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Educational Forum

Postgraduate pharmacology curriculum in current scenario and future prospects: an educational forum

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ABSTRACT

In India Doctorate of Medicine (MD) pharmacology is primarily knowledge oriented based on teaching, seminars, lectures and research related activities including animals and paper-based experiments and day to day management of undergraduate classes. MD pharmacology student should be competent of both clinical and experimental pharmacology. So, the postgraduate pharmacology curriculum should be competent to meet all the job requirements. Therefore, medical council of India (MCI) has introduced new post graduate curriculum which is based on knowledge, practical, clinical skills, thesis skills, and attitudes including communication and training in research. In India demand for skilled clinical research professionals is increasing day by day for growing pharma industries and good academician. So, there is an urgent need for the experienced and skilled pharmacologist to fulfil the requirements. MD pharmacology students should get posting in different clinical departments and observatory posting in industry, clinical research organization (CRO), regulatory body and research organisations. The course of MD Pharmacology should be like that fulfil all the skills that a pharmacologist must have.

Keywords: Experimental pharmacology, Clinical pharmacology, Medical postgraduate

INTRODUCTION

Pharmacology in medical education has undergone several changes over the years. In India pharmacology as a part of MBBS courses was started in early 19th century. Col R. N. Chopra, Doctorate of Medicine (MD), MRCP IMS Pune, from Indian Army service was first professor of pharmacology.[1] Iswararah took pharmacology as optional for his MRCP at Edinburgh and he introduced MD pharmacology and therapeutics in Andhra University. Later medical council of India (MCI) deleted therapeutics from MD degree.

Pharmacologist has been competent borrowing from physiology, biochemistry, pathology, microbiology, statistics and he has developed own technique of bioassay.[2] Pharmacology consists of both clinical and experimental science. Experimental pharmacology is essential in understanding of drug action in diseases as well as for pharmaceutical industry for drug discovery and development. Clinical pharmacology is essential for prescribing practice in medicine, adverse drug reactions, clinical trial and pharmacovigilance. Prospects for a medical Pharmacologists may be in academics, pharmaceutical industry/clinical research organisation (CRO), research institutions and in regulatory bodies, scientific writer or science manager. Accordingly, a postgraduate (MD) student in pharmacology should acquire all the capabilities. So, the postgraduate pharmacology curriculum should be competent to meet all the job requirements.[3]

The overall course of postgraduate of MD pharmacology over three years in India is primarily knowledge based. The curriculum of postgraduate education in pharmacology in medical colleges/institutions in India is

based on broad goals of the MCI mentioned in postgraduate Medical Education Regulations 2000, amended up to May 2013.[3]

Currently a standard uniform curriculum for MD pharmacology does not exist in India. Some are modern according to present time need and others are very old and absolute. In most of the medical colleges there is main component of teaching and research related activities mostly includes dissertation, few animals and paper-based experiments, hospital visit for pharmacovigilance activities, seminars, lectures, journal clubs as well as day to day management of undergraduate (UG) classes. Most of the curriculum are not relevant according to present day need and hence not implemented totally. Therefore, certain institutions have derived their own teaching, learning and evaluation methods. Individually their innovations as well as curricula are excellent.[4]

These innovations vary from use of paper-based exercises, real patients to use simulations, computer assisted learning and mannequins. However, most of colleges emphasize on the traditional approach of knowledge-based learning and not on the skills and competency. Hence the basic objectives of postgraduate training are not adequately addressed. Therefore, it is necessary to frame objectives in cognitive (knowledge), psychomotor skills and affective (attitude, behaviour, etc) domains. The teaching and assessment methods should be suitably included. Ethical part in research and informed consent are effectively taught.

The sentiments as well as the scientific logic for and against animal experimentation are a never ended issue and it is the most important single issue in postgraduate curriculum. In the absence of clear guidelines on whether and to what extent we can and should continue animal experiments and confusion still persist about animal experiments. Now animal experimentation has been reduced to paper based exercises and these only test knowledge rather than analytical and decision making skills. Hence postgraduate students do not acquire the skills of "must do's" in experimental pharmacology while "to do" and "not to do" animal experiments are a major debate; alternative methods of teaching and evaluation are developed by various institutions.

Most of the departments are not equipped for alternatives to animal experiments and alternatives are also varied and uncertainty about animal experiments be cleared and which guidelines should be followed for animal use either MCI or control and supervision of experiments on animals (CPCSEA).[5]

Recently MCI include competency-based medical education (CBME) based postgraduate curriculum. The CBME movement has met the criticism, part of which can be attributed to varying interpretation of what it is, and to the way it is being applied.[6-8] The medical education community has defined competency as "the habitat and judicious use of communication, knowledge, technical reasoning, emotional values and reflection in daily practice for the benefit of the individual and community".[8]

SYLLABUS FOR POSTGRADUATE MD PHARMACOLOGY

Keeping in view the possible functions of medical postgraduate in pharmacology, they should acquire the following capabilities under three domains of learning.

