

IUPHAR-Educational Section Satellite Meeting

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Abstracts

**Education
Section**



PLEANARY SPEAKER:**Pharmacology Education in Africa: Challenges and Opportunities**

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Pharmacology is a key subject in education of pharmacists, doctors, nurses, scientists and other professionals from pre-degree to postgraduate levels. Given discrepancies in needs, facilities, personnel and other resources for pharmacology education in different parts of the world, it is inevitable that variability in challenges and opportunities exist. In developing countries generally and in Africa particularly, a number of challenges have been identified to be common, including (i) large classes with limited learning spaces, staff and budgets (ii) curricula development for different professions (iii) bridging basic and clinical pharmacology, and (iv) effective assessment of students' knowledge. Decreasing costs of computer hardware and software as well as telecommunication, present opportunities for mitigating many such challenges, including (i) setting up of digital libraries (ii) utilisation of e-learning resources (iii) development of innovative teaching skills, and (iv) pooling-cum-sharing of resources. Encouraging interest in pharmacology at pre-degree level should improve the number of pharmacology educators; while using training-the-trainer approach in implementing the Integrative and Organ Systems Pharmacology programme can achieve a sustainable multiplier effect in practical pharmacology. Drawing on recent examples of networking and collaborations, this presentation will further show how national pharmacological societies in Africa and the Pharmacology for Africa initiative are uniquely positioned to play crucial roles in tackling the aforementioned challenges, and creating opportunities to overcome them. In addition, the IUPHAR Education Section may need to develop benchmarks to guide minimum academic standards for teaching, learning and research aimed at improving pharmacology education worldwide, and not just in Africa.

PLENARY SPEAKER:**Internet-Based Solutions to Alleviate Shortages of Pharmacology Faculty in
Developing Countries**

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WINNER: Early Educator Award (Clinical Pharmacology)

A Feasibility Study of a Learner Centered Student Run Clinic (LC-SRC) With the Emphasis On Pharmacotherapy

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Introduction: Context based learning (CBL) is defined as learning in a setting similar to the setting of the future profession. The effects of CBL include the boost of intrinsic motivation and the willingness of students to invest in themselves. CBL is increasing in medical curricula but does not meet its full potential yet. An earlier introduction of (bachelor) students into the clinic, and actually giving them responsibility for patient care, might approximate the full potential of CBL. Student run clinics (SRCs) in the United States are an example of this concept. However SRCs are founded to organize healthcare to the uninsured. Although the problem of uninsured patients is small in the Netherlands, the SRC-concept seems to be an excellent example of ultimate context based learning. We aim to evaluate feasibility of a learner centered-SRC (LC-SRC) with insured patients, focused on pharmacotherapy.

Method: a feasibility study was performed. Student teams, consisting of 1st, 3rd and 5th year medical students, worked together to treat patients under supervision of an internist. Patients were selected from the internal medicine outpatient clinic for follow-up in the LC-SRC after their regular (first) consultation. Organizational aspects were evaluated using a set of questionnaires. The LC-SRC was considered feasible if the following three conditions were met: a. patients were satisfied with the patient care delivered by the student-teams and were willing to come back to the LC-SRC. b. the LC-SRC was considered feasible by supervisors (workable/useful/safe). c. the LC-SRC was considered feasible by students (workable/ useful).

Results: In total 31 consultations were conducted by student-teams. 31 students and 4 clinical specialists participated. Pharmacotherapy intervention plans were made in one third of all consultations, a pharmacotherapy intervention was started in 23% of all consultations. Feasibility aspects: Patients' opinion: response rate was 94%.

Professional behavior of students was judged sufficient to excellent by 90%. Over 90% felt comfortable during the consultations. 97% were willing to come back to the LC-SRC. Average consultation mark was 7.9 (scale 1-10). Supervisors' evaluation: response rate was 100%. Professional behavior of students was judged sufficient to excellent. All supervisors responded that this pilot was safe for patients and the quality of care was guaranteed. Average mark for the LC-SRC was 7.8 (scale 1-10). The workability was judged dubious by one supervisor, the reason being the amount of time needed for guidance. Lack of time was pointed out as important by all supervisors, however all supervisors would like to supervise the LC-SRC again. They all think the LC-SRC should be continued and agreed that the LC-SRC has additional

value for medical education. Students' response rate for the surveys was 94%. All participants felt responsible for the care offered to the patients and valued the consultations they conducted. All participants responded that working in student-teams is instructive. 86% rated the LC-SRC as well organized and almost 90% would feel safe to send a relative to the LC-SRC. 97% think the LC-SRC is a valuable addition to the medical curriculum. Feedback from text boxes represented positive aspects on responsibility + independence, competencies and teamwork. Suggestions for improvement were on aspects of organization, feedback and preparation. Pharmacotherapeutic intervention plans were formulated in 32% of the consultations by the student-teams. Indications for making a pharmaceutical intervention plan were: polymyalgia rheumatic, osteoporosis, Vitamin D deficiency, subclinical hypothyroidism, H. pylori gastritis, hypertension/IgA nephropathy, chronic urinary tract infection and adverse drug reactions.

