

Need for Restructuring Practical Pharmacology Undergraduate Curriculum

Gurudas Khilnani

Dean, GMERS Medical College, Dharpur-Patan, Gujarat, India

Correspondence to: Gurudas Khilnani (drgurudas@gmail.com)

Received: 23.12.2013

Accepted: 01.01.2014

DOI: 10.5455/njppp.2014.4.010120141

With the advent of new curriculum of pharmacology and availability of precompounded, 'ready to use' dosage forms, clinical pharmacy has replaced the conventional dispensing pharmacology. Current curriculum incorporates several exercises in accordance to MCI recommendations^[1] but several clinically and therapeutically relevant aspects remain to be considered (vide infra). Forgotten is an art of preparing mixtures and lotions extemporaneously. Many things were learnt during preparations of various dosage forms. There was greater psychomotor activity involved than is needed in today's practicals. Just scanning through drug reference (IDR, CIMS etc.) for finding out various preparations available in market actually promotes prescribing by "branded (proprietary) names and not generic prescribing! Similarly, calculating amount of drug needed for an IV infusion, adjusting the flow rate and dose calculations appear to be more suitable for nursing students. While current curriculum addresses to some of these skills but much remains to be done. An attempt has been made recently by Devi et al^[2] to develop a teaching module having OSPE stations for parenteral drug administration. The focus is to avoid medication errors by correct drug administration. This is laudable effort. Earlier, Mathur^[3] and Desai^[4] suggested development of core competencies (skills) such as Communication skills, Prescription writing skills, Critical appraisal skills and Community-related skills in practical pharmacology curriculum. Recently, a curriculum change is proposed by Herur^[5] to enhance ability

to learn communication skills in physiology.

Reading and interpretation of pharmacokinetic data and calculation of half-life or clearance are just extensions of mathematic exercises and can be done in a class room setting than in practical pharmacology laboratory! In such an exercise, a student is deeply involved in counting trees thus loses sight of woods! I feel it is too early for a second MBBS student to directly interact with patient and advise him about medications. Concept of 'P' drug and its selection is a clinically useful exercise but only a few examples have been developed.^[6] Often an example of nitroglycerin in angina pectoris is sited as is shown in WHO monogram. There are many drugs whose selection is based not only on evidence of efficacy and safety but also on patient's characteristics. Many patients suffer from more than one disease (diabetes and hypertension; hypertension and chronic lung disease) and thus require polytherapy. This problem of polytherapy exposes adults to adverse Drug reactions (ADRs) and adverse drug-drug interactions. About 13% of seniors taking 5 or more medicines develop ADRs as compared to 6% in those taking 1-2 medicines.^[7] Therefore, more attention should be paid on such exercises which address the problem of ADRs and pharmacovigilance. One approach can be analysis of the prescription copies collected from OPDs and Wards by the students and critically evaluating against the standard guidelines. Another approach could be to assign a particular patient to a group of students to follow him

during hospital ward postings. The group shall record all details of medicines prescribed by treating physician to the patient. Then, clinically relevant pharmacology of those drugs used by patient shall be studied and presented as a plenary or a small discussion. This real-life exposure to therapeutics shall promote rational thinking about drug selection; from *which* and *how* to *How much*. Inappropriate use of antibiotics is another serious problem which leads to antibiotic resistance and failure of therapy. Teaching UG students about appropriate use of antibiotics and use of Standard therapeutic guidelines in antibiotic selection can be useful exercise to inculcate good prescribing habits. Similarly, critical evaluation of drug promotional literature would be a useful exercise during houseman internship period than as a practical pharmacology exercise. A rational pharmacotherapy approach using WHO Guide to Good Prescribing guidelines has also been suggested by Krishnaiah et al.^[8]

There are many dosage forms available for clinical use. Identification and selection of a correct dosage form (Strength, volume, route of administration and dosing interval) for a particular patient could be another exercise in clinical pharmacology practicals. For example, a sustained release (SR) theophylline tablets are available for twice a day (BD) or once a day (OD) use as compared to a plain theophylline tablet, which needs to be taken three times a day. Metformin 500mg tablet needs to be given thrice a day whereas metformin SR 500 mg may be used OD or BD. Teaching appropriate use of inhaled medications (metered dose inhalers-MDIs v/s Dry powder inhalers-DPIs) which require hand-mouth coordination will prepare students to develop good communication skills. An area of therapeutics often ignored is timing of intake of oral medicines in relation to meals. Voglibose is taken with meals whereas L-thyroxin must always be taken on empty stomach. Bisphosphonates are taken in the morning with a full glass of filtered water (not mineral water), in upright position after an overnight fast and breakfast be avoided for at least an hour thereafter. These precautions are

