

Learning the Use of Medicinal Herbs in Phytotherapy: A Tripartite Approach for Pharmacy Students

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Abstract

Herbal remedies constitute an important component of any healthcare system. Increasing demand for the use of herbal remedies and reports of harm caused by inappropriate use are not uncommon. Pharmacists are well positioned to offer advice on the use of drugs and herbs; therefore natural products must be included in the Pharmacy curriculum. At the Department of Pharmacy in the National University of Singapore, instruction on natural products is delivered based on a tripartite approach. In the module, students learn about the constituents of the herbs, the quality assurance of the herbal products and the evidence-based efficacy of herbal remedies. Eighty four percent of students who gave feedback agreed that the tripartite approach had allowed them to gain a holistic appreciation of the use of medicinal herbs. The majority of students agreed that the module had provided an enriching learning experience (88.4%) and stimulated self-directed study on the subject (95.7%).

Keywords: *Herbs, herbal remedies, natural products, phytotherapy*

Introduction

For centuries, herbs have been known to possess medicinal value and they have been used for prevention and treatment of ailments in various cultures. Today, the practice of using herbal preparations as a form of Complementary and Alternative Medicine (CAM) is becoming more prevalent, and the sale of such herbal supplements now constitutes a sizable portion of the healthcare product market (Mahady, 2001). On the other hand, there are also reports of harm and even fatality caused by the improper use of herbal products (Cappuzzo, 2006). Therefore it is important for users to be informed and vigilant about the potential risks of consuming certain types of herbs.

In Singapore, with a multi-racial population, it is not uncommon for consumers to use herbal healing methods that have an origin in Traditional Chinese Medicine (TCM), Ayurvedic Medicine, Homeopathy or even Western Herbalism. While many finished herbal products are freely

available, safeguard measures have been adopted to protect the consumers. The Health Sciences Authority has instituted regulatory guidelines for the sale of TCM in Singapore and products found adulterated with undesirable substances are withdrawn from the market (Yee et al, 2004; Koh and Woo, 2000). Such practices assure that poor quality herbal products are removed from the supply chain.

On another note, there is evidence showing that some herbs cause side effects and episodes of drug-herb interactions have also been reported (Izzao and Ernst, 2001). Therefore, consumers should be adequately informed about the appropriate use of these natural remedies. Pharmacists, who are experts in drugs, should provide advice on the correct use of herbal products and prescription drugs. For this reason, and with the purpose to accomplish the key role of a drug information provider with competence and professionalism, it seems reasonable to include Natural Products as an essential subject in the pharmacy curriculum.

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The Department of Pharmacy at the National University of Singapore, offers an essential module in its final year of study. The teaching of this subject has been traditionally focused on the aspects of pharmacognosy, drug discovery and phytochemistry. However, due to the increasing use of herbal products as CAM, it seemed useful to include aspects of phytotherapy to allow undergraduates to appreciate the role of medicinal herbs in pharmacotherapy and their potential interactions with synthetic drugs. Therefore, the instructional approach of the module was revised to align with the educational philosophy of the Department, which adopts a tripartite approach that focuses on the three “pillars” of pharmacy, namely the drug, the product and the patient.

This report describes an improved modular structure, its syllabus and the forms of assessment. In addition, student feedback on the module and their attitudes toward the use of medicinal herbal products are also presented.

Descripton of Module

In Singapore, pharmacists are often employed in sectors where knowledge of medicinal herbal products is essential, for example in the enforcement of regulatory guidelines on the supply and sale of TCM or in the case of reviewing patients’ medications at the community pharmacies and hospitals. Taking into account these different requirements, a tripartite approach is adopted in the design of a natural products module so as to achieve three main learning objectives. Firstly, students learn about the origin of the chemical constituents that impart medicinal value to the herbs. Secondly, they discover how modern pharmaceutical technology and regulatory guidelines assure the manufacturing of good quality herbal products. Finally, through documented evidence, students learn to appreciate that medicinal products can be efficacious and safe.

