

TRENDS IN MEDICAL EDUCATION IN SOUTH AFRICA

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Trends in medical education in South Africa are in some instances common to those in other parts of the world, but in other instances are peculiar to South Africa, being determined by local philosophy, culture and customs, local demands of practice, and local pre-university education.

The only constancy in the designing of medical curricula all over the world is a constant desire to change. Whilst the medical schools of one country contemplate reducing the total duration of their course from 8 to 6 years, and increasing the duration of the course in a particular subject from, say, 1 to 2 years, medical schools of equivalent merit in other countries are contemplating increasing their total course from 6 to 8 years, and reducing the course in the same particular subject from 2 years to 1 year. This means that no country is ever satisfied with its medical curricula, which is a healthy state of thought, but it also means that there is no such thing as a perfect curriculum. Change for the sake of change must be avoided; change for the sake of improvement is to be encouraged.

Every medical school has its curriculum committee, which meets at intervals with greater or less enthusiasm and effectiveness. Sir Robert Hutchison once prophesied with confidence that 'on the last great day when the earth shall quake and the rocks melt and the sun be turned to darkness and the moon to light, the multiple happenings that will be seen will certainly include the spectacle of a strong committee of a medical school seated around a table discussing learnedly and with much feeling the revision of the medical curriculum'.

The impossibility of planning the perfect curriculum is due to the many variables that have to be considered in its evolution. The mass of factual information and knowledge is increasing so rapidly from year to year and decade to decade that the selection of what is sound and essential to be offered the average student presents an almost insuperable difficulty. The innate qualities and educational standing of the medical student vary from year to year, from school to school, and from country to country. Teachers vary in their interests, in their views on teaching, and in their ability to teach. The careers for which students are to be trained cover a wide field. 'The medical profession', as George Eliot writes, 'allows one to have the exclusive scientific life that touches the distance, and to befriend the old fogies in the parish too'. Even though it is agreed that the

emphasis of teaching must be on preparing the student for some form of general clinical practice, the best way in which to effect this purpose is by no means settled.

Objectives of Medical Education in South Africa

The over-all objective in South Africa, as in most other countries, is to prepare students for some form of general clinical practice, and for many years there seems little doubt that in South Africa this practice will, in the main, take the form of private practice. The number of full-time posts in clinical practice is comparatively small and, in the opinion of the author, is unlikely to increase appreciably in the next 20 years in South Africa. A feature peculiar to medical training in South Africa is the need to imbue students with that sense of responsibility and self-reliance which is particularly necessary in rural practice, where consultative and technical assistance is not readily available when needed. The needs of specialistic training need not be considered in arranging a medical curriculum, since specialism must in any case be built on a foundation of undergraduate training which is common to all forms of later clinical practice. Whether the prospective public-health medical officer or the medical administrator requires the same medical education as that which is given to the prospective clinical practitioner is disputed, but this dispute does not alter the main issue that the majority of students will be entering clinical practice, and the course must be such as will prepare for that form of practice. The requirements of general practice, as envisaged by the author, were elaborated in 'The Training of Students for General Practice', published in the *Journal*¹ on 5 February 1955, and will not be repeated here. Clinical training should include experience amongst the different racial groups of the population.

Selection of Medical Students

The quality of the medical student admitted to the medical course has a considerable bearing on the design of a curriculum, and therefore a discussion on selection of medical students must be included in any discussion on medical education. The background for medical education is set at school before the student enters medical school, and the curriculum must, to a certain extent, be adapted to the form of school education and culture which the majority of students receive.

It is agreed that students most suited to a medical training and career should, if possible, be selected to undertake the training. But just as there is no perfect medical curriculum, there is certainly no perfect method of selecting medical students. The most elaborate system of student selection in the world, such as that which has been evolved in the United States of America over the last 25 years, and which includes so-called 'aptitude' tests, claims no more than to select a group of students who will be likely to succeed in passing the examinations of the medical curriculum and completing the course.

