

Feel good in the medical pharmacology

Dattatray Sampatrao Bavane^{1*}, Akram Naikwadi²

¹Department of Pharmacology,
BKL Walawalkar Rural Medical
College, Dervan, Sawarde,
Chiplun, Ratnagiri, Maharashtra,
India

²Department of Pharmacology,
SBMP Medical College,
Vijaypur, Karnataka, India

Received: 19 June 2017

Revised: 30 June 2017

Accepted: 24 July 2017

***Correspondence to:**

Dr. Dattatray Sampatrao
Bavane,

Email: drdattabavane@
gmail.com

Copyright: © the author(s),
publisher and licensee Medip
Academy. This is an open-
access article distributed under
the terms of the Creative
Commons Attribution Non-
Commercial License, which
permits unrestricted non-
commercial use, distribution,
and reproduction in any
medium, provided the original
work is properly cited.

ABSTRACT

Background: A curriculum is a vision and road map to meet academic objectivities. The major objectives of teaching pharmacology to the medical students is best way of understanding, retaining pharmacological information and to provide a rational basis for choosing drugs skilfully to relieve patient's ailments. For better understanding of subjects and its correlation the sequential and interdependent schedule achieved through rearrangements of topics. So that earlier chapters of this pattern are arranged in such manner as general consideration of pharmacological principles and physiological topics of treatment part slowly in 3rd term. By the time student of IInd M.B.B.S are familiar with disease conditions from other paraclinical and clinical departments to achieve the goal for understanding of remaining topics. There should be continuous ongoing reforms for discovering, interpreting, revising and delivering the current knowledge of the subject relevant to the needs of society as a part of research.

Methods: A structured 16 point questionnaire containing both open and close ended questions regarding reforms and innovation in pharmacology is prepared for opinion poll. The total 289 participant are from III, IV, V, VI, VII and VIII term's M.B.B.S. students. The participants are also allowed to offer their own suggestions for certain important item regarding modification in teaching curricula of the subjects.

Results: Large majority of the students of opinion poll are in favour of reforms and innovations. They also suggested their own suggestions regarding the refreshing of the subjects.

Conclusions: The teaching program of pharmacology at regular interval should be researched to discover, interpret, revise and deliver the updates in basic pharmacological knowledge of drugs and its application.

Keywords: Interdependent, Medical pharmacology, Rearrangement, Refresh, Reforms

INTRODUCTION

A curriculum is a vision and road map to meet academic objectivities. Does the present curriculum in pharmacology meet these objectives? Pharmacology being a dynamic subject needs to be constant updating. Pharmacology has undergone phenomenal growth during the last twenty five years and drug therapy now forms its major aspect. So far pharmacology was associated with study of drugs in dogs cats and rats. While therapeutic or clinical application was regarded as entirely independent

and mystical skill. Now it is generally agreed that the major objectives of teaching pharmacology to the medical students is to provide a rational basis for choosing and using drugs skillfully to relieve patient's ailments. This is becoming more and more important as the practicing doctor is now confronted with so called "newer drugs" at such a great pace that even a full time pharmacologist sometimes finds it difficult to keep abreast of their merits and demerits. Therefore, it is highly desirable that the students of pharmacology should be educated to develop

critical outlook towards various drugs to inculcate in clinical practices- as rational drug therapy.¹

The undergraduate curriculum in pharmacology has been topic of intense debate. Presently the subjects are taught with high factual information with little clinical correlation.

The current pharmacology teaching program is monotonous and theoretical and is not helpful in retaining the knowledge of number of drugs for practical application while presenting. The teaching of pharmacology in the present scenario should activate prior knowledge.² The first and foremost question regarding reforms that needs to be answered is asked often “What aspects pharmacology should be given due importance for an undergraduate student as Therapeutics? Or clinical pharmacology? Or experimental pharmacology?”³