Reflection and conclusions: The "learner centered" student run clinic" (LC-SRC) is founded and considered feasible, and could be a valuable addition to medical school in extending context based learning. Both patients and students were satisfied with the LC-SRC project. The supervisors found the LC-SRC feasible, taking into account the time needed for supervision. The fact that our SRC was mainly focussed on learning instead of care to (uninsured) patients had no effect on the satisfaction of patients with the delivered care. Even insured patients, who have the possibility to choose their own healthcare provider, are willing to consult the LC-SRC. In The United States this situation is different, a lot of patients are uninsured, do not have these rights and are left over to SRCs. Moreover, the fact that our SRC was mainly focused on learning instead of care (to (uninsured) patients) had apparently no effect on the satisfaction of patients with the delivered care. As described earlier, the percentage of pharmacotherapy intervention plans was 32% during this LC-SRC pilot. Since earlier studies reported good results of pharmacotherapy interventions in SRC, it seems to be promising to extend pharmacotherapy exposure in the LC-SRC. Specifically, projects such as polypharmacy medication check-ups could be started in a LC-SRC to increase the amount of pharmacotherapy problems. According to our opinion, early clinical exposure with real responsibility for patient care including pharmaceutical treatment and monitoring (LC-SRC) might be an efficient manner to improve (pharmacotherapy) knowledge and clinical skills.

ORAL PRESENTATIONS:

The European Register of Pharmacologists: EPHAR Project to Support Postgraduate Professional Development in Pharmacology in Europe

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In many countries, pharmacologists have raised concerns that pharmacology as a discipline is under threats of disappearing. Departments of pharmacology have been abolished or merged with other units to form larger entities and in many cases not even the former laboratories have retained their distinction as pharmacological units. The new European Registered Pharmacologist (ERP) scheme of EPHAR, the Federation of European Pharmacological Societies, is intended to provide a distinctly visible documentation which certifies that bearers excel in standards of education, skills, experience and professional standing in pharmacology. The current project draft has already gained recognition by EMTRAIN and LifeTrain, subprojects of the EU Innovative Medicines Initiative (IMI), Europe's largest public-private initiative which aims at improving the research environment in all sciences involved in medicines research and supporting European science in this broad field in the context of world-wide competition. The ERP project is based on the European Registered Toxicologist program of EUROTOX. The guidelines describe formal requirements and procedures for registration and re-registration as well as fields of theoretical and practical knowledge and experience that are relevant for eligibility for registration. The certification process shall be based on national certificates, existing or newly set-up, which, when meeting the criteria established by the EPHAR guidelines and a multinational working group, will be the basis for inclusion of individual applicants in the European register. The guidelines also shall assist European pharmacological societies in setting up appropriate training opportunities for potential ERP candidates and implementing or providing opportunities for continuing professional development.

Lifetrain: Towards A European Framework for Continuing Professional Development in Biomedical Sciences

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The medicines research and development process has recently undergone considerable change and will continue to change: biomedical professionals are now expected to be much more agile than previously, moving and collaborating between disciplines, sectors and geographical locations. This necessitates that they continually develop and maintain the required competencies to work most effectively.

LifeTrain is an emerging pan-European framework for continuing professional development in the biomedical sciences. It has been developed with four major stakeholder groups – professional/scientific bodies, course providers, employers and individual professionals. The LifeTrain framework comprises four sets of agreed principles (one for each stakeholder group) and has a growing list of signatories who have agreed to the principles of the framework and to continue working together to implement LifeTrain.

LifeTrain's approach focuses on working collaboratively to develop competency profiles for the different roles required in medicines research and development, spanning the entire value chain. Responsibility for learning lies with the individual professional, but is supported by employers, professional/scientific bodies and course providers working together to provide an appropriate environment for learning. This stimulates mutual recognition of competencies to facilitate mobility: across disciplines; between academia, industry and Regulatory Authorities; and across geographical boundaries.

LifeTrain is coordinated by the EMTRAIN project (www.emtrain.eu), on behalf of all the Education and Training projects funded by the Innovative Medicines Initiative (IMI). IMI (www.imi.europa.eu) is Europe's largest public-private partnership, and aims at improving the research environment in all sciences involved in medicines research and supporting European science in this broad field in the context of world-wide competition.

Several stakeholder groups, including the IMI projects Eu2P (www.eu2p.eu), PharmaTrain (www.pharmatrain.eu) and SafeSciMET (www.safescimet.eu) as well as professional bodies like EPHAR (www.epharm.org) are currently developing certification processes to recognise that bearers excel in standards of education, skills, experience and professional standing in their respective disciplines. LifeTrain provides the framework for them to work together.