The wide selection of careers open to medical graduates makes it very difficult indeed to generalize upon the qualities that should be looked for in a prospective graduate. It is generally agreed that it is required of an adequate medical student that before entry to medical school he must have achieved an academic standard which has been defined by the school and by the South African Medical and Dental Council, that he possess a modicum of intelligence, a stable personality, intellectual honesty, and good motivation in regard to the career of his (not his parents') choice. Academic achievement at school, intelligence, and emotional stability, can be objectively assessed with fair accuracy. On the other hand, intellectual honesty and motivation in respect of the many careers open to the medical graduate are personality traits that cannot yet be objectively assessed by tests. Only by observing the student on his way through his undergraduate, and for that matter his early postgraduate, career can a rough idea of these two qualities be obtained.

Even if all the required qualities could be readily assessed at the time the student enters the medical school, these qualities are possessed in adequate quantities by so many of those wishing to undertake a medical career that where there is a restricted entry to a school and the number of applicants is greater than the number being accepted, selection on the basis of these personality traits would not whittle down the numbers sufficiently. Even though the number of applicants does not exceed the number of vacancies, a school may still decide to restrict entry even to the students who satisfy the standard set by the school. There is, however, much to be said for 'letting nature take its course' and, where there is no restriction of entry, allowing all those applicants who wish to enter the medical faculty to do so, and subsequently to drop out according to their own wishes, or be dropped out according to their failure to achieve a satisfactory standard of work.

Much as the universities of South Africa may wish to effect improvements in their pre-university school education, it is public educational policy at present to refrain from attempting to adapt school education to suit the 6% of the school population who will proceed to university. Nor can universities insist upon the character of a pre-university compulsory post-matriculation year at school. It is for these reasons that in the last few years moves have been made to institute a 'basic training year' at South African universities, the detailed course for which has been elaborated by the University of the Witwatersrand. Instruction in com-

munications, written and verbal, and in logic, were to be included. For economic reasons it has to date not been instituted.

THE MEDICAL COURSE

It is not intended to discuss in any detail the content of the medical curriculum. An added emphasis upon chemistry, physics and physiology appears to be universal, but there is a great difference of opinion regarding the actual measure of such increased emphasis in terms of hours and coverage of subject matter.

The subject content of the course, and the contents of the various subjects of the course, are important, but far more important than content is co-ordination between the different subjects throughout the course. A 2-year course in organic and inorganic chemistry before the student begins physiology may be far less educative and effective than a 1-year course in the same subjects properly co-ordinated with the requirements of physiology and medicine. A profound knowledge of organic chemistry will not make the student more *understanding* of the work later in the course, and in his subsequent career, unless it is co-ordinated with such later work. Factual knowledge of formulae does not help the student to *understand* the therapeutic or toxic action of a drug on the body, nor does it help the student to reason according to the principles of the scientific method, namely observation, inference and verification. A mass of facts without co-ordination is certainly not sound education.

The printed syllabus means little. The manner in which that syllabus is put into operation, particularly in co-ordinating the subjects of the course, is far more important.

Another factor affecting the content and operation of the curriculum is the quality of the teaching staff, their special interests, and their adequacy in number. The teaching staff, not the syllabus, determines the character and personality (good, bad, or indifferent) of a medical school. Experience is only educative if it occurs under proper guidance, and the quality of guidance depends upon the teaching staff. Teaching is an individual matter, each teacher having his own technique, which may be didactic, Socratic, or even silent, the last creating an atmosphere from which the students absorb instruction.

To illustrate the objectives of co-ordination and the difficulties met in achieving that co-ordination, I shall describe the system now in practice in the Department of Medicine at the University of the Witwatersrand. The system is dependent on warm interdepartmental co-operation. It is very far from perfect, and is described only by way of illustration. It certainly can be emulated, and may be either imitated or disapproved.

Medicine must be co-ordinated not only with the 'pre-clinical' subjects, particularly Physiology and its branches of biochemistry, histology and pharmacology, and Pathology, but also with its sister clinical subjects. The term 'pre-clinical' in relation to such subjects as anatomy, physiology, pharmacology and pathology, in the context of a discussion of a medical curriculum, is unfortunate, for these subjects, which start before

the clinical subjects, should be para-clinical as well, and continue into the clinical training years.