Time has now come to teach the students how to select drugs based on evidence. Thus, the primary objectives of pharmacology as a subjects in medical education is to provide basis for therapeutic decision in terms of benefits and risk enabling the doctors to selects the most appropriate drug. Dispensing pharmacy and experimental pharmacology remained the cornerstone of conventional pharmacological practical exercises. Clinical utility and relevance of these practicals have been questioned and criticized.⁴ Therefore the main domain of the pharmacology for medical undergraduate remains to develop the requisite therapeutic skills. The MCI draft of 1992 has defined objectives of pharmacology. Also, the directorate General of Health Services, Government of India suggested a clear emphasis on clinical pharmacology exercises to sensitize the subjects for a rational use of drugs effectively throughout their professional carrier.⁵

This goal can be achieved by teaching basic pharmacology and therapeutics. It is essential that teachers of pharmacology should be involved in ward rounds to design proper teaching of basic pharmacology and therapeutics. Further the students should be trained for proper scanning of information on common pharmaceutical preparations and to evaluate the formulations.⁶ The post graduate degree certification of some teacher of pharmacology is like M.Sc. (medical pharmacology). While clinical pharmacology encompasses only scientific study of pharmacokinetic and Pharmacodynamic principles of both old and new drugs in healthy volunteers and patients for their safety and efficiency in terms of treatment part. This is nothing but clinical trials data. Today's classical pharmacology can be extended to study other aspects in clinical practices as inclusion of rational therapy, pharmacovigilance, good documentation practices, therapeutic drug monitoring wing, new drug delivery system, inclusion of pharmacogenetics, pharmacogenomics, chronopharmacology reviewing of pharmacoconomics and pharmacoepidemiology etc. The outsiders suppose that teachers of pharmacology are non-medical faculty persons like pharmacists. By definition

pharmacology “consist of detailed study of pharmacokinetic and Pharmacodynamics principles of drugs particularly living system which may be beneficial or harmful.” The living system may be human being, animals and plants. So, we in medical fields require only pharmacological information for clinical application. Therefore, it is intense need of hour to divide pharmacology into medical, veterinary and agriculture pharmacology. Therefore, renaming of today's pharmacology as Medical Pharmacology is justifiable. Thus, the main purpose of the medical pharmacology is to deliver sequential pharmacological information for medical undergraduate to develop requisite therapeutic skill.

This research consists of “Perception of the medical students in Dept. of Pharmacology, BLDEU's Shri B.M. Patil Medical College, Vijaypur Karnataka, India regarding present teaching of undergraduate Pharmacology and possible reforms for better understanding and implication of the subject's information in clinical practices.”

Therefore, we can realize that the pharmacology subject in medical curriculum consists of basic pharmacological information and its application in clinical practices while prescribing.

The boundaries of teaching basic pharmacology are yet not defined. The 2nd MBBS students of pharmacology are not familiar with most of the disease conditions and teaching at this stage poses a challenge to the teacher too. For better understanding of subjects and its correlation the following sequential schedule with interdependent topics by rearrangements is suggested. So that earlier chapters of this pattern are arranged in such manner as general consideration of pharmacological principles and physiological topics of treatment part slowly in 3rd term. By the time student of IInd M.B.B.S are familiar with disease conditions from other paraclinical and clinical departments to achieve the goal of remaining topics.

Sequential learning

1. General Pharmacology
2. Drugs used in treatment of anaemia and blood Dycrasia
3. *Endocrinology*: Part -I Adenohypophyseal hormone, Thyroidal and Anti thyroidal drugs, Insulin and oral ant diabetic drugs
4. Drugs acting on ANS
5. *Drugs acting on PNS*: The skeletal muscle relaxants, and Local anesthetics
6. *Biogenic amines*: PG, Leukotrines cytokines., PAF and their inhibitors including, non steroidal anti-inflammatory drugs, Histamines and antihistaminic, HT and their antagonists
7. Water and electrolytes metabolism, Fluid therapy, plasma expanders and therapy of shock