Knowledge

Student must acquire knowledge of basic and applied pharmacology, drug regulations, clinical research and therapeutics, basic statistics to various study designs in pharmacology. The following parameters are to be noted: teaching and evaluation technique, team work, and ethics in research.

Psychomotor skill

The following parameters are to be noted: design and implement research project, estimation of sample size in research, application of statistical tests, conduct human studies, basic in-vivo and in-vitro experiments on small animals, perform drug assay and therapeutic drug monitoring, adverse drug reactions (ADR) reporting and causality assessment, write and critical appraisal of research paper, present papers in conferences, rational prescribing, use of various media and techniques in teaching, and construct evaluation tools for UG's.

Affective skill

The following parameters are to be noted: demonstration ability, lead and work in teams, good interpersonal relationship, motivation skill, counsel and mentor UG students, demonstrate professionalism, ethics in education and research, and communicate with clinicians, peers and UG students.

COURSE CONTENTS

The postgraduate students in MD (pharmacology) shall undergo a 3 year training that will comprise of theory – lectures, seminars, group discussions, journal review etc. and practical learning will comprise of experimental pharmacology, chemical pharmacology, and clinical pharmacology

Experimental pharmacology

It includes *in-vitro* (including bioassay)**;** ***i****n-vivo* (examine methods of drug evaluation); and toxicity tests

Chemical pharmacology

It consists of identification of drug/toxin by using chemical, biological and analytical tests; and quantitative estimation - use of calorimeter and spectrophotometer.

Clinical pharmacology

It comprises of evaluation of drugs in healthy volunteers as well as patients; critical evaluation of drug literature, pharmacoeconomics, pharmacovigilance, pharmacoepi - demiology; dissertation on suitable problems; training in UG teaching; computer training; and 6-month rotating posting will be allowed in all subjects, one-month casualty posting will be compulsory; postgraduate student must receive training through postings like – medicine, paediatrics, casualty, pharmacy and drug store; innovative bed side teaching; case based learning, small group discussions; a formal training in basic medical education technology is recommended; observatory posting in industry, CRO, regulatory body and research organisations are recommended as elective. This will allow the student a choice depending on their career performance.

ASSESSMENT

Assessment part is a neglected area both in UG and PG curriculum, not having a standardized structure and too varied.

In most of the institute where there is no regular internal assessment, PG students are assessed at the final examination and even in Institutes where regular internal assessment is carried out, there is no provision for inclusion in the final examination. Final examination is based more on the general impression of the student and performance on the day of examination. Some degree is awarded by the teacher not earned by the student. So, in absence of well-defined objectives and assessment plan the student and teacher remain confused about what is expected from them. So, to fulfil the gap in assessment part we must have a balance between the basic and applied aspects and recent advances.

For assessing knowledge, other methods like OSPE should be included, communication and presentation skills should also be evaluated. And Assessment should also include teaching skills evaluation of dissertation.

Recently MCI introduced CBME based curriculum and in this assessment part the following are included.

Formative assessment

It is the assessment during the training. It should be continued and should assess medical knowledge, patient care, procedural and academic skills, interpersonal skills, professionalism, self-directed learning and ability to practice in the system.

Quarterly assessment

Quarterly assessment during the MD training should be based on journal based, patient based, laboratory or skill-based learning, self-directed learning and teaching, departmental and inter departmental learning activity, external and outreach activities/CMES.

Summative assessment

It is the_assessment at the end of training. Postgraduate examination shall be in three parts- thesis; theory examination- four theory papers; and practical/clinical and oral/viva voce examination.

IN PRACTICAL EXAMINATION

Long experimental

Demonstrating effects of drugs/ interpretation of results in anaesthetised animals, Table exercises like calculating Pharmacokinetic parameters, statistical exercise, critical appraisal of a published paper, Abstract writing of a published paper, Evaluation of drug literature, Protocol designing, ADR reporting of causality assessment, analysis of rational and irrational formulations.

Short experiment

Isolated tissue experiment (bioassay of drugs. As per government regulations or interpretation of results of a result of a previous tracing); in vivo experiments; spotting exercises- various drug delivery systems, inhalers, insulin syringe, drip chamber, various tablets etc.

Oral/viva

Microteaching, discussion on dissertation, principles of general and systemic pharmacology, recent advances in pharmacology and drug therapy.

Therefore, we can say that assessment part in new CBME post graduate curriculum will fulfil all the future need and maintain the uniformity all over India.

CONCLUSION

Now a days there are various avenues for MD pharmacologist besides being an academician. Students can join pharmaceutical industry as clinical pharmacologists, medical advisor, regulatory consultants, and can be a part of data safety monitoring board.

To summarize India is fast emerging for outsourcing of clinical trials, clinical research industry will greatly flourish globally in near future. Therefore, there is a great demand for clinical research professionals today in the global market.

Hence there is an urgent need for the experienced and skilled pharmacologist in order to compete with optimal solution that benefits the students undertaking the MD pharmacology courses in the future. The course of MD pharmacology should be like that fulfil all the skills that a pharmacologist must have.

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