Physiology. Co-ordination of the work of the Department of Medicine with Physiology takes the form of a course in Clinical Physiology which starts after the student has passed the statutory examination in Physiology at the end of the second year. This course is arranged by a small committee of senior representatives from the Departments of Physiology, Surgery and Medicine. Owing to lack of staff and accommodation facilities, the course at present is weakest in the third year, when the students are studying Pathology and Pharmacology. In this year, the students meet once a week for 2 hours and are shown clinical cases, in the presentation and discussion of which major emphasis is placed upon the disorder of physiology that is illustrated. The meaning and measurement of venous pressure, for instance, is discussed over a case of congestive cardiac failure, and the mechanism of abdominal pain over a case of peptic ulcer.

In the 4th year the students attend the course for one session of 2 hours each week. Owing to shortage of staff and other facilities, it has not been possible to achieve the ultimate aim of having the students regularly do experimental physiological work on themselves in small groups. In discussing a subject such as pain, however, the students in small groups do simple experiments on each other, and staff, qualified to do so, anaesthetize a peripheral nerve on a number of volunteers and the students study and report on the effects; the effect of a non-habit-forming sedative on pain threshold is tested. The course includes instruction in the dynamics of the circulatory and the respiratory systems, the cardiac cycle, radioscopy, pain, nutrition, etc. Emphasis is placed upon the interpretation and mechanism of production of clinical symptoms and signs. However short of the ideal this course in the 4th year may be at present, every effort is made to imbue the students positively with the philosophy that physiology must never be forgotten in the practice of clinical medicine. The course is run on a seminar-discussion basis with demonstrations and experimentation, rather than on a lecture basis.

In the 6th year, a seminar-discussion series of meetings is held once a week in Medicine time, at which subjects suitable for clinical physiological discussion are chosen, for example, discussions of the eye in general medicine, of malnutrition, of jaundice, of purpura, or of headache. Here again, shortage of staff does not permit of as much interdepartmental co-operation as is desired by all departments concerned.

Pathology. Co-operation and co-ordination with the Department of Pathology takes the form of clinical pathological conferences arranged between the Departments of Medicine and Pathology. Members of both departments are always present. These conferences have now been abandoned in the 4th year, where they have given place to the course in Clinical Physiology, since the students are not then well enough equipped with a knowledge of clinical medicine to be able to obtain great advantage from clinical pathological conferences. They take place, however, through-

out the 5th and 6th year. The students themselves present the cases and lead the discussions, under the guidance of the staff of the two departments.

Anatomy. Co-ordination of clinical subjects with the Department of Anatomy takes place mainly under the aegis of the Department of Surgery. Nevertheless, it is arranged as far as possible that aspects of anatomy relevant to the teaching of the Department of Medicine are discussed simultaneously with the same group of clinical-year students in the clinical anatomy course organized by the Department of Anatomy.

Physics and Chemistry are not taught by the Departments of Physics and Chemistry in the clinical years, but such physics and chemistry as is related to physiology, chemical pathology and medicine, is dealt with in the Clinical Physiology and Clinical Pathology courses. For instance, the physics of sound is used as a basis of the interpretation of auscultatory examination of the chest, and the physics of optics in the interpretation of disorders of the eye in medicine.

Co-ordination with the other clinical subjects is equally as important as co-ordination with the so-called 'pre-clinical subjects'.

Psychiatry is regarded as the most important clinical subject to be co-ordinated into Medicine, Surgery, and Obstetrics and Gynaecology. In the Department of Medicine, this co-ordination is achieved in the medical wards of the Johannesburg General Hospital by having 2 part-time psychiatrists attached to the staff of every firm. One of these acts mainly as a consultant to advise on psychiatric problems in the ward, and the other concentrates on the teaching of students and the psychotherapy of the medical ward cases. In the 5th and 6th years, students in *Medicine time* are instructed in psychiatric interview technique in the medical wards, and also at the psychiatric out-patient department of the General Hospital. In addition to this teaching by the psychiatric staff, joint teaching-rounds are held in the medical wards with the 6th-year medical students, in which a psychiatrist and a physician take part. Whatever may be the dominating aspect of a case, medical or psychiatric, the student is led to see the essential unity of the body and the mind in all cases.