8. *Lipoprotein metabolism*: Drugs used in management of obesity and dyslipidemia
9. Coagulation anticoagulants, anti-fibrinolytic and Haemostatic agents.
10. *Physiology of urine*: diuretics/t Bladder dysfunction
11. Drug affecting cardiovascular disease, Nitric oxide and t/t of Angina pectoris, Rennin - angiotensin and their antagonists, therapy of Hypertension, therapy of Cardiac arrhythmia, therapy of heart failure; therapy of myocardial infarction and of Transient ischemic attack, claudication and stroke
12. Drugs acting on nasal and respiratory system
13. Drug acting on GIT functioning, Emetics, antiemetic, therapy of vertigo, peptic ulcer, GERD, constipation, diarrhea, IBS and IBD
14. Chemotherapy
15. Drug acting of CNS
16. *Endocrinology*: Part-II, Corticosteroids, Androgens, Estrogens, Progestin and OC Pills, Drug affecting calcium metabolism, vitamin D and drugs for osteoporosis
17. Vitamins, anti-oxidants, minerals and plant products
18. Pharmacology of ergot alkaloids and uterine relaxants
19. Antiseptics and disinfectants
20. Drugs used in skin and nail, mucous, membrane.
21. Vaccines and sera.
22. Enzymes in the therapeutics
23. *Immuno*: suppressants and stimulators.
24. Drug used for rheumatoid arthritis
25. Drug used in hepatic and renal insufficiency.
26. Drug used during pregnancy and lactation
27. Drug used in geriatrics.
28. Therapeutics gases.
29. Heavy metal intoxication and antidotes.

This pattern will provide better sequential learning of related topics for better application of basic pharmacological information. The pharmacology lecture should be more clinically oriented and treatment protocols to be added as a part of regular teaching in pharmacology. Therefore, it is required to keep pace with the rapid changes and requirements in clinical practices. Hence reforms in pharmacology have become the immediate need of the hour. Subsequently attempt should be made to introduce practical exercises on rational and scientific basis of therapeutics to resolve clinical problems. Attempts have been made all over India to make the teaching of pharmacology more interesting and innovative. For extension of knowledge few lecture hours for learning basis of aurvedic principles of treatment can be conducted. Because that pharmacology describe plant as one of the source of drugs. Aurvedic vaidya's claims that their sources of drugs are plants. Chronotherapeutic principles can be added in teaching. As it is the study of delivering the drugs in a proper concentration at a right time to cure in biological rhythm due to particular diseases.⁷

A computer assisted learning incorporating demonstration of drug action is included, as practical. For CAL Software have advantages like:

- Effective methods of teaching practical aspects
- Many experiment can be demonstrated within short time
- Reduce animal use
- Exercise difficult to be conducted in the laboratory can be demonstrated using CAL
- No experimental errors can be seen.⁸

The teaching of medical emergency therapeutics aspects can be introduced to teach treatment part of 25 medical emergency conditions and are expected to know and remember the pharmacotherapy of those conditions in clinical practices accurately. It is useful tool to solve problems of drug optimization i.e. to enhance the desired efficiency or to reduce its undesired effects.⁹

The information about medicines is the need of the community. It will be better if the information is provided by medical pharmacologist. According to W.H.O. Rational Pharmacotherapy (RPT) require that the patients receive medications appropriate to their clinical needs, in doses that meet their own requirements, for an adequate period of time and at the lowest cost.¹⁰

This can be achieved by including Rational Therapeutics and pharmacoeconomics in pharmacology practical curriculum at regular interval. For imparting updates in basic pharmacology knowledge of drug and its application is required. These objectives can be evaluated by periodic assessment and feedback from medical graduates.

Objectives

- To evaluate the opinion of students regarding modification of the teaching the subject of Pharmacology.
- To know best way of understanding pharmacology.
- To know the best way of retaining pharmacological information.
- To understand application of the information and to acquire adequate therapeutic skills for the rational prescribing in clinical practices.

METHODS

The questionnaire was designed and finalized after departmental discussion to obtain feedback.

A structured 16 point questionnaire containing both open and close ended questions regarding reforms and innovation.

in pharmacology is prepared for opinion poll. The study subjects were total 289 students of III, IV, V, VI, VII and VIII terms' M.B.B.S. of 2012 batch students from

BLDEU's Shri B.M. Patil Medical College, Vijaypur Karnataka. Along with questionnaire introductory part of research is also provided to the students for aims and objectives of the research. The students included in the study are requested to fill up the questionnaire. The sixteen-item questionnaire was provided for opinion poll. The participants are also allowed to offer their own

suggestions for certain important item regarding modification in teaching curricula of the subjects.