The Virtual Pharmacology Lab - An Online Repository of Free Educational Resources to Support Practical Pharmacology Teaching

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The Virtual Pharmacology Lab (www.virtualpharmacologylab.com) is an open access repository of quality assured learning objects designed to support pharmacology practical teaching through promoting sharing and re-use of existing resources. At the moment the repository contains >650 learning objects obtained by disaggregating eleven existing computer-based simulations of practical pharmacology classes, developed by one of the authors (DD- brief descriptions can be found at www.sheffbp.co.uk), into their component elements. Each learning object is tagged with descriptive metadata including author, title, and brief description.

The learning objects include: data traces - showing how a particular tissue preparation responds to a change in experimental parameters (e.g. administration of a drug/drug combination); textfiles e.g. a description of how a particular experiment is performed and the apparatus used; images, diagrams; video – e.g. depicting dissection of a preparation, setting it up in an organ bath; interactive student tasks and self-assessment questions.

Making resources available in more granular formats should make it easier for teachers to tailor their own teaching materials by embedding/incorporating the learning objects into e.g. a website, PowerPoint presentation, e-book. While the repository content is currently limited to the author's materials it is hoped that colleagues will contribute additional resources and make these freely available for (non-profit) teaching purposes under the same Creative Commons license.

Users of the repository are requested to complete a short questionnaire and the feedback from that will inform future developments which will depend very much on the level of interest in using the repository from the user community.

ETRIS: A Free, Web-Based Repository of Educational And Training Resources In In-Vivo Sciences

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There is a global shortage of individuals with the knowledge and skills necessary to undertake in-vivo or whole animal research. To address this skills shortage, many countries, have committed significant funds towards training the next generation of in-vivo scientists. There is also a need to provide for continued professional development (CPD). This training and CPD would be best facilitated with freely available open educational resources (OERs) or learning objects (LO) and therefore the aim of this project was to collate, evaluate and disseminate OERs and LOs that could be used in education and training in in-vivo sciences. Open educational resource repositories and websites of professional and other organisations were searched for suitable OERs and LOs (e.g. video podcasts, guidance notes, statistical packages). A call was also made to colleagues in relevant professional bodies. Individual resources were evaluated and a brief description of each written. These were then collated into an Education and Training Resources in In-vivo Sciences (ETRIS) website, subdivided into topics across the entire spectrum of resources required by practicing in-vivo scientists including surgical procedures, animal welfare and husbandry, ethics and the 3Rs, experimental design and analysis. This website and resources are now available, free of charge, to colleagues at www.etr.is.leeds.ac.uk. ETRIS will be of significant benefit and a valuable tool for colleagues engaged in education, training or research in in-vivo sciences. It is envisaged that it will be a living wiki; that will grow as colleagues either contribute or provide links to new OERs and LOs.

The eBook 'Pharmacology in One Semester': Uses and Student Evaluation

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The eBook 'Pharmacology in One Semester' is an unpacked/simpler version of pharmacology for use with Biomedical/Medical/Science or Allied Health students, who are undertaking an introductory unit, or one unit in total, in Pharmacology. It was designed to have flexibility in content, and allow the teacher to modify the content to suit their teaching style and/or the cohort. The eBook is available at no cost from <http://eprints.qut.edu.au/54563/>, and has been distributed nationally and internationally.

In Australasia, the eBook is being used as a resource by students and staff. Thus, JH and JL provide the eBook as a resource for their allied health students (nursing, midwifery, podiatry, paramedic, chiropractic, osteopathy and Chinese medicine students), but do not know whether the students are using it. DM uses the eChapters on Drugs & the Gastrointestinal Tract, Drugs & the Respiratory system, and Neurological drugs as a resource for pharmacy students, and has shown that it was accessed often, and this access is probable to download the eBook. EP has used the eChapters on Drugs & Hypertension and Anti-infectives as the basis for overviews of these topics on the Monash University ePharmacology site. SD uses the eBook as the basis of her lecturing to Allied Health students (nursing, paramedic, podiatry, optometry), and releases the eChapters after the lecturing. The QUT students use the eChapters in their preparation for tutorials and exams, and the eBook is very popular with this cohort. In summary, the eBook 'Pharmacology in One Semester' is being used as envisaged by its authors.

Faculty-Wide Adoption of an Active Learning Approach to Replace Didactic Lectures

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Introduction. It is well established that the traditional lecture format has significant limitations, often resulting in a passive learning experience for students. "Active learning", in which didactic teaching is replaced at intervals with specific, goal oriented tasks that all students complete, has been shown in many contexts to allow students to construct and test their conceptual models during class

Methods. The Faculty of Pharmacy and Pharmaceutical Sciences at Monash University committed to adopting an active learning approach, in which lectures are replaced by active learning classes, using a staged approach over 4 years.

Results. Evaluation of 381 students across 15 units over 2012 and 2013 revealed that the majority of students viewed active learning as superior to conventional didactic lectures with regard to engagement, clarifying misconceptions and depth of understanding. Staff reported increased enjoyment of classes, and analysis of student assessments indicated that students performed as well or better on exam questions that were at higher Bloom's levels than previous exams on the same topics, as assessed by increased frequency of questions requiring synthesis and evaluation. Staff preparation time for these classes rose from a baseline of 3.3 ± 2 hours (mean \pm S.E.M.) prior to the pilot to 9.2 ± 4 hours when preparing for active learning classes in 2012, then fell to 1.2 ± 1.1 hours when repeating those classes in 2013.