important to avoid esophageal irritation and erosions. Insulin is adsorbed on glass bottle and therefore, it is important message for UG student to learn to use insulin infusion. Conversely, nitroglycerin (NTG) infusion is prepared in glass bottle because plastic bottles adsorb it. There is a considerable loss of NTG (only 20%-60% is delivered) if plastic tubings are long, flow rate is low and concentration in infusion is high.^[9] NTG tablets are dispensed in dark amber colored bottles to avoid inactivation and cotton fillers are not used because cotton adsorbs NTG. I feel such dispensing facts should be known to a UG student in pharmacology. Another area to be explored is the pharmaco-economic. There is a need to develop exercises on cost-effectiveness of therapy. Such exercises shall increase awareness about affordability of medicines because even today, over 70% of health expenditure is "out of pocket" of the patients. Drug therapy in special age groups is becoming increasingly important. There could be an exercise on drug selection or on pharmacokinetics of a particular drug in vulnerable age group.

Another area of interest is developing attitudes towards new medicines. Newer medicines are often "me-too" drugs and are patent protected, thus are costly. Students should know how to critically evaluate the efficacy, safety and cost effectiveness of such medicines. The age old dictum "Neither *first to prescribe nor last to discard*" is most appropriate for such drugs. The students should also know that "*primum non nocere*" is the sheet anchor of good therapeutics.

Dr. BM Hegde in a thought provoking article^[10] said and I quote "*Doctoring needs more skills. Practical and clinical examinations should mimic real life situations. Medical education is an education for life*".

This write up is about further restructuring of curriculum in practical pharmacology. There is a need of holistic approach to redesign curriculum according to the existing and emanating educational requirements. Active learning may be promoted by incorporation of several techniques such as thinkpair- share, pause

procedures, minute papers, and discussion of MCQs, and concept understanding by use of models, role plays, seminars, and working on mannequins. Adopting a variety of teaching-learning methods increases both teacher's and learner's enthusiasm.^[11] Prudence entails to bring about horizontal and vertical integration in pharmacology. There is a hazard of increasing burden on the students because the knowledge contents cannot be squeezed in available time framework. However, curriculum needs to be modified to focus on "processes and approaches" rather than on contents only. A simultaneous relook at the assessment strategies is also needed because of subjective nature of both theory and practical examinations.^[12] Time seems propitious to raise these issues at suitable fora and invite views and contributions from academicians for curriculum development which meets with the requirements of a basic doctor in our country.

REFERENCES

1. Gitanjali B, Shashindran CH. Curriculum in clinical pharmacology for medical undergraduates of India. *Indian J Pharmacol.* 2006;38:S108-14.
2. Devi V, Upadhye P, Ram P, Menezes RG. Development of a teaching module for parenteral drug administration and Objective Structured Practical Examination stations in pharmacology. *Indian J Pharmacol.* 2013; 45: 587-92
3. Mathur V. Towards a more meaningful teaching of pharmacology. *Indian J Pharmacol.* 2004; 36:259-61
4. Desai M. Changing face of pharmacology practicals for medical graduates *Indian J Pharmacol.* 2009;41:151-2
5. Herur A. Standardized patients in physiology curriculum of India for effective learning of basic science concepts, clinical and communication skills: A proposed change. *Natl J Physiol Pharm Pharmacol.* 2013; 3: 198-202
6. Khilnani G. The Concept of personal drugs in undergraduate pharmacology curriculum. *Indian J Pharmacol.* 2008;40: 131-2
7. Anathanam S, Powis RA, Cracknell AL. Impact of prescribed medications on patient safety in older people. *Ther Adv Drug Saf.* 2012;3:165 -174.
8. Krishnaiah V, Ramaiah V, Ramakrishna R. Comparison of rational pharmacotherapy approach by medical students with and without Guide to Good prescribing guidelines. *Natl J Physiol Pharm Pharmacol.* 2013; 3(1): 53-56. doi:10.5455/njppp.2013.3.53-6
9. Drugs.com. Nitroglycerin: drug information online. Available from URL (cited December 18, 2013): www.drugs.com/pro/nitroglycerin-injection.html
10. Hegde BM. Need Based medical Education (View point). *J Ind Acad Clin Med.* 2010;11:12-5
11. Thaman RG, Dhillon SK, Sagar S, Gupta MP, Kaur H. Promoting active learning in respiratory physiology - positive student perception and improved outcomes. *Natl J Physiol Pharm Pharmacol.* 2013; 3(1): 27-34. doi:10.5455/njppp.2013.3.27-34
12. Patel BS, Kubavat A, Piparva K. Correlation of students performance in theory and practical of final summative pharmacology examination in MBBS curriculum: A critical insight. *Natl J Physiol Pharm Pharmacol.* 2013; 3: 171-5

Cite this article as: Khilnani G. Need for restructuring practical pharmacology undergraduate curriculum. *Natl J Physiol Pharm Pharmacol* 2014; 4:1-3.
Source of Support: Nil
Conflict of interest: None declared