Pharmaceutical Care Education at the University of Chile

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The study of Pharmacy at the University of Chile has been continuously adapting to the scientific developments and change in the practice of pharmacy. The University of Chile has considered, since 1997, the internship as one of the final activities in the pharmacy curriculum. In 1998, some modifications were made in the objectives and contents of this final activity. The purpose of these modifications was to include and develop the concept of pharmaceutical care. The present study shows some results obtained through these modifications. Between 1998 and 2000, 187 students completed the new internship experience. Of this total, 143 (76.5 percent), worked directly with patients, with a maximum of 80.6 percent (50 students) in the year 2000. Between 1998 and 2000, 118 students (63 percent) preferred to have these practice experiences at adult and children's hospitals. Changes in the internship motivated students to formulate and to develop pharmaceutical care plans. This new type of internship has been evaluated as a very stimulating activity.

INTRODUCTION

Chile is a South American country of about 16 million inhabitants. In 1998, there were five universities where pharmacy was taught in this country. Recently, three other universities have begun to offer a pharmacy curriculum. Each year, about 200 students receive the professional degree of pharmaceutical chemist. This degree qualifies the graduate to work in the pharmaceutical industry and in hospital and community pharmacies, clinical laboratories, universities, and regulatory agencies. To accommodate these job opportunities, the curriculum includes basic science courses and pharmacy subjects.

Chilean pharmacy curricula include five years of regular course work, followed by another year for the ending activities. All five-year programs are quite similar at the universities, but the final activity to receive the pharmacy degree varies between the universities. At the University of Chile, these activities include an apprenticeship in community pharmacy (240 hours), an internship (210 hours and another apprenticeship (six months) or a titled thesis (six months or longer). In 1985, pharmacy studies at the University of Chile finished with the public defense of a thesis work of a supervised research study that usually took one year.

The University of Chile is the oldest Chilean university, its pharmacy program having first started in 1833. From its beginning and up to the 70's, Chilean pharmacy studies were influenced by the curricular pharmacy programs offered by European universities. In 1971, the faculty at the University of Chile, with the counseling of some members of the University of California in San Francisco, introduced clinical pharmacy activities into the curriculum. The approach included lectures and seminars on clinical pharmacy (clinical pharmacy course), and experiential activities in a hospital setting (hospital internship). This curriculum finished with two short professional practice experiences (one month each) and the development and defense of a one-year thesis.

The new pharmacy curriculum at the University of Chile included clinical pharmacy as a subject in the second half of the fifth year and consisted of 90 didactic hours. This course provided the basic concepts to be applied by the students in an internship of 150 hours. This first internship first started in 1974 and in 1987 was developed in hospital settings. The internship required students to follow the patient's disease state, obtain drug histories, attend clinical rounds, discuss disease cases, and provide drug information to health professionals and students (Table I).

In 1987, the last important modification of the curriculum took place, (see Appendix). The clinical pharmacy course remained at the same level with the same amount of hours, but the internship became one of the final activities and was increased from 150 to 210 hours. Despite these changes, teachers had a feeling of frustration and both they and the students felt that the activities did not develop what was needed for community pharmacy practice. Since 60 to 80 percent of students will work in community pharmacies following graduation, this criticism was of concern.

Chilean pharmacy faculty, in collaboration with colleagues at Washington State University School of Pharmacy, and the University of California in San Diego, formulated their concept of pharmaceutical care that was introduced into the curriculum in 1998. The content and objectives of both clinical pharmacy and internship subjects was reformed to improve the skills needed community pharmacy practice of pharmaceutical care. The present study describes the changes introduced, and the activities done by the students during the period, 1998-2000.

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Table I. Objectives of the internship up to 1997

To apply knowledge about drugs to certain aspects of patient's care
To apply knowledge about drugs in order to rationalize therapy of prevailing diseases
To monitor patient's outcome to a therapy taking into account the expected effects, the laboratory result, the adverse drug reactions, the drug interactions, and the patient's compliance
To use appropriate communication techniques to give active and passive drug information to health professionals and students
To counsel patients about the correct drug administration, compliance, adverse drug reactions and interactions
To apply pharmacokinetic knowledge to solve clinical problems and adequate drug dose
To detect adverse events caused by the drug therapy and to discuss their cause

REFORMS

The clinical pharmacy course changes that were oriented to pharmaceutical care, and their objectives are listed in Table II. These reforms were implemented through lectures and seminars about pharmaceutical care of patients with different clinical conditions. For example, some topics included pharmaceutical care of patients with hypertension, diabetes, asthma, and other diseases. Furthermore, during the time allotted to seminars, students went to hospitals for the first time in their studies. There, they first obtained information about patients, their health problems and drug therapies in order to identify present or possible drug or lifestyles-related problems. The students then proposed interventions or actions for preventing or solving the detected problems, and also proposed and discussed monitoring and evaluation parameters. During the last week of the clinical pharmacy course students presented a proposal of a pharmaceutical care plan.

