

Rotational Training Programme For Postgraduate Students Of Pharmacology: Our Experience

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Abstract: Background: Rotational training programme for the postgraduate students of pharmacology should be planned with the aim of making them competent as pharmacologist. Thus in the present study we decided to develop a rotational duty programme and evaluate perception and attitude of postgraduate student towards it. Methodology: We developed a rotational duty programme at our department which was structured by defining objectives to be achieved, content to be learnt, weekly targets to be accomplished and assessment to provide feedback to the students. The perception and attitude were recorded using a questionnaire in which their adequacy of duration of posting; adequacy, relevance and implementation of weekly time table; adequacy and relevance of the training imparted in the posting; quality and pattern of assessment and their perceived benefit from the rotational training program were assessed. Results: Postgraduate students found the programme adequate and relevant in terms of duration, implementation of weekly targets, training imparted and quality of assessment. Students also perceived the programme as beneficial. Suggestions were given by the students in the areas they considered modification is required. Conclusion: Suggestion given by the students along with discussion by faculty members were incorporated in improving the standard and strengthening the programme. There is a need for development of such programmes to improve the standards in postgraduate teaching in pharmacology. These programmes also need to undergo relevant amendments in order to improvise them. [Gajbhiye S NJIRM 2016; 7(2):93-99]

Key Words: Questionnaire, Feedback, Faculty Members, Postgraduate Teaching.

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Introduction: Postgraduate training in pharmacology nurtures the students to evolve as competent pharmacologists. The current postgraduate curriculum in pharmacology specified by Maharashtra University of Health Sciences (MUHS) trains the students in learning areas such as research methodology, literature search, biostatistics, animal experiments and a study of common poisons and their identification.¹ Every Pharmacology department affiliated to the university tries to impart training in these areas to the students during their post graduate tenure. In addition, appropriate training of students on topics of patient management in clinical trials, reporting and assessment of adverse drug reactions, ethical promotion of drug advertisements and drug development activity are also essential in carving the students to emerge as eminent pharmacologists. All these areas can be well covered by arranging a rotational programme for postgraduate students to expose them to these domains in a systematic manner. Rotational practical training in MD Pharmacology should be designed for the students with the aim of making them competent as pharmacologist for a career in academics and industry. The postings should help to achieve different objectives for postgraduate students laid down by the university. Thus this program will help to develop expertise in field of pharmacology. Hence it was decided to develop such a

rotational training programme at our institute and review the perceptions and attitudes of postgraduate students towards it.

Material and Methods:

Development of rotational training programme at our institute

In our department practical training in pharmacology was imparted to postgraduate students by posting them in bioassay laboratory, neuropharmacology laboratory, and specialized research laboratories of the department, pharmacology ward and animal house. The postings at these places were structured by defining objectives to be achieved at the end of the postings, content to be learnt, activities with weekly targets to be accomplished and assessment to provide feedback to the students. This practical training programme was designed following extensive discussions and brainstorming sessions by the faculty members in 2010 and was initiated for the batch which took admission in May 2010. The entire programme is depicted in Table 1.

The programme curriculum was handed over to the postgraduate students at the beginning of each posting. The training was imparted to them by the faculty members of the respective laboratory/ward. The students reported the activities done to the faculty

members on daily basis and if they encountered any difficulty in execution of the activity, they were free to approach them. Every week a review of the activities of an individual student was taken in a joint meeting of faculty of the laboratory in which he/she was working, other faculty members and the head of the department. At the end of each posting assessment was carried out wherein both theory and practical aspects were assessed. Repeat postings were given to the students if they did not meet the bare minimum requirement. Similarly if their performance in the assessment was <50%, necessary training was imparted and they were reassessed.

Collection and analysis of feedback on practical training programme

A feedback questionnaire on rotational training programme was formulated by the faculty. It consisted of 6 questions, each with close ended response on a dichotomous scale and providing open ended justification for the same. These questions addressed to the adequacy of duration of posting, adequacy, relevance and implementation of weekly time table, adequacy and relevance of the training imparted in the posting, quality and pattern of assessment and their perceived benefit from the rotational training program. The questionnaire also had comment section

where students were requested to state the lacunae & suggestions for improvisation of the programme. The questionnaire is shown in figure 1. The questionnaire was validated for content and face validity.

Institutional ethics committee granted a waiver for informed consent as feedback of the students was a part of evaluation of this novel programme. At the end of rotational training programme, the questionnaire was emailed to the students and they were requested to email the filled questionnaire to one representative amongst them. This student representative then forwarded all the feedback forms to the Faculty- in-charge of postgraduate programme after coding so that the anonymity was maintained and opinions were sought in unbiased manner.