Discussion. The first phase of implementation has been highly successful based on student and staff perception and on exam performance.

Interactive therapeutics addresses the issue of antimicrobial stewardship

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Teaching antimicrobial stewardship to senior clerkship students at Sultan Qaboos University, College of Medicine and Health Sciences took a revolutionary turn recently with a very favorable student satisfaction outcome. In accordance with the correlation between early antibiotic intervention and improved patient outcome in seriously ill patients, Sultan Qaboos University Hospital (SQUH) recently commenced prescribing piperacillin/ tazobactam in the Accident and Emergency (A&E) Department. In order to audit the appropriate use of piperacillin/ tazobactam, a prospective study to describe the prescribing pattern of piperacillin/ tazobactam in the Accident and Emergency department was designed. A comparison of the prescribing pattern with SQUH guidelines was also made. The study included 162 patients with a total of 176 episodes. Medical health records were reviewed to obtain patient data including demographics, dose, duration, culture, and indication for piperacillin/tazobactam treatment. The rate of appropriateness of prescribing according to SQUH guidelines was 33/176 (18.8%). The main indication of appropriate piperacillin /tazobactam was febrile neutropenia (13.1%). The rate of inappropriateness of piperacillin/tazobactam prescription was 143/176 (81.2%).The most inappropriate indication being urinary tract infections (19.9%). The findings of this study were used to design a one day workshop on antimicrobial stewardship in a small group setting. The workshop was interactive and had objectives that addressed: a big pharma talk, no free lunch, cost effectiveness, an introduction to antimicrobial stewardship, paradigm shift and new drug targets, a documentary film on resistance, and an evidence-based discussion of cases .These interactive sessions included presentations and discussions.

Correlation Between Exam Performance and Marks Obtained in an Undergraduate Student Directed Group Learning Exercise

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This study compared marks obtained by students in a traditional exam setting with those obtained by the same cohort of students in an in semester, inquiry based research project. The study was conducted on three separate cohorts of first year undergraduate students enrolled in a Bachelor of Pharmaceutical Science Degree, in three consecutive years. The exam was based on material taught in traditional didactic lectures. The inquiry based research project was run over a four week period during which students researched a particular disease or disorder in groups of five and were then assessed by an oral presentation of their findings. The presentations were peer assessed. In all three years, marks obtained by students in the project were strongly and positively correlated to their final overall mark which included exam as well as coursework assessment ($P < 0.0001$, $R = 0.5532$). Similarly, individual project marks were positively correlated to exam performance ($P = 0.0367$, $R = 0.2400$); and also positively correlated to the sum of all other assessment components ($P = 0.0196$, $R = 0.2726$). Project marks were also positively correlated to student scores in the exam question which related to the project topic in the first two years ($P = 0.0361$, $R = 0.2458$) but this did not reach statistical significance in the third year ($P = 0.0716$, $R = 0.1964$). It is concluded that students who perform well in in-semester learning projects of this nature also perform well in end of year exams and vice versa.

Assessment of Rational Prescribing Skills in the Written Exit-Examination at WITS Medical School

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Prescribing medicines is the primary intervention that doctors offer to influence their patients' health; however concerns have been expressed about the extent to which graduates are prepared by medical schools to assume prescribing responsibility. This study analysed the exit-level written assessment component of final-year students in the Graduate Entry Medical Programme (GEMP) at the University of the Witwatersrand, Johannesburg with respect to fitness-for-purpose (validity) to test rational prescribing skills. Examination questions were selected via an adjudicative process to determine a prescribing mark. Question items were then analysed according to Bloom's Revised and the SOLO Taxonomies. The theoretical framework of constructive alignment was used to interrogate fitness-for-purpose and the knowledge structures of the skills were explored using a Bernsteinian lens. A comparison of "A-Type" (single best answer) multiple choice questions (MCQs) with "R-Type" (extended matching) MCQs paradoxically highlighted students' greater proficiency in the R-Type questions ($p < 0.0001$). Both taxonomies indicated that students scored well on questions which tested recall and application of knowledge, but struggled with questions involving evaluation. Questions were poorly distributed according to Harries' delineation of prescribing skills to be tested. Examination marks showed that 83.6% of students were competent to prescribe according to the graduating standards of the University. Despite high examination scores, this study illustrates a lack of constructive alignment between assessment requirements, curriculum delivery and objectives of the course. Curricular components including problem-based learning and horizontal integration constrained epistemic access to the structure of rational prescribing knowledge and the exit-level written assessment did not sufficiently test rational prescribing skills.

POSTERS

Feedback on the use of Video-Aided Pharmacology Practicals in Teaching Basic Pharmacology at Kampala International University-Western Campus.

