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IMPLEMENTATION OF CLINICAL PHARMACY IN TÜRKİYE

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Abstract

A program leading to degree of master of science in clinical pharmacy is discussed which is designed to prepare specialist having the basic concepts of clinical pharmacy and skills to conduct researches in drug evaluation.

The program is composed of a didactic session, clerkship and research work (thesis). The didactic session includes courses of biology of diseases, infectious diseases, advanced biopharmaceutics and clinical pharmacokinetics, clinical biochemistry, drug information, drug monitoring, applied therapeutics, immunology, biostatistics and pharmacy practice. Clerkships include the following areas inpatient pharmacy, community pharmacy, internal medicine, pediatrics and surgery. Weekly 3 hours discussion session at college or clerkship site are scheduled to review these experiments.

This program helps to develop leaders in clinical pharmacy in Türkiye and promotes the development of a clinically oriented attitude in students and staff members in the college as well as assist in the stepwise transition from a pharmacy school with primary emphasis on dispensing to a more clinically (patient) oriented pharmacy program.

In this article a suggested B.S. program for faculty of pharmacy in Türkiye and a need for Continuing Education Courses concerning the new roles of pharmacist (clinical pharmacy) were also discussed.

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Key words: Clinical Pharmacy, Pharmacy education, Continuing education, M.Sc. Program, Pharmacy practice.

Introduction

Clinical Pharmacy revolution started 60 years ago. The main mission of clinical pharmacy is promotion and assurance of rational drug use. In the literature there are many studies indicating importance of stepwise introduction of clinical pharmacy education in the curriculum (1-3). Stepwise transition from traditional curriculum will decrease the trauma in old teaching staff and need for large number of clinical staff (4). The pharmacy education in Faculty of Pharmacy in Türkiye is mostly product oriented. For example in Marmara University, there are three sections teaching different topics are heavily product oriented and these sections are as follows (5).

a- Section of Basic Pharmaceutical Sciences:

Includes; Analytical Chemistry, Biochemistry, Pharmaceutical Microbiology, Pharmaceutical Botany, General Chemistry.

b- Section of Professional Pharmaceutical Sciences:

Includes; Pharmacology, Pharmacognosy, Pharmaceutical Chemistry, Pharmaceutical Toxicology.

c- Pharmaceutical Technology Section:

Includes; Pharmaceutical Technology, Cosmetic Sciences.

Depending on pharmacy education in Türkiye and on experiences of many schools in USA, England and others, a M.Sc. Program was developed in Marmara Univ. Faculty of Pharmacy for the first time in 1991 (6-12).

In this article I will discuss my experiences in developing Clinical Pharmacy in Türkiye from three points:

I- Implementation of M.Sc. Program in Clinical Pharmacy in Marmara Univ.

II- Suggested B.S. Program for Faculty of Pharmacy in Türkiye.

III- Continuing Education Program in Clinical Pharmacy in Türkiye.

I- Implementation of M.Sc. Program in Clinical Pharmacy in Marmara Univ.

The aim of this program is to prepare specialist in clinical pharmacy so that they can conduct following functions:

1. Teaching and training of other pharmacists.

2. Share functions with other health care personnel in the team of patient care.

3. Conduct research in different areas related with drugs (Drug evaluation clinical use, toxicity, etc.)

The program requires 2-2,5 years. The program includes following parts:

a. Courses: The following courses given to M.Sc. student within 2 semesters and courses are drug information, advanced biopharmaceutics and pharmacokinetics, clinical pharmacy practice, clinical biochemistry in diagnosis and treatment, clinical pharmacy and therapeutics (applied therapeutics), drug monitoring, biology of diseases, microbiology, infectious diseases, immunology, biostatistics.

b. Clerkships : The clerkships include rounds with physicians and case presentation 15 hours/ week for 2 semesters. The clerkships description are as follows

- Retail Pharmacy (Outpatient) : Students become familiar with the drug trade name and dispensing procedures. Also they get knowledge on Over Counter Drugs (OTC), cosmetics and self medications.