Thus the questionnaire was administered to postgraduate students of each batch starting from 2010 to 2012 (n=20). The batch which joined in 2009 also got exposed to this new structured programme midway of their postings (n= 5) and hence the feedback of this batch was also taken.

Each question of feedback questionnaire was subjected to content analysis and common themes that emerged were presented by descriptive statistics.

Table 1: Postgraduate Pharmacology Practical Training program

Name of the posting	Duration	Objective	Activity to be done	Assessment
Experimental laboratory	4 months	Student must be able to perform bioassay using isolated tissue experiments	<ul style="list-style-type: none"> • To conduct biassay using rat colon, rat fundus, rat uterus and guinea pig ileum respectively and calculate unknown concentration • To perform atleast 4 bioassays for each isolated tissue • To perform atleast one antagonist assay • To perform atleast two in vivo experiments. 	Journal correction Mid posting exam- Theory Brief answer question (50 marks) End posting exam ➤ Theory - Brief answer question (50 marks) ➤ Practical exam: To perform one isolated tissue experiment. (150 marks)

Name of the posting	Duration	Objective	Activity to be done	Assessment
Neuro-pharmacology laboratory	2 months	Student must be able to carry out evaluation of antiinflammatory, analgesic, local anaesthetic anticonvulsant, nootropic, sedative – hypnotic, antidepressant, antipsychotic, muscle relaxant activities & antistress activity using experimental models	<ul style="list-style-type: none"> • To evaluate drugs affecting spontaneous locomotor activity using actophotometer, jiggle cage, traction wire, rota rod • To evaluate anxiolytic activity using Elevated plus maze, Hole Board Apparatus, Two Chambered Box • To evaluate anticonvulsant activity using Maximal electroshock and chemical induced seizure – PTZ, strychnine, picrotoxin • To evaluate antipsychotic activity using cooke pole climbing apparatus • To evaluate the effect of drugs on learning and memory using complex maze and two point discrimination • To evaluate anti-stress activity, antidepressant activity using forced swimming test • To get acquainted with working of instruments; flicker fusion, hand steadiness apparatus, reaction type apparatus, pulse oxymeter, bicycle ergometer 	<p>Journal correction</p> <p>Mid posting exam- Theory Brief answer question (20 marks)</p> <p>End posting exam Theory - Brief answer question (40 marks)</p> <p>Practical exam: Viva voce (20 marks)</p>
Animal House	2 months	Student must know the aspects of maintenance of animal house and should be able to perform administration of drugs and blood collection in animals.	<ul style="list-style-type: none"> • To acquire skills in handling small animal • To acquire skills in feeding small animals • To acquire skills of administering drugs via different routes in small animals. • To perform blood collection in small animals • Compare hematological features of blood samples from different animals • To get acquainted to animal house facility including appropriate temperature , humidity and light and dark cycle required for various animals • To get acquainted with ethics in animal research and CPCSEA guidelines • To understand the breeding in animals including types of breeding, size of litters, after care of litters , common infections in animals and their control measures, guidelines regarding the waste disposal 	<p>End posting exam</p> <p>Practical exam</p>

Name of the posting	Duration	Objective	Activity to be done	Assessment
Pharmacology Ward	2 months	Be able to write clinical trial protocol for various phases	<ul style="list-style-type: none"> To design protocol and protocol related documents including the informed consent document and case record forms. To be familiar about the process of new drug development and requirements, objectives of various phases of clinical trials, To get acquainted with regulatory and ethical guidelines, ICH- GCP guidelines, Indian GCP, ICMR Guidelines(2006) and Schedule Y 	<p>Mid posting exam- Theory (100 marks)</p> <p>End posting exam Theory – Brief answer question (40 marks)</p>
Pharmacology Research Laboratory	2 months	Student should be able to perform chemical assays using various equipments	<ul style="list-style-type: none"> To identify common equipments used in biochemical laboratory To state principles of various chemical assays used for drugs To compare various chemical assays techniques To process a sample (with assistance) on colorimeter, flurimeter, spectrophotometer, TLC, ELISA reader, platelet aggregometer, hematology counter, image analyzer To realize the importance of the care to be taken while storing biological samples 	<p>Journal correction</p> <p>Mid posting exam – Practical exam</p> <p>End of posting exam –</p> <ul style="list-style-type: none"> ➤ Theory exam ➤ Journal correction ➤ Practical exam