Statistical analysis

The descriptive statistics was used to analysis of data in the result. The frequency was shown as a percentage.

Table 1: Opinion poll of the total 289 students with percentage (%).

No.	Questions for opinion poll	Yes (%)	No (%)
1	Can we rename this today's pharmacology as Medical Pharmacology?	264 (91.4)	25 (8.65)
2	Do you agree for traditional sequence of teaching basic Pharmacology v/s new sequence mentioned in introduction?	266 (92.04)	23 (7.95)
3	Should Pathology topics and Microbiology topics precede systemic pharmacology teaching for understanding of various disease conditions.	228 (78.9)	61 (21.1)
4	Is chalk and board teaching more effective than audio video teaching in Pharmacology regarding understanding of the subject depth?	190 (65.7)	99 (34.25)
5	Are you in favour for inclusion of few lecture hours for learning basis of Aurvedic principles of treatment?	259 (89.6)	30 (10.38)
6	Drug Promotion: The exhibition of samples / dosage forms of various drugs in museum - to be familiar with brand and generic name- as one the practical of pharmacology?	260 (89.9)	29 (10.03)
7	Can we add new Chapters such as pharmacokinetics of drugs in impaired hepatic and renal function to prevent and minimize toxicity?	196 (67.8)	93 (32.17)
8	Can we add a new chapter on chrono-therapeutics?	237 (82)	52 (17.99)
9	Can we introduce practical on therapeutic drug monitoring with the help of video of HPLC/RIA monitor therapeutic drug dose level?	255 (88.2)	34 (11.76)
10	Can computer assisted learning incorporating demonstration of drug action be included - as practical?	224 (77.6)	65 (22.49)
11	Can we introduce practical on Pharmaco - economics, consisting of price comparison and trade name/ brand name for its familiarity through drug promotion by medical representatives and MIMS, CIMS etc in drug information centre.	237 (82)	52 (17.9)
12	Should we include teaching of medical emergency therapeutics in Vth term in practical hours?	264 (91.4)	25 (8.65)
13	Are you interested in participating interactive seminars on important topics?	241 (83.4)	48 (16.60)
14	Can we start the Pharmaco- therapeutics consisting WHO based rational pharmacotherapy for various disease conditions in 5 th terms as a revision of Pharmacology?	239 (82.7)	50 (17.30)
15	Is it beneficial for inclusion of the tutorials as a part of memorizing important text-topics in IV th term practical hours?	245 (84.8)	44 (15.22)
16	Will it be beneficial to have pharmacological consultancy as an option to teaching and industry jobs by only Medical- pharmacologists for drug of choice, dose monitoring over use / under use of drug, selection of rational prescribing (Safe and effective drug therapy), monitoring of ADRs, and reporting to pharmacovigilance centres and treatments of non -responding cases etc. as a part of Drug information centre in Pharmacology?	224 (77.6)	65 (22.49)

RESULTS

The total two hundreds and eighty nine students from III, IV, V,VI, VII and VIII term's M.B. B. S. batches were participated in the opinion poll. The feedback obtained from the students is presented in observation table. Large

majority of the students are in favour of reforms and innovations suggested. They also expressed their own suggestions regarding the refreshing the subjects. The salient features of this feedback regarding reforms in pharmacology are meaningful. As many as 91.4% of the students are in favour of renaming of today's pharmacology as 'Medical pharmacology'.

As much 92.04% of the students agree with newly mentioned teaching sequence of the various topics in the subjects as compared to traditional sequence of teaching various topics.

The majority of the students (78.9%) are requiring pathological / microbiological conditions to be known before learning treatment part of pharmacology.

The students somewhat differed in opinion regarding chalk and board (65.7%) and audiovisual (34.25) teaching. The 89.6% and 89.9% students are happy to learn ayurvedic principles in few lecture hours and exhibition of various dosage forms/ samples of drugs during practical session respectively.