The response of the students to this type of teaching has been very satisfactory, and they frequently comment that it has enabled them to see the unity of the mind and the body. The success of this co-ordination between Medicine and Psychiatry depends entirely on the personal co-operative effort of physicians and psychiatrists.

This teaching of psychiatry in the medical wards is complementary to the course organized by the Department of Psychiatry, the examination for which is written at the end of the 4th year of study.

Paediatrics is also co-ordinated with Medicine in that, in addition to the formal course of lectures in Paediatrics in the 5th year and a period of full-time attendance at the Children's Hospital in the 6th year, paediatrics demonstrations are arranged twice a week in the 6th year and once a week in the 5th year during *Medicine time*. Furthermore, a paediatrician examiner is included in the final examination in Medicine.

Dermatology is similarly co-ordinated. A course of lectures is held in the 5th year, but clinical instruction is given in *Medicine time* in the 6th year and to a rather less extent in the 5th year. The students are made to feel that *Dermatology* and *Medicine* are a unity.

Social Medicine. One assumes perhaps too readily that all modern clinical teachers appreciate their responsibility to teach what is called 'social medicine'. In the teaching of clinical medicine every effort should be made to discuss the patient in relation to his domestic, social and occupational environment and, where relevant, to discuss his treatment in relation to such social therapeutic agencies as are available. This theme was elaborated in 'The Training of Students in General Practice'¹.

Ethics: Conduct of Medical Practice. It is also desirable that these subjects should be discussed by all clinical teachers, and in fact by all teachers, in the ordinary course of their teaching duties, the set courses of lectures in these two subjects being complementary to this teaching.

Lectures

Systematic lectures of text-book type should be abandoned. There is, however, in the opinion of the author, a case to be made for holding systematic co-ordinating lectures, the emphasis being upon co-ordinating clinical subjects with physiology, anatomy, pathology, and biochemistry, and with the sister clinical subjects. There is also a place for systematic lectures which review in balanced fashion the vast fields of knowledge which cannot be readily comprehended by students through their own reading. Systematic lectures must be complementary to practical work, and should aim at instructing on the importance of deduction, inference and thought. A short course of instruction in statistics by a broad-minded statistician has much to recommend it.

Seminars and Discussions

The seminar-discussion type of teaching is desirable in all years, particularly in the wards. In the 6th year, seminar-discussions in the Department of *Medicine* take place 3 times a week, at which the students themselves lead the discussion under the guidance of a member of staff. These discussions include each week one clinical pathological conference, one clinical case discussion, and one discussion on selected subjects which lend themselves to a discussion of the principles of co-ordination. The biochemist, the speech therapist, the ophthalmic surgeon, the endocrinologist, are invited to attend these discussions when related to their field of work. Through staff shortages it is not possible to achieve the ideal of co-ordination and co-operation in these discussions.

Student Numbers

For all teaching, but particularly for ward teaching, it is desirable that student groups should be small. In the 6th year, student numbers have been reduced to 3 or 4 per firm, in the 4th year to 8 or 9, and in the 5th year to 9-12. The small groups permit of fuller

discussion of all the clinical aspects, mental and physical, of each case, and all the socio-economic and environmental aspects. They also permit of good interpersonal relations between staff and students. The students are invited to take the teacher to the case, rather than being taken by the teacher to cases of the teacher's choice. They are made to feel responsible for their cases.

Examinations

The elimination of examinations is, in my opinion, impossible unless the staff/student ratio permits of a tutorial system; for this a staff/student ratio of 1 : 4 is obligatory. Not only must the numerical ratio be correct, but the staff must be sufficiently experienced and senior to assess fairly the student performance. It would seem that in South Africa no medical school is at present well enough off to be able to afford the staff in all departments for a tutorial system. Examinations must therefore for the time being continue.