The natural products module is considered essential for pharmacy undergraduates. The module carries four modular credits and requires 60 contact hours which includes 24 hours of lectures, 4.5 hours of tutorials, 7.5 hours of seminars and 24 hours of laboratory work. The syllabus is divided into three sections and is delivered by three faculties. Students are first introduced to the role of medicinal herbs in different healthcare systems and how herbs provide materials for new drug development, manufacturing of semi-synthetic drugs and phytotherapy. The biosyntheses and pharmacological activities of various classes of constituents derived from some well-known herbs are introduced. Aspects of pharmacognosy are also covered to demonstrate how medicinal plants are studied traditionally and this is contrasted by how modern scientific methods, such as chemical and DNA fingerprinting, can be used in the identification and authentication of plants today. The next section of the syllabus focuses on processing and formulation of natural substances into herbal remedies, with particular emphasis on the methods of analysis that are able to ensure the quality and safety of the finished products.

The instructional materials are based on the World Health Organization’s guidelines on good agricultural and collection practices for medicinal plants as well as the safety monitoring of herbal medicines in pharmacovigilance systems. In the final part of the module, the class is divided into groups of either three or four students and each group is assigned to

produce a report on a topic related to medicinal herbal products or alternative practices. In addition, each member of the group must submit an individual report on a study case related to the topic of the group (see Table I for examples). After six weeks, selected groups are selected to give an oral presentation to the class, thus stimulating learning and discussion.

Table I. Two examples of group and individual assignments.

No.	Topics
1.	<p>Maintenance of men’s health and vitality.</p> <p>Scope</p> <p>Prostate hypertrophy, erectile dysfunction, baldness etc are some of the common ailments that affect men. In recent years, the healthcare industry has begun to introduce natural products for the management of some of these common male health problems. Discuss.</p> <p><u>Case 6</u></p> <p>Peter (50 y.o.) has been taking Cardiprin 100 for about 2 years after having gone through an angioplasty procedure. Recently, he has been feeling a little lethargic and reckons that the stress at work is taking toil on his body. He has decided to start a daily course of multivitamins. He bought a brand of vitamins specially targeted for men. Each tablet also contains saw palmetto and ginseng among 20 other vitamins and minerals. After taking the vitamin tablets for about 3 weeks, his gum started to bleed whenever he brushes his teeth in the morning.</p> <p>Evaluate this situation and offer an explanation based on scientific evidence.</p>
2.	<p>The principles of Traditional Chinese Medicines</p> <p>Scope</p> <p>Give an overview of the principles of TCM; including the principles of using herbs in TCM.</p> <p><u>Case 10</u></p> <p>Susan, 54 years old, was recently diagnosed with stage -2 breast cancer and was supposed to undergo surgery and chemotherapy. She has read an article about Traditional Chinese Medicine and its usefulness in disease management. She believes that “Chinese herbal medicine is natural and therefore must be safer than Western medicines which are synthetic poisons”, so she does not wish to start chemotherapy and insists that TCM can help her. As a pharmacist working at a cancer centre, what is your opinion on the above statement and how would you advise this patient?</p>

At the practicals, students learn to conduct experiments related to the extraction of herbal constituents, In addition to the lectures and assignments, the students are also required to complete eight practical sessions of three hours each pharmacopoeial assays of crude drugs, semi-synthesis of natural products and instrumental analysis of dosage forms containing active herbal ingredients. The series of practicals is designed to supplement the lectures on quality assurance of herbal products.

The learning outcomes of the students are evaluated in two ways: 1) a continuous assessment component that includes the practicals and the assignments; 2) a 2-hour final examination that consists of 60 multiple-choice questions and three short questions.

Evaluation

The cohort of final year undergraduate students was invited to participate in a survey during the last session of the module. A questionnaire, consisting of ten statements that described the module, was distributed and students were required to indicate whether they agreed or disagreed with each statement (see Table II). Completed questionnaires were received from 69 out of a class of 86 students (80.2%). Therefore, the results could be considered as representative of the whole cohort of students.

