Towards a more meaningful teaching of pharmacology

It was indeed a pleasure going through the editorial entitled “New wine in new bottles” written by Gitanjali.1 Someone had to hold the bull by its horns and Gitanjali has done it so admirably. I am appalled at the purported statement of the AIIMS spokesman who advises his students that if they (students) have such strong opinions about what the curriculum should be like, they can go and start a college of their own.2

Be that as it may, let us look at the article for the observations and recommendations of the author. Does the present curriculum in pharmacology meet the course objectives? I would respond by saying absolutely not. The program being implemented currently lacks uniformity at different medical colleges. This may partly be due to the lack of clarity in the directions from the Medical Council of India (MCI). Even their recommendations are outdated and sketchy.3 The next issue that she has raised concerns the group of academics who are supposed to be the custodians of keeping the curriculum abreast of the rapid changes in the subject. Where are they? What are they doing? I am of the firm opinion that the changes would be best brought out by young, active teachers, and I daresay that there is no dearth of such dedicated individuals in our country. We all blame the MCI for all the ills which exist in the curriculum but if I may be permitted to ask my fellow colleagues-teachers of pharmacology in India, have they at any time made any collective effort to bring about the required improvement? Has this issue been raised by the members of the fraternity at any National forum? We do have The Indian Pharmacological Society; has this topic been the issue of serious debate? My guess is that it has not.

I firmly believe that the teaching-learning process has two limbs—the teacher and the student—and that for any meaningful progress in the learning process there has to be mutual respect for each other. The views of the students should not and cannot be casually dismissed. Most of the institutions the world over do have one or more students’ representatives in their academic/curriculum committees and one must respect the students’ point of view.

Teaching methodology currently practiced

A questionnaire was put up on Indpharm, an e-group of the Indian Pharmacologists. The following information emerged from the survey:-

1. Pharmacology is taught in the 3rd, 4th and 5th semester (1½ years) soon after the students have done two semesters of anatomy, physiology and biochemistry. Therapeutics is not taught at this stage. In later years, the respective clinical departments are supposed to teach therapeutics. The department of Pharmacology is not involved in the teaching of therapeutics during the final years.

2. A total of 110-190 teacher-centered lectures are delivered, there is hardly any interaction between the teacher and the student. Usually, the notes are transferred from the notebook of the teacher to the copies of the students (most of the times without passing through the brain of either of them).

3. Tutorials are rarely organized; in fact some schools do not have them at all. There are other institutions where well-run tutorials are conducted, this being an exception rather than a rule. In most instances such tutorials have more than 25 students to each teacher.

4. Practicals - Experimental pharmacology/Pharmacy practicals. Several colleges continue to do isolated tissue experiments and in the premier institution AIIMS, students still prepare liniment of turpentine and castor oil emulsion. But this is not the complete picture. There are a number of centers where clinico-therapeutic exercises and prescription writing is regularly practiced.

5. The good old practice of memorizing the doses continues in most of the institutions, again exposure to the British National Formulary (BNF), Martindales Extrapharmacopoeia, WHO Essential Drug List and Guide to Good Prescribing is done at some centers.

6. Some centers are also showing how to use an inhaler, administration of drugs by various routes such as putting up an intravenous line, thanks to the Guide to Good Prescribing.4

7. Hardly any integrated/interdisciplinary teaching takes place.

8. Most of the colleges follow the archaic examination method consisting of two theory papers, viva and practical. Most of the colleges do keep a certain percentage of marks for internal assessment. Subjective element plays an important part in the final grading. The quality of record-keeping and the retrieval system is however, a debatable issue.

9. We do have a few centers where contemporary methods of teaching and learning exist. These centers are manned by well-qualified and trained faculty and are equipped with computers and access to the internet.

What background knowledge should one have

Gitanjali has raised very relevant questions regarding the aspects of pharmacology, which should be included in any core
curriculum. Before we go into the details of such curricula, let us identify our expectations from a medical student in the discipline of Pharmacology.

At the end of three semesters in Pharmacology, an undergraduate medical student should:
a) Be equipped with the requisite skills to rationally prescribe medicines.
b) Practice cost-effective medicine.
c) Be aware when not to give medicine.
d) Have a sound knowledge of pharmacokinetics and pharmacodynamics of those drugs which he/she is using.
e) Collect information from authentic texts and journals and not from the literature provided by the detail men.
f) Be a lifelong learner and practice self-directed learning for which he/she has developed critical appraisal skills.
g) Possess good communication skills and be able to administer drugs by various routes.
h) Use a ‘P’ list.