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Background: The teaching of Pharmacology in medical schools requires imparting both sound knowledge and skills in the area of pharmacology. It has been noted globally that practical pharmacology is susceptible to inadequate funding because of the capital and recurrent expenditure needed to procure and maintain laboratory animals, instruments and chemicals. While many institutions have resorted to single set up demonstrations, learning is often restricted to a few “front benchers” and is generally ineffective since the classes are very large. Several ingenuity has been proposed to enable student better comprehends the theories of basic pharmacology. One of such is the use of a video demonstration. This abstract reports the feedback on the use of video –aided pharmacology practical (VAPP) in teaching basic pharmacology.

Methods: Two hundred and nine third year medical students, who had completed their second year basic pharmacology, were selected. They were administered a pre-validated short questionnaire containing seven closed ended questions and one open ended question on the use of VAPP. Descriptive statistics analysis was used and results were expressed as percentage.

Results: The feedback indicated that the VAPP was liked by about 95% of the students. It also revealed that VAPP helped students to understand basic pharmacology concepts. A higher percentage (91%) indicated it improved their observation and critical thinking abilities. About 57% disagreed that time allowed for reporting the practicals in their manuals were enough. 93 % of the respondents agreed that the instructions were clear and understandable. Majority agreed that VAPP stimulated their interests in pharmacology and the exercises helped them to revise their lecture notes both before and after the practical sessions. The most important limitation to VAPP was cited as large class size; about 32% also stated insufficient time during the practical session as a weakness. About 18% however stated the inability to provide hands-on practical skills as the most important weakness of VAPP.

Conclusion: The feedback result showed that students generally accepted the use of video –aided pharmacology practical in teaching basic pharmacology. However, students might be missing the skills provided by hands-on experiments.

Student Perception Of Value Of Lecture Snapshots: Improved Performance

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Because students struggle with a second-year pharmacology subject (identical to unit of study or course), two new features were introduced: short 10-15 minute recordings, referred to as snapshots, and a mid-trimester test. Lecturer-created snapshots focused on key lecture concepts and/or complex figures. The mid-trimester test comprised short answer questions based on 2 randomly chosen cases drawn from 4 weeks of subject content. Both the final examination results ($p=0.0002$) and overall subject mark ($p=0.005$) improved significantly compared to the previous year, despite a poor overall performance on the mid-trimester test. Although the composition of student cohorts varies annually, there was no significant difference in performance in two physiology subjects taken by students also enrolled in this pharmacology subject between the two years. Consequently, it is reasonable to conclude that the introduction of these two features explains the significant difference in performance. Student feedback indicates that snapshots were highly valued and may have contributed greatly to the improvements in performance, although poor mid-trimester test results might have motivated the improved results as well. In a changing university milieu, students are often time-poor, particularly external (distance) students, and the qualitative student feedback is in accord with reports suggesting that shorter, more focused recordings might have advantages over full lecture recordings for student learning and revision. This data would suggest that although a poor performance on the mid-trimester test might have acted as a catalyst to improve performance, there is a potentially stronger link between snapshot recordings and improved learning outcomes.

Using Videos to Encourage Student Engagement with Practical Classes

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To encourage students enrolled in science/biomedical science degree programs to be more prepared and engaged with their laboratory classes, we introduced videos into our practical teaching. In some classes, videos were used to introduce and make students more familiar with specific equipment and techniques to be used in the practical session. In other classes, the videos replaced the face-to-face pre- and post-lab talks. Pre-practical videos set the context of the practical with respect to the lecture material and introduced specific aspects of the protocol and data management. Pre-practical videos were linked to online quizzes to allow students to assess their level of understanding. After the practical, a “wrap-up” video was created to model the process of data interpretation and critique the session. All videos were made by the teaching academics using commercially available webcams and/or screen capture software. Our data shows that the number of views of the videos used as alternatives to face-to-face talks exceeded the class enrolment, suggesting that some students accessed them more than once. Feedback from student surveys indicated that the videos were helpful in preparing for the practical and also for the writing of the practical report. Anecdotal feedback from demonstrating staff was that students had a greater understanding of the protocol than in previous years. Our results suggest videos provide a flexible learning tool that may increase the level of engagement of students with their practical classes thereby improving the laboratory experience so that they derive maximum benefit from these classes.

A Brief Analysis of Pharmacology Education in Some Nigerian Medical Schools

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INTRODUCTION : Pharmacology remains a very important basic and clinical science in the training of medical doctors worldwide. Medical schools in different countries operate different curricula and use different methods for instruction in their institutions. The traditional lecture based didactic method have given way in recent years to a more integrated and problem-based learning method. The main objective of this work is to describe various aspects of pharmacology education in some Nigerian medical schools.

METHODOLOGY : This questionnaire-based study involved six Colleges of Medicine from the three main regions of Nigeria. A copy of the questionnaire was e-mailed to a contact person in the Department of Pharmacology in each participating institution and the returned copies were collated.