With regard to the module, fifty-eight of the sixty-nine respondents (84.0%) agreed that the tripartite approach adopted by the module had helped them gain a holistic appreciation on the use of therapeutic natural products.

The majority (88.4%) of the class agreed that the different instructional modalities had enriched their learning experience. Almost all (95.7%) the students agreed that they were stimulated to discover more about therapeutic herbs on their own. One third of the respondents strongly agreed that the module had succeeded in integrating different aspects of pharmacy and the majority (78.3%) found the integration useful in consolidating the technical knowledge and skills encountered in previous years.

About three quarter of the respondents (75.4%) felt that the module was difficult to manage in comparison with other essential modules offered at the same level; however, 82.6% of the respondents still enjoyed studying it. All in all, 97% of the respondents felt that knowledge of natural products was essential for pharmacy graduates, indirectly suggesting that pharmacists must be well informed about the use of therapeutic herbs.

In terms of applicability of herbal products for treatment, 23 of the respondents (33.3%) agreed that consistent scientific evidence demonstrating the efficacy and safety of some herbs had changed their attitude toward using herbs for disease management. However, ten respondents were still doubtful about herbs' reliability and the attitudes of only two students

Table II. Results of survey conducted on the cohort of final year pharmacy undergraduate students who read the natural products module.

S/N	Statements	Strongly Agree	Somewhat Agree	Not Sure	Somewhat Disagree	Strongly Disagree
1.	The division of this module into three sections (ie. drug, product, patient) is appropriate and has helped me gain a holistic appreciation on natural products.	19 (27.5%)	39 (56.5%)	11 (16.0%)	-	-
2.	The module has stimulated my interest in learning more about the impact and importance of natural products in drug discovery and disease management.	16 (23.2%)	50 (72.5%)	3 (4.3%)	-	-
3.	The module has exposed me to a range of learning modalities (namely lectures, tutorials, practicals, assignments and seminars) which has highly enriched my learning experience.	15 (21.7%)	46 (66.7%)	7 (10.1%)	1 (1.5%)	-
4.	The module has demonstrated interconnection between different aspects of Pharmacy (eg. medicinal chemistry, pharmaceuticals and pharmacotherapy).	23 (33.3%)	34 (49.3%)	11 (15.9%)	1 (1.5%)	-
5.	The module has refreshed and consolidated my understanding in some aspects of technical knowledge and skills that I have learned in previous years.	12 (17.4%)	42 (60.9%)	12 (17.4%)	2 (2.9%)	-
6.	The module has changed my attitude towards the use of natural products in disease management because in some cases, there are strong scientific evidence to demonstrate their efficacy and safety.	23 (33.3%)	34 (49.3%)	10 (14.5%)	2 (2.9%)	-
7.	I have enjoyed studying the module because the knowledge gained is very relevant for self care and my future career.	19 (27.5%)	38 (55.1%)	9 (13.0%)	3 (4.4%)	-
8.	In comparison with other essential level 4000 modules, I have found this module to be difficult to manage.	22 (31.9%)	30 (43.4%)	8 (11.6%)	8 (11.6%)	1 (1.5%)
9.	Knowledge in natural products is essential for Pharmacy graduates.	42 (60.8%)	25 (36.2%)	1 (1.5%)	1 (1.5)	-
10.	Through this module, I have learned that natural products do have a place in complementing conventional drug therapy.	37 (53.6%)	28 (40.6%)	4 (5.8%)	-	-

was not changed despite the strong scientific data reported in literature. Interestingly, only four students were still unsure whether natural products had a place in complementing conventional drug therapy, although they admitted that herbs should be used as CAM.

On the basis of the positive feedback from the students, it could be inferred that adopting the tripartite approach to studying medicinal herbal products was found to be highly enriching since it had stimulated their interest in phytotherapy. Therefore, this module would continue to be offered in the same format in subsequent years.

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