- In-patient Pharmacy : Students get knowledge on unit dose distribution of drugs. IV admixture and total parenteral nutrition (TPN) and all aspects of drug dispensing procedures in the hospital.

- Internal Medicine : Students are exposed to patients and to medical staff. During the ward rounds, the students obtain information on diagnostic procedures and treatments. Student follow the patients and keep full patient profiles (patient medication history, drug history, treatments). The students also have the chance to practice patient education

- Pediatrics : During the ward rounds and attending out-patient pediatric clinics, the students become familiar with many problems in pediatric therapy.

- Surgery : The students become familiar with many surgical procedures and pre-post preparation of the patients. The students obtain a better understanding of need for antibiotic prophlaxis, pain management, electrolyte and fluid balance and drug interactions with anesthesia.

c. Thesis: Thesis include any research work concerned with drugs and diseases. The thesis takes 1-1,5 years and examples of thesis are completed in this program: In vitro evaluation of commercial Co-Trimoxazole tablets, in vitro evaluation of commercial naproxen preparations and its use in pre-menstrual cycle syndrome, studies on gentamicin nephrotoxicity in diabetic rats.

II- Suggested B.S. Program for Faculty of Pharmacy in Türkiye

The courses distribution in Marmara Univ. Faculty of Pharmacy B.S. program until 1994 are shown in Table 1. From 1994 till present a course distribution are shown in Table 2 (5). Both tables indicates that pharmacy education in Türkiye is product oriented and is very far from patient

Table 1. Marmara University Faculty of Pharmacy B.S.Program (Until 1994).

	1.Semester		2.Semester	
	Theoretical	Lab.	Theoretical	Lab.
First year				
General chemistry	2	–	2	2
Physics	3	–	3	–
Mathematics	4	–	–	–
Biology	2	–	2	–
Anatomy	3	–	–	–
Biostatistics	–	–	3	–
Latin for pharmacy students	–	–	2	–
Introduction to Ph.technology	–	–	2	–
Atatürk's principles	2	–	3	–
Turkish	3	–	2	–
Foreign language	3	–	2	–
Computer	2	–	–	–
Second year				
Analytical chemistry	3	6	3	6
Organic Chemistry	3	–	–	–
Biochemistry	–	–	4	3
Physiology	3	–	–	–
Pathology	2	–	–	–
Microbiology	3	3	–	–
Public health	2	–	–	–
Pharmaceutical Botany	–	–	3	4
Third year				
Pharmacognosy	2	3	2	3
Pharmaceutical chemistry	3	4	4	4
Pharmaceutical technology	4	4	4	4
Pharmacology	4	–	3	1
Food analysis	2	3	–	–
Fourth year				
Pharmacognosy	2	3	2	3
Pharmaceutical chemistry	2	4	2	4
Pharmaceutical technology	4	4	4	4
Pharmaceutical toxicology	–	–	3	3
Pharmacy law and management	2		–	–
Medical surgical and first aids	–	–	2	–
History of pharmacy	1	–	–	–
Applied Pharmacology	–	–	2	–
Psychotropic Drugs	2	–	–	–

Table 2. Marmara University Faculty of Pharmacy B.S.Program.

First Year

1.Semester	Theo. + Prac.	2.Semester	Theo. + Prac.
General chemistry	4 + 0	Analytical chemistry I	3 + 4
Physics	3 + 0	Organic chemistry	3 + 0
Biology I	2 + 0	Biology II	2 + 0
Mathematics	3 + 0	Biostatistics	3 + 0
Computer	2 + 0	Anatomy	3 + 0
Latin for pharmacy students	2 + 0	History of pharmacy	1 + 0
Introduction to ph.technology	2 + 0	Foreign language II	2 + 0
Foreign language I	3 + 0	Turkish II	2 + 0
Turkish I	3 + 0	Atatürk's principles	3 + 0
Atatürk's principles I	2 + 0		22 + 4
	26 + 0		