The reflection of the students regarding addition of new topics like pharmacokinetic of drugs in patients with hepatic / renal diseases and therapeutic drug monitoring with the help of HPLC? RIA is about (67.8%) and (88.2%) respectively. The 82% of students favour addition of Chronotherapeutic principles in teaching. Near about 82% students agreed with computer assisted learning incorporating demonstration of drug action be included - as practical.

The students are also interested in knowing pharmacoeconomics i.e. price difference along with brand names of drugs through drugs promotion by medical representatives, MIMS, CIMS, IDR etc (82%) and knowledge regarding emergency therapeutics (91.4%) in practical hours. Near about (83.4%) want to participate in conducting interactive seminars. The large percentage i.e. near about 82% of students are also interested in learning lessons in chronopharmacology. The large no. of students (82.7) are intended to know WHO based rational pharmacology for various disease conditions as a revision of the subjects and to improved the prescribing skills. The students view regarding inclusion of the tutorials –as a part of memorizing text- topics is about 84.8%. The maximum students (91.4%) confirm best pharmacological consultancy by medical pharmacologist at the drug information centers. Apart from above observations mentioned in the table the participants have mentioned suggestions for some important items regarding modification in teaching curricula of the subjects as follows:

- It would be best if it is implemented.
- Winter vacations for durgapuja and Deepwali.
- Case studies should be included.
- Revision of clinically important drugs.
- Teachers of pharmacology should be involved in ward round along with clinicians.
- Practical session should be shortened.
- Active learning of drug dose and its schedule have to be included.
- One month vacation after every phase.
- The quality of the food in the mess supervised taking food by a teacher residing in the campus.

- Get together twice in a year.

DISCUSSION

The student's opinion poll was meaningful as expected with their suggestions. This opinion poll adds up feedback in teaching pattern. Feedback is essential to find out the effectiveness of the process, the need to change it, as well as, to evolve strategy for its improvement. The students and interns in medical colleges should get drug promotion material and literature as a comprehensive information and familiarity about drugs of various pharmaceutical companies through the medical representatives for future doctors. So can we recommend M.R to attend call in drug information centre? It can provide guidelines for rational use of drugs and avoid overuse of one drug and underutilization of others.

According to W. H. O. Rational Pharmacotherapy (RPT) requires that the patients receive medications appropriate to their clinical needs, in doses that meet their own requirements, for an adequate period of time and at the lowest cost to be them and their community. This can be achieved by including Rational therapeutic in pharmacology curriculum. This can be achieved by video footages to the RPT courses program and case based teaching therapeutics. Subsequently attempt should be made to introduce practical exercises on rational and scientific basis of therapeutics to resolve clinical problem.¹¹ The another part of research consists addition of new topics like pharmacokinetics of drug in renal and hepatic insufficiency, Pharmaco-economics - for knowing price difference and familiarity with brand names. The inclusion of the tutorials - as a part of memorizing text-topics is also essential.¹²

From the feedback evolution obtained it is observed that students like to study interestingly pharmacological information and its application in clinical practices. Important suggestions regarding the modifications in pharmacology teaching curricula are making the subject more clinically oriented and more interactive.

The ultimate aim of medical pharmacology emphasizes involvement in drug information centre. Medicines are now regarded as active substances plus information. There are various drug information centers like drug information specialists manage drug services as by pharmacists and other professional.¹³ There are also pharmaceutical consultations in UAE communities.¹⁴ Also the Karnataka state pharmacy council established its drug information centre and which is recognized by international register of drug information services.¹⁵ One community developmental medicinal unit as a part of NGO at Calcutta reply queries from not only from health care professionals but also from patients side also regarding drug information.¹⁶ These centers provides guidelines for rational use of drug to promote safe and effective drug therapy. It will be better and competent to run drug information centre by medical pharmacologist as

consultancy carrier as an option to teaching field and industry job because he can better correlate and interpret pharmacological information for rational prescribing of various disease conditions.