The students must not be permitted to think that once an examination is behind them they can forget that particular subject for the rest of the curriculum. The curriculum must be arranged and operated so as to maintain their interest throughout the course in the subjects with statutory examinations early in the course. Certain medical schools have attempted to insure against neglect of early subjects by holding all the statutory examinations at the end of the curriculum. This system throws an unbearable burden upon the students, and the standard of knowledge in all subjects has been found to suffer when all the examinations of the curriculum are concentrated together at the end. In this system, it is universal practice to hold, at the conclusion of the didactic course in these earlier subjects, 'class tests' which must be passed if the student is to proceed to the succeeding years. These class tests defeat the whole purpose of the postponement of the examinations to the end of the curriculum, since they have the force of statutory examinations.

The author's opinion is that there should be, as there are at present, 'stop' statutory examinations in selected subjects at various stages of the course, the stage at which these examinations are held depending on the subject and the general arrangement of the curriculum in each school. These subjects would include anatomy, physiology, pathology, public health, forensic medicine, and perhaps psychiatry. The teaching of these subjects must, however, continue in a sufficiently interesting and co-ordinated manner to attract the students and stimulate and maintain their interest through the subsequent years of the course. They should know that in the final examination in the clinical subjects, their knowledge of 'pre-clinical' and related sister clinical subjects will be tested.

The recording of regurgitated factual information should not be regarded as the sole function of an examination. The examination must be assessed as a test of approach, of method, of initiative, of knowledge, and of thoughtfulness. Very relevant to modern examinations is the remark of the Stoic philosopher of the 1st century, Epictetus, who wrote: 'As if sheep, after they have been feeding, should present their

shepherds with the very grass itself that they have cropped and swallowed to show how much they have eaten, instead of concocting it to wool and milk'.

The Intern Year

The intern year is not yet sufficiently well organized in South Africa to permit of its being a factor modifying the content and operation of the curriculum to any notable degree. The time may come in the future when the intern year must be spent at the mother school, in which case the curriculum may be adapted to regarding the intern year as an extra year of the curriculum. At present, about one-third of interns in South Africa serve their internship in a hospital away from their alma mater. Some proceed to other hospitals in South Africa, others proceed outside the Union.

General

During the curriculum, a certain amount of factual knowledge and of techniques must naturally be learnt by the student. He should learn enough of techniques to enable him to start practice, first as an intern and later as a medical practitioner, but these techniques should be taught and learned in such a way as to enable him to adapt himself later to the learning of new techniques required to deal with situations that he may meet in practice, that he has never met before. It is impossible, during a medical course, to instruct the students in *all* the techniques they may require in practice, and to instruct them in *all* the situations that they may meet. The volume of facts and techniques taught must not be so massive as to thwart thought, understanding and

a sense of method. Karl Pearson, in his *Grammar of Science*, suggested that the true aim of the teacher must be to impart an appreciation of method and not a knowledge of facts. He admitted to having forgotten at least 90% of the facts that were taught him at school, but the notions of method which he learnt from his instructor in Greek grammar he had never forgotten. A synthesis by a single mind of all the knowledge that *could* be learned and taught is becoming increasingly difficult. The responsibility of selecting what should be taught, and of synthesizing, lies heavy on the teacher. It was Robert Hutchison who in 1925 wrote: 'Those of us who have the duty of training the rising generation of doctors must not inseminate the virgin minds of the young with the tares of our fads. It is for this reason that it is possible for teaching to be too up-to-date. It is always well, before handing the cup of knowledge to the young, to wait until the froth has settled.'

Lastly, all teachers entrusted with the responsibility of imparting to the students under their tutelage a balanced synthesis of the ever-increasing knowledge of Medicine would do well to take note of the views of Roger Bacon who, in the 13th century, wrote: 'Impediments to knowledge are too great dependence on authority, allowing too great weight to custom, fear of offending the vulgar, and the affectation of concealing ignorance by the display of a specious appearance of knowledge.'

REFERENCE

1. Elliott, G. A. (1955): S. Afr. Med. J., 29, 134.