The core curriculum should have three broad areas:
i) Concepts and Principles
ii) Systemic Pharmacology
iii) Professional Skills

Concepts and principles

- Introduction to pharmacology, its branches: recommended text and reference books, access to the library, the computer lab, internet and the audio-visual aids center for self-directed learning.
- Pharmacokinetics and its application in the rational selection and prescription of drugs.
- Inflammation and infection—the role of antiinflammatory and antimicrobial drugs, mode of action and principles of their use.
- Efficacy and safety testing and clinical trials of drugs.
- Menstrual cycle, hormonal control of ovulation, teratogens, drugs secreted in milk and those which cross the blood-placental barrier.
- Immunization schedules, prescribing for the pediatric age group.
- Neoplasia. General principles of anticancer therapy.
- Poisoning. General principles in its management.
- Receptors, bio-transformation of drugs, role of liver and kidney in the handling of drugs.
- Prescribing for the children, the elderly and those with renal, hepatic and cardiac disease.
- The autonomic nervous system and how drugs can influence autonomic receptors, its application in clinical practice.
- Acid base imbalance, i.v. fluids types and their indication

Systemic pharmacology

This part of the curricula should be arranged around a body system—cardiovascular, respiratory, renal, gastrointestinal, reproduction, endocrine, hematology, infectious diseases and so on. The pharmacology teaching should emphasize on the various groups of drugs available, select a prototype, describe actions, pharmacokinetics, adverse effects, uses, interactions and contraindications. Only the most commonly employed agents should be highlighted. It is a good idea to give a brief pathophysiology of the disease so that applying the knowledge gained by the study of pharmacology mentioned earlier, one can rationally work out how the drug would correct the process leading to the desired goal—alleviation of the problem.

Restricting one to a limited drug list would ensure that the student follows the essential drugs concept and selects a drug based on its efficacy, safety, compliance, cost and ease of administration. Once this golden rule is followed the student would be restricted in using around 200 drugs and would not be lost in the therapeutic jungle. The students should be encouraged to prepare their own P drugs list. This would help them in developing their own critical appraisal skill as well.

This part of the curricula can be through lectures which should be interactive and the students should be encouraged to participate. Well-organized tutorials, which are student-centered should be organized once a week to review what has been learned during the week.

Professional skills

Mere theoretical teaching, which is the current practice in most of the medical schools is not enough. The students must be taught certain basic skills which form an integral component of practicing rational therapeutics. I would like to reiterate that one does not need to reinvent the wheel, since an excellent publication from the World Health Organization (WHO) — “Guide to Good Prescribing” is available and should be used for the training of medical students in pharmacology.

Professional skill is yet another aspect of training a student which would enable him to perform his expected duties. These should include:
1) Communication skills
2) Prescription writing skills
3) Critical appraisal skills
4) Community-related skills

Objective structured practical examination (OSPE)

- There is an urgent need to do away with the old and archaic pharmacy and experimental pharmacology sessions, which for unknown reasons continue to form an integral part of the curriculum.
- These should be replaced by OSPE stations. In this the students have 20-25 stations each with a problem (question). The student gets 5-6 min per station and has to respond to each question and then move to the next station, a better version of the SPOT examination. Here are a few examples:
  (a) A clinico-therapeutic exercise on prescription writing.
  (b) An insulin syringe – the student has to identify it and mention where it is used.
  (c) Interpreting an antimicrobial culture and sensitivity test.
(d) Preparation of 1 in 1000 solution of the drug provided.
(e) Choosing a drug given the clinical history and its justification.
(f) In a diagrammatic representation of the mechanism of coagulation, identifying the site of action of Heparin, giving its route of administration for the prevention of deep vein thrombosis.
(g) A bottle containing antibiotic syrup. Ask what are the things which the doctor/parent must check before giving it to the child - give three responses.

I have no doubt in my mind that there are already a number of young, bright individuals who can work out more details.

Assessment

This would require a re-look. The study of medicine and evaluation must keep pace with modern developments. In my opinion, it should comprise the following:
1. Continuous assessment - 40% marks
2. Final examination - 60% marks
(a) Theory papers
   Two (40% marks)
   Paper 1 – 100 MCQs (should be pre-tested, available in a bank and their discrimination index and difficulty index known, each question must be peer reviewed and signed by two faculty members of the pharmacology department.)
   Paper 2 - Should contain around 25 short answer questions. This paper should have three types of questions - simple recall, interpretative and problem-solving type.
(b) OSPE
   Should have around 25 stations (20% marks)

Concluding remarks

There is an urgent need to have a National Workshop on “Pharmacology teaching at medical colleges in India” under the aegis of the Indian Council of Medical Research or the Medical Council of India. The participants should be teachers from various medical colleges, preference being given to mid-level teachers, who should form at least 50-60% of the invitees with 20% professors and 20% lecturers/senior residents/demonstrators. The suggested workshop should be a 3-day workshop with the following agenda:
(a) Preparing a core curriculum
(b) Rational selection of a limited drug list
(c) List of interactive lectures
(d) Acquiring skills such as prescription writing, critical Appraisal and communication
(e) Expected competencies from training students
(f) Role of the department in teaching therapeutics during final years
(g) Modern practicals - the OSPE program
(h) Assessment - continuous and final, tools, OSPE, theory papers,
(i) Viva-voce - Is there a need for this highly subjective criterion?

I would like the readers to please bear in mind that the observations and the suggested changes in the curricula are not based on the wild imagination of an old arm-chair theoretician, but are based on planning the curricula and implementing them, making several mistakes, and correcting them over a period of 18 years at the College of Medicine and Medical Sciences, Arabian Gulf University, Bahrain. I was lucky there was no MCI breathing over my shoulder and I was given carte blanche to fashion a curriculum which I thought satisfied the needs of the country. I am certain that in India too we can construct a curriculum which would address the essential needs of the health care program.

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References

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