At the end of their clinical pharmacy course, students completed a form to indicate their preferences about places to perform their internship. During the students' summer holidays, faculties contacted with colleagues or physicians or other health professionals working at the places proposed for the internship. The students who successfully finished the five-year curricular activities were able to begin the internship year. This was one of the final activities, and had the following objectives:

- to allow the development of skills for integrating knowledge acquired previously;
- to apply their knowledge and skills, in order to actively and responsibly participate in the health care team; and
- to propose, develop, apply, and to assess pharmaceutical care plans.

These approaches to the internship allowed more independent work by the students and also permitted the active participation of more faculty members. Until 1998, only faculty members from clinical pharmacy were integrated in the internship. In the reformed internship, other faculty members participated. These new faculty gave courses in public health, community pharmacy, and hospital pharmacy. In addition a number of practicing pharmacists and physicians accepted the challenge of supervising the interns at their working places.

The internship in the present curriculum, includes 210 hours distributed in a 12-week-period. Since 1998, the first week has included orientation activities, and invited health professionals who act as supervisors. Each intern and supervisor receives an Internship Guide that includes instructions, program of activities, a glossary of frequent clinical abbreviations and terms, clinical laboratory normal values, orienting issues developed by clinical faculties, and the Declaration of Tokyo about the Role of the Pharmacist in the Health Care System (1). After orientation, students are placed at different experiential sites. For two weeks they retrieve information about patients most used drugs, common drug-related problems and obtain information that could support the proposal of a pharmaceutical care plan. Once this plan is presented and accepted by the faculty member in charge, students develop forms, teaching materials, actions, and define the monitoring and evaluation parameters. All work is reviewed by both the supervisor and the faculty in charge. The students usually need from two to three weeks to complete this task, after which they must apply and assess the pharmaceutical care plan.

Table II. Clinical pharmacy objectives since 1998

To give knowledge and to allow the development of skills necessary for adequate apprenticeship in clinical areas of their future jobs
To allow the students to consider themselves as future health professionals who work in a team that has a common goal: the patient's well-being
To give basic knowledge about pharmaceutical care and to use this knowledge for the proposal of pharmaceutical care plans

In the last week of the internship, students present a ten-minute oral presentation and a poster on their developed work. These presentations take place at the Hospital Internship Meeting, held at the end of the school semester to which, faculty and students of other levels are invited.

RESULTS

One hundred eighty-seven students have completed the internship between the period 1998-2000. Their experience sites included adult and pediatric hospitals, community pharmacies, places such as primary health care clinics, a therapeutic community where drug addicts are treated, charity institutions, pharmaceutical industry, and drug information centers. Table III shows the distribution of studies by semester and type of activity. Activities were grouped into those done individually with patients, and those done a part of a health care team. In the first type of activity, students interacted with patients by giving educative lectures, handing out brochures and manuals, and assessed the impact of the education given on the patients' knowledge about diseases and treatments by pre- and post (4-

TABLE III. Type of activities developed by students during their internship, 1998-2000

	1998		1999		2000		Total
Type of activity	1st sem	2nd sem	1st sem	2nd sem	1st sem	2nd sem	
Directly with patients	28	23	18	24	34	16	143
With health teams	7	13	6	6	6	6	44
Total	35	36	24	30	40	22	187

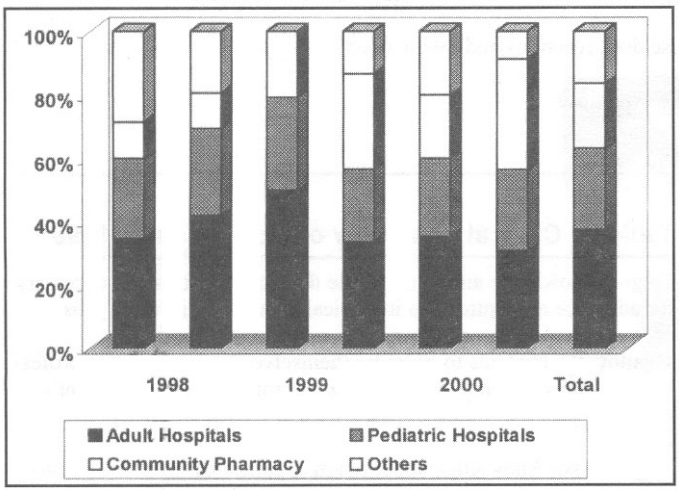

Fig. 1, Institutions where students did their internships.

6 weeks) surveys of the patient's knowledge of their disease state and therapy. Students worked with the health care team, optimized drug-related procedures, and/or gave information about drugs. As can be seen in Table III, students in both semesters preferred to work directly with patients rather than within the health care team.