Hence a new syllabus for pharmacology has become the immediate need of the hour. Consequently, reforms in undergraduate teaching are the need of hour. Therefore reviewing the teaching program at regular interval for imparting updates in basic pharmacology knowledge of drug and its application is required. These objectives can be evaluated by time period assessment and feedback from medical students to achieve learning goal.

To impart knowledge of application of pharmacological information, the teachers themselves should be well versed with the current trends in the theory and new drugs in the markets. Most of the students are agreeing with sixteen points in the questionnaire for opinion poll as per mentioned in table with their own suggestions.

CONCLUSION

The teaching program of pharmacology at regular interval should be researched to discover, interpret, revise and deliver the updates in basic pharmacological knowledge of drugs and its application.

ACKNOWLEDGEMENTS

Authors are sincerely thankful to II M.B.B.S. students of BLDEU's Shri B. M. Patil Medical College, Vijaypur Karnataka, India for participation in research. And with same regard thanks to Saau Sujata Talikoti for helped in typing manuscript.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Satoskar, Bhandarkar, Nirmala Rege. Preface. Pharmacology and Pharmacotherapeutics. 13th Edition; Mumbai.
2. Vasundara K, Kanchan P, Pundarikaksha H, Girish K, Prassana S, Jyothi R. An imperative need to change pharmacology curriculum: A pilot survey. Indian journal of pharmacology. 2010 Nov 1;42(6):420.
3. Gitanjali B. New wine in new bottles. Indian Journal of pharmacology; April 2004;36(2):63-4.
4. Gitanjali B, Shashindran CH. Curriculum in clinical pharmacology for medical undergraduates of India. Indian J Pharmacol. 2006 Dec;38(2):S108-14.
5. Vitthal B. Therapeutic approach. Journal of Pharmacology and Pharmacotherapeutics. January-March 2012;3(1):56-7.
6. Garg A, Rataboli PV, Muchandi K. Students' opinion on the prevailing teaching methods in pharmacology and changes recommended. Indian Journal of Pharmacology. 2004 May 1;36(3):155.
7. Maurya KK, Semwal BC, Singh N, Vivek S, Khatoon R. Chronopharmacology: a tool for therapy of diseases. Int. Res. J. Pharm. 2012;3(5):128-32.
8. Kuruvilla A, Ramalingam S, Bose AC, Shastri GV, Bhuvanawari K, Amudha G. Use of computer assisted learning as an adjuvant to practical pharmacology teaching: Advantages and limitations. Indian Journal of Pharmacology. 2001 Jul 1;33(4):272-5.
9. Parimala K, Kr S, Jagan N, Kumar V, Viswanathan S, Rasekhar M. Assessment of pharmacology teaching-a critical appraisal by medical school learners. April-June 2013;2(2):124-9.
10. Jaykaran NC, Yadav P, Kantharia ND. Intern doctors' feedback on teaching methodologies in pharmacology. Journal of pharmacology and pharmacotherapeutics. 2010 Jul;1(2):114.
11. Gelal A, Gumustekin M, Arici MA, Gidener S. Rational pharmacotherapy training for fourth-year medical students. Indian Journal of Pharmacology. 2013 Jan;45(1):4.
12. Karve AV. Tutorials: students' viewpoint. Indian journal of pharmacology. 2006 May 1;38(3):198.
13. Aquil M. Grooming a competent drug information specialist. Indian Journal of Pharmacology; April 2004;36(2):96-100.
14. Hamoudi NM. The pharmaceutical consultation in USE Communities. Indian Journal of Pharmaceutical Science; July - August 2011:405-7.
15. Lakshmi PK, Rao DG, Gore SB, Bhaskaran SH. Drug information services to doctors of Karnataka, India. Indian journal of pharmacology. 2003 Jul 1;35(4):245-7.
16. Avijit H, Amitava S, Sushanta R. One year experience of drug information service in the NGO sector. Indian Journal of Pharmacology. 2001 Jan 1;33(1):44.

Cite this article as: Bavane DS, Naikwadi A. Feel good in the medical pharmacology. Int J Basic Clin Pharmacol 2017;6:2177-82.