Figure 1

i)	Is the duration of posting appropriate? If NO, specify the duration of which posting/ postings that you think will be appropriate, giving suitable reasons
ii)	Was the weekly time table planned for you in any given posting <ul style="list-style-type: none"> a. Adequate in terms of content : YES/NO give reasons b. Relevant in terms of content: YES/NO give reasons c. Implemented as stated : YES/NO give reasons
iii)	Was the training imparted during any given posting <ul style="list-style-type: none"> a. Adequate: YES/NO give reasons b. Relevant: YES/NO give reasons
iv)	Do you agree that assessment/tests should be taken for the residents at the end of each posting? YES/NO give reasons
v)	Do you feel that the pattern of assessment at the end of posting should be changed? YES/NO give reasons
vi)	Did you benefit from the posting: YES/NO give reasons
vii)	Any other comments / suggestions about any of the postings

Results: Seventy two percent (18 out of 25) students felt that the duration of each posting was adequate. However, 5 students felt that postings in specialized research laboratories and pharmacology ward could be reduced and the time saved can be utilized for additional postings.

All students (25 out of 25) felt that the weekly time table given to the students prior to the beginning of the posting was adequate and 92% (23 out of 25) felt that it was relevant. Though majority of the students appreciated the week-wise distribution of activities, 3 students felt that rather than following a strict time table, they should be allowed to carry out these activities in the stipulated time of posting as per their discretion. According to one student timetable of activities should not be too rigid, as this can hamper in depth learning. In addition, one student suggested that they should be allowed to carry out additional experiments of their choice, not mentioned in weekly time table.

Implementation of the weekly time table was successful as per 80% (20 out of 25) students but 3 of the students complained of some hindrance due to other postgraduate teaching activities running concurrently like seminars and journal clubs that were scheduled in the morning.

68% (17 out of 25) students said that the training imparted was adequate. Two students proposed that direct supervision of lab in-charges is required and intermittent lectures and discussions should be conducted by teachers in order to help them understand the subject better. Also 5 students felt that labs in-charges gave them less time than expected and therefore most of the learning was on their own with the help of reference books. 3 Students opined that in pharmacology ward posting, they should be given more exposures to activities related to pharmacovigilance, pharmacogenomics and pharmacoconomics. Similarly they should be acquainted with bioavailability and bioequivalent studies.

92% (23 out of 25) believed that the training imparted was relevant. But 2 students felt that training on several instruments present in specialized research laboratory was unnecessary. Three of the students expressed that working in the Pharmacology Ward involves more of reading activity. Similarly 10 students

felt that activities relating to maintenance of animal house are irrelevant and a lot of time is wasted in following the procedures for maintenance.

Assessment system was perceived as essential by 96% (24 out of 25) students as it provided them an opportunity to revise important aspects in the related posting, track their progress and get feedback of the same. Students however, suggested that the assessment should be taken as stated in the schedule. As against this only 5 students felt that the pattern of assessment was adequate. 10 students felt that there is less emphasis on psychomotor skills and presentation.

96% (24 out of 25) students felt that they had benefitted from the rotational training postings as students got systematically introduced to the scope of postgraduate pharmacology. It was felt that the benefit from these programmes is immense as none of their counterpart from other colleges has such systematic postgraduate programme in place and the students from other colleges miss the opportunity to cover the essential topics.

Discussion: Our study has shown that the training of postgraduate students in different fields of expertise and their evaluation as conducted in our institute is the need of the hour. This will help the students not only for their MD pharmacology examinations but also in their respective chosen career as expert in pharmacology. Our study shows that significant room exists for improvement in the quality of postgraduate MD pharmacology training as indicated by the ratings of the various educational attributes of the training programme. Recommendations for improvement in important areas as identified by students need to be implemented. And evaluation of these postgraduate teaching programmes in form and content will help to improve these programmes further.²

Most of the students felt that the duration of the posting was adequate. During planning the rotational training programme duration of the postings was decided by the faculty members on the basis of scope & weightage in examination. Wherein duration of experimental lab posting was 4 months & postings in rest of the labs that is, pharmacology research centre, pharmacology ward, animal house and neuropharmacology lab was kept as 2 months each. Since the students felt that the duration of certain

postings needs to be shortened we had a relook at our programme schedule. After looking at the feedback by the students and discussion among the staff members the duration of all the postings were reduced from 2 months to 6 weeks and experimental lab posting duration was reduced from 4 months to 3 months. The weekly time tables were reframed keeping this change & the learning objectives for students in mind. This also led to the space for incorporating additional postings that could be planned for the students.