RESULTS : Pharmacology is being taught during the 400 Level only in four participating institutions while it is taught between 200-400 Level and 200-300 Level in the remaining two institutions. The faculty consisted of medical doctors with post-graduate (MSc/PhD) degrees in Pharmacology (11/26.2%), medical doctors with post-graduate fellowship in Clinical Pharmacology (9/21.4%), basic scientists with post-graduate (MSc/PhD) degrees in Pharmacology (16/38%) and pharmacists with post-graduate (MSc/PhD) degrees in Pharmacology (6/14.3%). The mode of instruction in all participating institutions was still the traditional lecture based method.

CONCLUSION: There is a need for some uniformity in the duration of Pharmacology instruction in Nigerian Colleges of Medicine. Also, the introduction of problem-based learning in Pharmacology should be a priority for these institutions.

Prevalence Of, And Positive / Negative Issues Surrounding, the Use of E-Learning Tools in Pharmacology Courses Across Australia

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The use of e-learning tools in University teaching and learning is increasing, however little is known about the prevalence of, and the issues surrounding, the use of specific tools by academics and students, which was investigated in this study. Academics (n=22, average 13 years teaching experience) and undergraduate students in pharmacology courses (n=276, average length of study 4 semesters full-time) were surveyed at the University of Adelaide, Monash University, The University of Sydney and the University of Western Australia. Data collated included: demographics; frequency of tool use; impact on teaching/learning effectiveness; and positives/negatives of tool use. The order of frequency of tool use by academics was: audio lecture recordings > online quizzes/assignments > lecturer videos > wiki groups > discussion boards > blogs > podcasts. While academics reported that these tools allowed more flexible teaching, the major drawbacks were the set-up time, consequent non-attendance at classes and unreliable technologies. The most frequently used tools by students were online quizzes/assignments, audio lecture recordings and lecturer videos. Blogs and podcasts were the least employed. While students reported more effective and independent learning with these e-tools, the lack of interaction with lecturers, non-attendance at classes and unreliable technologies were drawbacks. Although the use of e-learning tools has been embraced and was perceived to allow more flexible teaching and learning, the negative issues surrounding their use were substantial. Consideration needs to be given to how these tools are utilized and the available support to ensure effective incorporation into our teaching programs.

A New PhD Study in Medical Pharmacology-University Belgrade

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We funded a PhD study in Medical pharmacology at Medical faculty Belgrade (2012). The aim of this program is to create a human capital who can independently assess biological activity at molecular, cellular, tissue, system and organism levels, and can perform scientifically designed experiments, develop hypotheses and question them and then present the result to the scientific world. The program objectives are: to make contributions to the sciences in the field of experimental pharmacology, of clinical pharmacology and rational drug use, to develop effective applications on the new drug development and therapy and to train students at every levels, and promote the status of pharmacology profession in Serbia and Europe. Requirements for the application are: to be graduated from the school of medicine, dentistry, pharmacy and veterinary medicine (360 ECT) or to have MS degree in pharmacology/toxicology and 300 ECT, to satisfy the entrance criteria for the Health Sciences Institute and to be successful in the interview carried out by the department. PhD program requires education, experimental studies and laboratory practice for at least 6 semestars. Total minimum program credit is 180 ECT. Courses offered: 1. Compulsory for all PhD studies- 25 ECT (Methodology of scientific research, Biomedical Statistics, General mechanisms of drug action, Pharmacokinetics and drug interactions and Special clinical pharmacology, 5 ECT all) and 2. Elective subjects-5 ECT every (Laboratory techniques, Drugs in regulation of smooth muscle tone and endothelial function, Neuropsychopharmacology, Cardiovascular drugs, Drugs used in anesthesia and pain care, Bioethics, Pharmacogenetics, Pediatric pharmacology or Neurocardiology and drugs).

Development Of A Smartphone “App” For Converting Brand Names Of Drugs To Approved Names

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WHO Approved names of drugs are used almost exclusively in the teaching of pharmacology to medical and allied health students. Likewise, refereed medical literature and textbooks use Approved names and not brand names of drugs primarily because brand names can vary between countries depending on copyright. Unfortunately, upon graduation medical doctors are pressured by drug companies to prescribe by brand names. With the increase in widely used drugs such as Simvastatin, Fluoxetine, Gabapentin coming off patent, there has been a proliferation in brand names with each of the above drugs having 6 or more names available for prescribing in Australia. This makes it difficult for medical and pharmacy interns to take drug histories and to assess clinical needs for these drugs.

The latest generation of smart phones with touch screen input, large storage and computing capacity makes them ideal as portable computers for intern use. We have written an application ('app') that translates an entered brand name on the screen quickly into a new screen showing the Approved name in uppercase and below are listed the appropriate brand names in alphabetical order in lower case. Additional brief information to prompt the memory of interns is the clinical action of the Approved drug (e.g. antidepressant, broad spectrum antibacterial, proton pump inhibitor etc) followed by available dosage forms (e.g. tablets of 10 or 20 mg; capsules of 100 mg; sterile injection; etc). This database of 1480 brand names could be modified to show other country's brand names and delivered over the Internet.