Second Year

1.Semester		2.Semester	
Analytical Chemistry II	3 + 4	Pharmaceutical Botany	3 + 4
Biochemistry I	3 + 0	Biochemistry II	1 + 3
Microbiology	3 + 3	Food Analysis	2 + 3
Physiology	3 + 0	Pathology	2 + 0
	12 + 7	Public health	2 + 0
			10 + 10

Third Year

1.Semester		2.Semester	
Pharmacognosy I	2 + 3	Pharmacognosy II	2 + 3
Pharmaceutical technology I	4 + 4	Pharmaceutical technology II	3 + 4
Pharmaceutical chemistry I	3 + 4	Pharmaceutical chemistry II	4 + 4
Pharmacology I	4 + 0	Pharmacology II	3 + 1
	13 + 1	Cosmetics	1 + 0
			13 + 12

Fourth year

1.Semester		2.Semester	
Pharmacognosy III	2 + 3	Pharmacognosy IV	2 + 3
Ph.technology III	4 + 4	Ph.technology IV	4 + 4
Ph.Chemistry III	3 + 4	Ph.chemistry IV	2 + 4
Pharmacy law and		Applied pharmacology	2 + 0
pharmacy management	2 + 0	Medical Surgical and	
Ph.toxicology	3 + 3	First Aids	2 + 0
	14 + 14	Psychotropic drugs	2 + 0
			14 + 11

orientation. Depending on experiences of other schools, the following stepwise transition from traditional pharmacy school to more clinically oriented pharmacy education is proposed.

Step 1:

Duration: 4 years.

Aim: During this 4 years study, students obtain good pharmaceutical and biomedical education and good training in different areas.

Courses distribution: First, second and third year as in Table 1 and 2 with following changes: Decrease in the hours of traditional courses, decrease in the hours of laboratory and addition of new courses (patient oriented). At fourth year; first semester include addition of new courses e.g. clinical pharmacy, immunology, clinical biochemistry, patient counseling, drug monitoring, biopharmaceutics, clinical kinetics and computer science while at second semester include training in following areas: Clinical (retail pharmacy, hospital training), industrial (drugs and cosmetics), laboratory (microbiology, biochemistry and analytical chemistry).

Step 2:

Duration: 5 years.

Aim: Pharmacy graduate with partial specialization.

Courses distribution: First four years as in the step 1 while at fifth year; first semester include core plus selective courses. The second semester include training in the field of the specialization.

In order to conduct these suggested program, new departments must be developed. e.g. pharmacy practice department, clinical and biomedical sciences section.

III. Continuing Education Program In Clinical Pharmacy In Türkiye

Course Description: One day course was arranged with chamber of pharmacy in two different areas in Türkiye (Ankara, Adana) in 1994. One hundred pharmacists attended the course. The following topics were discussed during the course: Clinical pharmacy education, clinical pharmacy practice, patient education, role of the clinical pharmacist, interpretation of laboratory data, case presentation (diabetes mellitus, asthma), IV admixture program and hospital formulary system.

Course Evaluation: Pre and post questioners were answered by the participant and the result presented were evaluated in percentages.

Results and Discussion: Table 3 shows the pharmacist characteristics. Ninety percent of the pharmacists who attended the program had ages between 20-50 years. There were higher percentage of female pharmacists (66%). The main working areas were in retail pharmacy (52%), followed by hospital pharmacy (22%). Ninety eight percent of pharmacists joint this program indicated the need of continuing education program in Türkiye. Pharmacist's evaluation of various services following the completion of the clinical pharmacy continuing education program were presented in Table 4. Most of the clinical functions of the pharmacists were considered important and participants indicated that these functions must be conducted by the pharmacists.

Fig. 1 shows the pharmacist's opinion in changes of pharmacy education in Türkiye. Before the course, 73 % of the participants indicated the pharmacy education must be changed. After the course 98 % of participants indicated the pharmacy education must be changed. This shows how the continuing education program helps in implementing new ideas.