All most all students felt that the weekly time table was adequate & relevant to them. This was a positive feedback from the students. Hence it was decided to continue with the same. Weekly time tables were designed with the aim to structure the current activities and to introduce the components of the posting in a systematic manner. However taking into account the suggestions of the students regarding the flexibility with the time table it was decided that any change in the time table needs to be discussed with the respective in-charge in advance so that it can be planned and executed accordingly. Also those students who for some reasons could not complete the objectives as stated in the programme would be given repetition of their postings for duration decided by in-charges.

Majority of the students felt that the implementation of the weekly time table was done as stated. With regards to students concern that certain duties like attending seminars & journal clubs hinders their activities to be performed during rotational training, it was decided that these activities form a part of postgraduate curriculum and the exposure to these activities is required during the residency program. And hence we decided to continue these activities as stated.

Regarding the training imparted larger number of students felt that it was adequate and relevant. However lots of suggestions were given by the students to improve them. As pointed out by students regarding need for doing more clinical trial related work, a lot of thought by faculty members was given to the same. It was then decided to post the students in clinical pharmacology for 2 month for fulfilling few of these needs. The students posted in clinical pharmacology attend the therapeutic drug monitoring OPD, are involved in designing protocol of pharmacogenomic or pharmacovigilance studies.

Students are also involved in observing the obtaining of informed consent, evaluating inclusion/exclusion criteria, completing source documents, dispensing study drugs, its storage and accountability, filling CRF, report and follow up of adverse events and serious adverse events. Clinical pharmacology department at our institute is equipped with machinery to do therapeutic drug monitoring and pharmacogenomic studies. Also clinical pharmacology department is a pharmacovigilance centre. Thus these activities are not offered by pharmacology department but are useful for training the postgraduates.

To strengthen the quality of training imparted it was decided that the days saved from shortening of the postings will be utilized in posting these students to industry and ethics committee for 1 month and clinical pharmacology for 2 months. The postings in industry were initiated keeping in mind the kind of work they will be exposed in future as entering in pharmaceutical industry is one of the career prospects of pharmacologists. In industry postings students were trained to make power point presentations for the CMEs, presentations for training medical representatives. Students were trained on how to modify the manner & content of the presentation depending upon the audience. For the posting in ethics committee, it was decided that afternoon time in the Pharmacology ward which involved more of reading activity would be utilized. During posting in ethics committee the students were made to read SOPs of ethics committee, taught how to review protocol and other documents and attend the meeting of ethics committee.

Suggestion regarding writing different protocols apart from the conventional safety efficacy studies was also discussed. And it was decided that as writing a protocol is a part of postgraduate seminar, students will be asked to design protocols for pharmacovigilance, pharmacogenomic, pharmacoeconomic, bioavailability and bioequivalent, food-drug interaction and drug-drug interaction studies instead of asking to design only the conventional safety-efficacy studies. Also a suitable expert from academics or industry would be invited for the same. There were discussions within the faculty members regarding the administrative work in the animal house postings, which students deemed as less useful and time consuming. However the faculty members felt that these administrative duties give

exposure to the students on how to maintain and run an animal house. So it was decided that these responsibilities will remain as a part of their duties in animal house.

As has been suggested by students, discussion with lab in-charges is very important and helps students to understand the topic better. Students also felt that the lab in-charges are not available at the time of their needs. The requirement of more student teacher interaction is required to overcome this problem. Thus we decided that lab in-charges can fix a time for the students posted in their labs each day when students can come and discuss their doubts. Faculty members are the cornerstone of educational process and are pivotal to effect the desired improvements.³ Also there is need for continuous faculty development programmes in order to increase the quality of postgraduate medical education.⁴ After giving a lot of thought we decided that it is desirable that conferences & workshops with relevant topics pertaining to the respective postings should be attended by the lab in-charges in order to update their knowledge regarding the same.⁵

Students agree that assessment should be taken at the end of each posting. Assessment of students was done for each posting at the end. Both theory & practical assessment was carried out. Assessment was kept with the idea that it will help students decide their progress and identify areas where they need to improve. Students too agreed that this was essential. But students were not happy with the pattern of assessment. Most students felt that it was not appropriate and more emphasis should be given to practical skills.

When asked about the benefit from these postings all most all students felt that they were benefitted. This tells us that the students were content and satisfied with the programme. Reasons for this could be that we have structured our programme and we aimed of raising the standards of this programme.

Conclusion: Thus we conclude that the rotational training programme should be structured to impart adequate and relevant training in imparting skills & competencies. Continuous feedback from the students of the postgraduate teaching programmes helps to improve and bring about relevant changes and strengthen the programme. Also for certain aspects

students may not be able to realize the importance or may be biased towards a viewpoint, in these situations faculty view point should be considered.

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