The Ethically Aware Pharmacologist: Embedding an Understanding Of Ethical Issues And Ability To Address These Within Pharmacology Degree Programmes

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The UK Quality Assurance Association for Higher Education Biosciences Benchmark statement requires students "to be confronted by moral and ethical questions, to consider viewpoints other than their own and to engage in intellectual argument". The University of Leeds views an education in ethics and to be ethically aware as a key attribute of its graduates. It requires all students to be provided with knowledge and understanding of the ethical issues within their individual disciplines and training in ethical thinking during their studies. Therefore, our aim was to develop a coherent programme of ethics education for pharmacology and other biomedical sciences undergraduate students

Students are introduced to both generic (e.g. role and responsibilities of a scientist; research ethics and governance) and specific (use of human participants and informed consent; animal experimentation) ethical issues throughout the three years of their programme. Interactive teaching methods (e.g. role play, debates, case studies, audience response handsets) are utilised to engage students, promote discussion and enable them to consider alternative viewpoints in a supportive, non-confrontation environment. Individual workshops are integrated within existing modules rather than within stand-alone ethics modules. Student feedback on this education is excellent, appreciative of both the content and teaching methods. This study provides an example of how an education in ethics and training in ethical thinking can be successfully embedded within Pharmacology degree programmes.

Enhancing Graduate Employability: Alternative (non-laboratory-based) Final Year Research projects

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With the increase in student numbers, coupled with reductions in staff and resources, many Pharmacology Departments are finding it increasingly more difficult to provide wet, laboratory-based final year or capstone research projects for all their students. Furthermore, in the current economic climate, it is essential that graduates possess employability skills and have relevant work experience. However, less than 20% of our graduates go into careers in scientific research. Our aim was therefore to develop non-laboratory based, “alternative” research projects which develop key transferable skills required by graduate employers and provide experiences more closely matched to the majority of our graduate's final career destinations. In addition to traditional individual or group laboratory-based projects or critical reviews of the literature, students within the School of Biomedical Sciences, University of Leeds, have the option to undertake bioinformatics or computer modelling projects, conduct audits of published clinical trials, undertake public health surveys in the community, develop educational resources or create and deliver science workshops in schools. These “alternative” projects enable students to undertake research in areas of interest to them. They have been confirmed as academically equivalent to traditional Final Year projects by our External Examiners. Past graduates actively promote the outstanding educational experience and impact on employability of these projects to their peers; 35% of students opting for an alternative project as their first choice of project in 2013-14. This work demonstrates the need for pharmacology educators to consider offering their students the option to undertake non-laboratory-based final year or capstone research projects.

Educating the next generation of in-vivo scientists: The British Pharmacological Society's in-vivo training initiative

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The Association of British Pharmaceutical Industries report "In-vivo sciences in the 21st Century" highlighted the shortage of individuals, within the UK, with the knowledge and skills to undertake in-vivo studies. Increases in student numbers, coupled with decreases in staff and financial resource have resulted in very few undergraduate students being provided with an education and practical experience of in-vivo pharmacology, yet in-vivo studies remain an essential component of biomedical research. In order to redress this loss of in-vivo education from undergraduate degree programmes, the British Pharmacological Society introduced its "In-vivo Teaching Initiative"; its aim, to provide a select cohort of students with a brief education and hands-on practical experiences of in-vivo studies. The initiative supports undergraduate in-vivo sciences modules at 7 Universities. Course content varies between providers but typically covers animal welfare, ethics, data handling and interpretation, the use of in-vivo techniques in different research areas and at least five "hands-on" practical experiences. A follow-up survey of graduates from the past 8 years from one Institution (University of Leeds) found 73% were current employed in scientific research, over half of whom spend between 75-100% of their time undertaking in-vivo research. 51% of respondents thought this education had been of benefit to their careers suggesting that that the initiative is achieving its aims. This initiative is financed by the major UK pharmaceutical companies. There are no other streams of support available for this type of activity and it is very unlikely that Universities could offer these courses without this funding.

The Knowledge and Attitudes of Medical Students in Serbia Concerning Rare Diseases: A Cross-Sectional Study

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The knowledge regarding rare diseases improves general aspects for those patients such as planning of national strategy, funding, foundation of expert centres etc. Therefore, the role of undergraduate medical education is essential in providing good foundation for future doctors involved in this issue.

We aimed to assess knowledge and attitudes of the 3rd and 6th year medical students towards the treatment of rare diseases in Serbia.

In this cross-sectional study, two samples of students were questioned for a survey (350/446 students of the 3rd year, 78.48%; and 242/ 517 students of the 6th year, 46.81%). Total response rate was 98.35 %.

