the ability to make value judgments. These inputs to a medical curriculum are perhaps as important as making students aware of the diagnostic potential of ultrasound, CT and MRI scans, cardiac catheterization and such modern investigative techniques.

Alternative medicine

The change of concept of the patient was referred to above. Patients are now viewed as consumers with options and rights, same as the purchaser of any other service or product. In the medical market this consumer can choose between conventional medicine and many forms of alternative medicine.

Despite the great technical advances of conventional medicine, many patients and even some, medical practitioners are turning with interest to these various forms of alternative medicine, e. g. – ayurveda, acupuncture, acupressure, herbal therapy, hydrotherapy, homeopathy and chiropractic reflexology.

21st Century medical education should take note of this consumer interest, beliefs and demands. It should encourage students of medicine and doctors to keep an open mind and to learn of the basic concepts behind these forms of alternate medicine. The future doctor should be able to pro-

vide some guidance to the patient about what may be appropriate and beneficial. To encourage a haughty and superior attitude would not be in the best interest of the patient.

Medical informatics

The fusion of the computer and communication gave birth to the Internet and the World Wide Web. Medical students and doctors require training to access and select the most valid and relevant information. Computerization has revolutionized the keeping of patient records, hospital records and statistics. Many general practitioners have a patient data base and access the Internet for information relevant to diagnosis and management decisions. It is likely that in the developed world there soon will be bedside work stations with all the patient information on-line.

So the doctor of the 21st century will require a reasonable information technology capability and we will probably see in this century medical informatics being included in the curriculum rather than being included only as an additional teaching resource.

Appropriate changes made to curriculum at the University of Colombo, Faculty of Medicine

The teaching/learning strategies of the Faculty of Medicine, Colombo are directed towards producing a doctor who will be able to perform in all available health care settings, who is sensitive to the changing needs of society and who is aware of governmental and non governmental structures and organizations whose expertise and abilities can be harnessed towards good health and welfare.

The clinical leaning experience of our students is not only in the tertiary care setting of the teaching hospital but in first contact care settings as well. The first contact care programme takes students to municipal dispensaries, family practices of general practitioners, peripheral hospitals in rural settings, district hospitals in semi-urban and to non-governmental organizations involved in health and social welfare. Many students do their elective appointments in such settings.

There is a strong community medicine component which spans all five years of training which includes a family attachment and a community attachment among the urban poor, many small group discussion sessions, student presentations, seminars and health education poster sessions. On completion of this programme the student should have acquired the ability to identify health related problems in the community; plan and implement preventive, curative and rehabilitative measures at a community level; identify, recommend and implement activities which promote health of the individual, family and community; educate the community towards better health; plan and conduct appropriate health related research projects; work as a leader or a member of a health care delivery team; develop and maintain the personal characteristics and attitudes desirable in a health professional.

A new innovation of the curriculum is the Behavioural Sciences Stream spanning all five years whose teaching/learning activities include personal development and communication skills, medical ethics, changing behaviour, and health care delivery systems. Small group discussion sessions are used to expose them to real life situations and issues with the objective of creating awareness of current issues, promoting self expression and of fostering the capability of making value judgments.

Students are informed on a wide array of health and welfare related topics through a Special Topics Module e.g ageing and the problems of the elderly; terminal illness; victims of war and disaster; survivors of torture; physical, mental, emotional and sexual abuse including legal aspect, occupational health, environmental health, and alternative medicine.

Mental health has been given much more emphasis than in the past. There is a special integrated module on mental health. Psychological Medicine has been given prominence as a separate final year clinical subject on par with the traditional clinical subjects of medicine, surgery, paediatrics and gynaecology and obstetrics.

Clinical appointments in mental health are not only hospital based but in a community mental

health centre which runs a day care service, provides support to families with mental patients through a caregivers association, has a suicide prevention programme and which in collaboration with the Social Services Department pursues vocational training and employment for the mentally ill.

Prerequisites for good medical education

The knowledge, skills and attitudes that modern medical students are expected to absorb and reflect on are vast. Three factors bear on to what extent medical educationists succeed.

Teacher selection and training: First, the skill of the teacher, and hence the necessity to select carefully the future teachers of medical students, on criteria relevant to the task at hand. Also to train them, and encourage them, to keep abreast of current trends and techniques in medical education.

Student selection: Second the selection of this 'pluripotent' student with the capability of absorbing all that a medical course exposes them to. More consideration should be given to the qualities and attributes of the student who is selected to follow a medical course.

In Sri Lanka, selection to faculties of medicine is done centrally and on the basis of A-Level scores. Flaws in selection are confounded by the district quota system because of which selection of students for medicine is not on the basis of all island merit.

"There is evidence that for work involving complex tasks the best predictor of effectiveness is some measures of mental ability or IQ" (4). A-Level results may provide evidence of high IQ but the district quota ensures that students are admitted with very modest A-Level results and therefore possibly an IQ below the level required for medicine.

There are some characteristics that we demand of any doctor. Sufficient intellectual ability for the job, honesty, integrity, conscientiousness, helpfulness, willingness to cooperate, interpersonal skills and empathy (5). Can these characteristics be assessed?

Two medical schools, the University of New Castle, New South Wales, and Mc Masters in Ontario which invested heavily in selection have shown that careful selection and good support have a positive impact (6).

The method of selection of students to medicine in Sri Lanka needs review and change. We are increasingly seeing students who cannot cope with the course, who have been forced to opt for medicine by parents, who dislike the practice of medicine, who want to study medicine from books and notes instead of by the bed side of the patient, and who are reluctant to develop the skills that the job demands.

Funds: The third requisite for imparting well rounded and relevant medical education of the 21st century, of course, are funds and resources which could create the necessary environment conducive to learning e.g. student centered learning cannot achieve its full potential if one does not provide adequate library, and Internet facilities. Students of medicine cannot thrive when they are facing serious financial, language and accommodation problems. These are problems faced by faculties of medicine in Sri Lanka.

The greatest challenge of all perhaps is to avoid developing competent and efficient medical technologists, but to produce competent and efficient humanists, sensitive and caring persons. The skill required of medical schools and medical educationists is to strike that correct balance.

Balance training around high technology curative medicine with training around low technology care with limited resources.

Balance dependence on investigations with coping mainly with ones clinical skills and judgement.

Balance training in tertiary settings with more training in primary health care settings.

Balance acquisition of knowledge, and skills with developing correct attitudes.

Balance tight learning schedules with time to reflect on trends and discoveries in the world of medicine and their ethical implications.

The student's umbra of core content should have a penumbra of global medicine trends and issues.

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