Table 3 Pharmacist Characteristics

Age	%
20-30	33
30-40	31
40-50	31
50-60	4
60>	1
Sex	
Female	66
Male	34
Professional age	
15>	45
10-15	15
5-10	12
1-5	28
Working area	
Retail pharmacy	52
Hospital pharmacy	22
Industry	1
Laboratory	4
Other	21

Table 4 Pharmacist Evaluation of Various Services Following Completion of The Clinical Pharmacy Continuing Education Program

Clinical pharmacy services	Need for services (%)	
	Needed	Not needed
Administration of drugs	78	22
Supervision of drug administration	97	3
Monitoring of drug therapy	98	2
Patient education	97	3
Nursing in service education	87	13
Drug information	95	5
Patient discharge consultation	70	30
Therapeutic consultation with physicians	89	11
IV additives programme	90	10
Total parenteral nutritional consultation (TPN)	86	14
Drug distribution system (unit dose)	73	27
Medication histories	96	4
Pharmacokinetic consultation	86	14
Quality assurance programme	69	31
Drug utilization review	96	4
Monitoring for adverse drug reaction	97	3

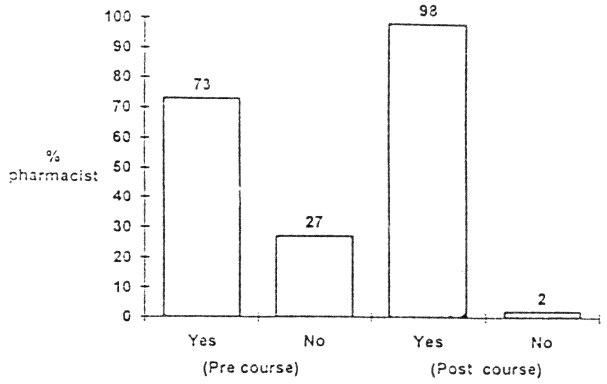

Fig 1. Pharmacist opinion in changes of pharmacy education in Turkiye

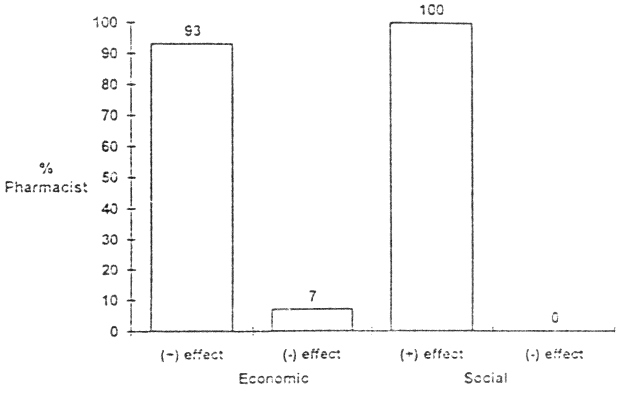

Fig 2. Probable Effect of Clinical Pharmacy Practice on Economic and Social States of The Pharmacist

Fig. 2 shows the potential effect of clinical pharmacy practice on economic and social states of the pharmacists, the participants indicated a positive effect.

Table 5 indicates pharmacist's suggestions for better pharmacy practice in Türkiye. Twenty four percent of participants suggested the education program to be changed, 18 % suggested introduction of clinical pharmacy in the curriculum to improve pharmacy practice.

In conclusion; the introduction of clinical pharmacy in both undergraduate and graduate levels will help creating leaders in clinical pharmacy in Türkiye and will promote the development of clinically oriented attitude in students and staff members. It will also assist the stepwise transition from a pharmacy program with primary emphasis on dispensing to a more clinical (patient oriented) pharmacy program.

The results of pre and post evaluation of a continuing education program indicated that the pharmacist need these clinical functions and they state the need for changes in Pharmacy education in Türkiye towards patient care.

Table 5 Pharmacist suggestions for better pharmacy practice in Turkiye

Suggestions	%
Education program (Changes)	24
Clinical pharmacy	18
Specialization	13
Change in pharmacy law	10
Continuing education program	8
Improvement of the economic states	7
Identification of role of the pharmacist	6
Unity of the pharmacist	6
New roles	3
Effective role in drug industry	2
Chain pharmacy or company	2
Computer	1

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