Sixth year students estimated that they were more informed on this issue analyzed than the 3rd year students ($P < 0.05$). However, significant percent of participants estimated incorrectly prevalence of rare diseases according to the EU standards (3rd year - 42.68%, 6th year - 49.55%). Core curriculum subjects were the main source of information on rare diseases (3rd year – 63.14%; 6th year – 92.14%). Our participants agreed that the most important problems are the following: high drug prices, difficult access to drugs, and lack of public information. In order to improve pharmacotherapy of rare diseases in our country, participants suggested the establishment of the National Plan for Rare Diseases, approval of more appropriate drugs, simplified access to appropriate medicines, and more rapid diagnostics. It is necessary to improve knowledge and attitudes of our medical students concerning rare diseases.

**The Knowledge and Perceptions of University Of Limpopo, Medunsa Campus
Bachelor of Pharmacy Students about the Use of African Traditional Medicines in the
Healthcare System**

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The prevalence of African traditional medicines (ATMs) use has various possible impacts on conventional disease management. The acceptance and recognition of the use of ATM by the National Department of Health and WHO obliges that health care professionals should be aware and have some knowledge about ATM. Pharmacists are the custodians of medicines and are expected to be at the fore front of knowledge about all medicines, including ATM.

The aim of the study was to investigate the perceptions of Medunsa Campus BPharm students, and to determine their knowledge regarding ATMs and their use in the healthcare system.

A descriptive quantitative study was done on BPharm students of 2013 from first to fourth year. A self-administered questionnaire was used to obtain data from 187 of the 245 enrolled students.

The majority of participants (94%) were aware about the use of ATM by the public, and perceived the medicines to be sometimes effective (69%) and beneficial (54%). They believed that safety issues, storage and interactions were not taken into consideration when ATMs are produced.

Most of them (66%) had not been taught but knew sources of ATMs; yet they believed that people commonly using ATMs were rural dwellers, the poor and the illiterate. The media (65%) was their main source of information, however they did not know about regulatory issues and stakeholders involved. They (67%) thought pharmacists had no role to play in ATM issues.

A need has been established for students to be taught about ATMs to close the gaps identified. It is therefore recommended that aspects of ATM use be included in their curriculum.

Problem-Based Learning Teaching in Accordance With Undergraduate Students and Graduate Students in the Cardiovascular Pharmacology Curriculum in Medical College

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Background: In order to improve knowledge and understanding of the cardiovascular pharmacology for undergraduate students and graduate students, problem-based learning (PBL) based on the integrated curriculum undertook at Health Science Center Xi'an Jiaotong University. Therefore, it was the key point that was the difference between undergraduate students and graduate students in scope of the PBL teaching.

Methods and Results: Using the clinical cases adapted from real patients with the learning aims served as the learning tool of PBL about cardiovascular system for undergraduate students. Motivation to study, the relevance of cardiovascular knowledge and the use in clinical practice were promoted. Importantly, the PBL about cardiovascular system was easier for undergraduate students to actually digest the mechanism, clinical use, adverse reaction and toxicity of drugs. For medical graduate students, special lecture about cardiovascular diseases in PBL underwent in the first semester. The newest research progress, study protocol, therapeutic schedule and other information were involved in the contents of cardiovascular lecture. Meantime, the capabilities of problem-finding, autonomic study, literature-searching and problem-solving, as well as the scientific activity made the great progress during the PBL course.

Conclusion: All together, understanding basic knowledge was the main aim in the PBL on the basis of the integrated curriculum for undergraduate students, while the widespread vision of life science was the key point for medical graduate students. The PBL acted as the learning method in medical school to more effectiveness of understanding the cardiovascular pharmacology for undergraduate students or graduate students.

Peculiarities of Clinical Pharmacology Teaching At Post-Graduate Level for Clinical Pharmacists in Ukraine

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Clinical pharmacy is a new speciality, gathering medicine and pharmacy, the main goal of this field is creation of reliable theoretical basis and methodological approaches for rational application of medicinal preparations. The goal of Clinical pharmacy, as a field of study, is formation of theoretical knowledge and skills of pharmacists and clinical pharmacists for collaboration in a therapeutic team with a doctor, a nurse, to provide effective and safe personalized pharmacotherapy, to prevent by-reactions of preparations, to implement the pharmaceutical treatment of the patients in hospitals and at sales of medicinal preparations in drug-stores. Knowledge in clinical pharmacy will improve compliancy of the patients, will optimize drug introduction, will allow prediction of probable drugs and drugs and meals interaction, it will minimize the risk of drug adverse effect and polypragmasy. The role of a clinical pharmacist in a drug store has been increasing recently, due to wide-spread self-treatment and implementation of protocols and recommendations on rational application of over-the-counter drugs. A clinical pharmacist has an important role in clinics due to implementation of formulary system and system of drug safety and efficiency monitoring. Implementation of continuous pharmaceutical education of clinical pharmacist is supported with creation of teaching programs, including main sections of clinical pharmacology, pharmacogenetics, chronopharmacology, drug interaction. Study of peculiarities of drug application in pediatrics, geriatrics, and obstetrics is obligatory.