Students worked mostly at hospitals (see Figure 1). This preference was surprising to the faculty as it was thought that the students would rather end up at community pharmacies where they eventually would practice. When we asked why they preferred to work at hospitals, the students answered that the internship represented a unique opportunity to be with patients and the entire health care team.

As an example of interns' interest, Table IV shows that in the year 2000, fifty students developed pharmaceutical care plans. These plans were most commonly directed to psychiatric **(6/50)** obese patients (5/50), and patients with cardiovascular disorders (5/50).

CONCLUSIONS

The new internship implemented at the School of Pharmacy of University of Chile in 1998 removed some teaching deficiencies that were needed to prepare the pharmacy graduate for the practice. Some of these deficiencies were overcome through changes in the clinical pharmacy course that preceded the internship. Students considered that this internship represented a stimulating activity and some expressed that it should be of longer duration.

Due to students' evaluation of the 1998 internship, it was decided to continue offering the same activities in the future until the curriculum modification was enforced. On the other hand, internship represents challenge for faculty members and practicing pharmacists as it urges them to program new professional activities, to study and to create new teaching approaches.

Even though the faculty members are conscious that some of the studies developed by our students do not precisely fit in pharmaceutical care activities, the internship implemented in 1998 at University of Chile represents one of the first Chilean academic approaches for teaching pharmaceutical care. The faculty plans to continue improving the internship activities in order to offer students better opportunities to develop pharmaceutical care during their stay at the University.

Table IV. Pathologies and other problems of patients included in pharmaceutical care studies in the year 2000

Pharmaceutical care for:	Number of studies
Psychiatric disorders	6
Obesity	5
Cardiovascular disorders	5
Diabetic Mellitus	4
Microbial Infection treatment	4
Cancer	4
Peritoneal dialysis patients	3
Asthma	2
Hyperlipidemia	2
HTV infection	2
Liver or kidney transplants	2
Old age	2
Attention deficit hyperactivity	1
Renal failure	1
Cystic fibrosis	1
Epilepsy	1
Psoriasis	1
Osteoporosis	1
Diarrhea	1
Anticoagulation therapy	1
Self-medicated	1
Total	50

[a]Blood Hypertension: four studies.

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Reference

(1) World Health Organization, *The Role of the Pharmacist in the Health Care System,* WHO/PHARM/94.569.

APPENDIX, PRESENT PHARMACY CURRICULUM AT THE UNIVERSITY OF CHILE

Year 1, 1st semester		**Year 1, 2nd semester**	
Chemical laboratory techniques	75	General chemistry I	120
Genetics and cell biology	105	Basic anatomy	60
Elective	60	Elective	60
Total hours	240	Total hours	240
Years 1, Annual signatures			
Mathematics	300		
Introduction to pharmacy	90		
Total hours	390		
Year 2, 1st semester		**Year 2, 2nd semester**	
General and inorganic chemistry	120	Analytical and instrumental chemistry I	120
Physics I	75	Physics II	105
Organic Chemistry I	135	Organic Chemistry II	120
Physiology I	120	Botany and Pharmacognosy I	60
Total hours	450	Elective	45
		Total hours	4
Year 3, 1st semester		**Year 3, 2nd semester**	
Physical chemistry I	90	Physical chemistry pharmaceutical	75
Analytical and instrumental chemistry II	120	Analytical and instrumental chemistry III	75
Organic chemistry III	120	Biochemistry	90
Statistics	45	Industrial processes	105
Botany and Pharmacognosy II	90	Pharmaceutical chemistry & drugs analysis I	90
Total hours	465	Total hours	435
Year 4, 1st semester		**Year 4, 2nd semester**	
Physiological and pathological chemistry I	90	Pathology	60
Social Science	45	Public health	90
Pharmaceutical chemistry & drugs analysis II	120	Jurisprudence	45
Special optional course	60	Pharmaceutical Administration & Economics I	45
Total hours	315	Special optional course	30
		Total hours	270
Year 1, Annual signatures			
Pharmacology and pharmacodynamics	165		
Pharmaceutics	195		
Total hours	360		
Year 5, 1st semester		**Year 5, 2nd semester**	
Bromatology	75	Quality control	75
Microbiology	90	Nutrition	60
Cosmetics	60	Toxicology	45
Pharmacology and pharmacodynamics II	75	Clinical pharmacy	90
Biopharmaceutics and pharmacokinetics	75	Community and hospital pharmacy`	75
Administration and pharmaceutical and Economics II	45	Total hours	345
Special optional course	30		
Total hours	450		
Year 6			
Practice in community pharmacy	240 hours		
Internship	210 hours		
Optional Practice or final research study	6 months		