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Pharmacy education in Iraq: History and developments 1936-2012

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Abstract

Background: Iraq has a population of approximately 30 million and many colleges of pharmacy. The oldest school was opened in Baghdad University in 1936. **Aim:** Our study's aim is to provide a clear review of pharmacy education in Iraq from 1936 to 2012. **Method:** This study selected all public and private universities in Iraq for review. Information was obtained by distributing a validated questionnaire among pharmacy colleges, as well as contacting colleges' representatives to collect more information. **Results:** Iraq has 14 public and 4 private colleges of pharmacy, 5 of which were established in different Iraqi public universities before 2000. All colleges of pharmacy offered bachelor's degree programs, while 5 colleges of pharmacy offered MSc degree program (Baghdad, Mosul, Sulaimani, Hawler and Al-Mustansyriah Universities). In addition, the PhD program was offered in 2 college of pharmacy (Baghdad and Mosul Universities). Now, the percentage of female students in colleges of pharmacy is higher than the percentage of male students. Most of pharmacy colleges have a unified education curriculum except 3 colleges in north of Iraq (Kurdistan region) used different education curriculum. In the last 10 years, the number of pharmacy colleges were increased from 5 colleges to 14 public colleges and 4 private colleges, but this increases in the number of colleges was not positively increases in academic staff in pharmacy colleges, especially in new colleges of pharmacy. After 2007, many Iraqi pharmacists joined to international Universities as a Master and PhD students in different fields of pharmaceutical science. **Conclusion:** In Iraq, the academic and non-academic pharmacists have a strong desire to advance the science and practice of community and hospital pharmacy.

1. History and Growth of Pharmacy Education

Prior to 2000, the growth of publicly pharmacy institutions was very slow. Until early 2000, there were 5 colleges of pharmacy (public universities) offering pharmacy education at the bachelor's and postgraduate's levels. The first college of pharmacy was founded in 1936; it was called the Royal College of Pharmacy and Chemistry. The

college was merged with the University of Baghdad in 1957. Other four colleges were established in different Iraqi universities, as follows: Mosul University in 1964; Hawler Medical University in 1997; Basrah University in 1999; Kufa University in 1999 [1-5].

As shown in Table 1, from 2000 to 2012, thirteen colleges (9 in public universities and 4 private colleges) of pharmacy were established in different Iraqi universities, as follows: Mustansiriyah University in 2000; Tikrit University in 2002; Sulaimani University in 2004; Kerbala University in 2006; Duhok University in 2009; Babylon University in 2010; Anbar University in 2011; Thiqr University and Missan University in 2012. In addition, 4 private colleges of pharmacy were established as follows: Baghdad Pharmacy College established in 2000 by the Iraqi pharmacists union, Al-Yarmouk University College in 2006, Al-Rasheed University College in 2010, and Al-Rafedin University College in 2011 [6- 20].

Our study's aim is to provide a clear review of pharmacy education in Iraq from 1936 to 2012 regarding educational programme, curriculum, students, staffs, Colleges' departments, conferences, and researches.

2. Educational Programs and Curriculum

A variety of pharmacy degree programs are offered in Iraq: Bachelor in pharmaceutical sciences (B.Sc.), High diploma in pharmacy, Masters of pharmaceutical sciences (M.Sc) and Doctor of philosophy in pharmacy (PhD). All colleges of pharmacy offered bachelor's degree programs, while 5 public colleges of pharmacy (Baghdad, Mosul, Hawler, Mustansiriyah, Sulaimani) offered MSc degree program. In addition, the PhD program was offered in 2 public colleges of pharmacy (Baghdad and Mosul). In 1972, Baghdad University offered MSc degree program in 4 areas of pharmaceutical sciences, while the PhD program was offered in 1975 in pharmaceutical chemistry, as shown in Table 1. [2-20]

Five years is the period of study required for bachelor degree in pharmaceutical sciences. While the periods of study

required for master's degree in pharmaceutical science is two years, and the period of doctorate is 3 years. All the graduate and postgraduate programmes are mix-mode programmes (courses and researches) [1].

Table 2 lists the B.Sc curriculum and unites/hours that was revised after 2010 and it is the same across all colleges except the colleges of pharmacy in Kurdistan region. Curriculum change can be undertaken by central governmental committee. The basic pharmacy courses of the program consist of mostly old with many unnecessary topics that are of little practical value. The B.Sc program of most of the universities includes a mix of basic science (such as mathematics, physics, biostatistics, languages, general chemistry, and inorganic/organic chemistry), advanced chemistry and analysis (such as biochemistry, medicinal chemistry, and analytical chemistry) and basic pharmacy (such as clinical pharmacy. Pharmacy practice pharmaceuticals, pharmacology, toxicology, pharmacognosy, and pharmacokinetics).

Table 1. Pharmacy colleges' sponsor, established year, and degree offer.

University Name	Sponsor	Established year	Degree offered
Baghdad	Public	1936	B.Sc, M.Sc, PhD
Mosul	Public	1964	B.Sc, M.Sc, PhD
Hawler Medical	Public	1997	B.Sc, M.Sc
Kufa	Public	1999	B.Sc
Basrah	Public	1999	B.Sc
Mustansiriyah	Public	2000	B.Sc, M.Sc
Baghdad Pharmacy College	Private	2000	B.Sc
Tikrit	Public	2002	B.Sc
Sulaimani	Public	2004	B.Sc, M.Sc
Kerbala	Public	2005	B.Sc
Al-Yarmouk	Private	2005	B.Sc
Babylon	Public	2008	B.Sc
Duhok	Public	2009	B.Sc
Al-Rasheed	Private	2010	B.Sc
Al-Rafedin	Private	2011	B.Sc
Anbar	Public	2011	B.Sc
Thiqr	Public	2012	B.Sc
Missan	Public	2012	B.Sc

Table 2. Bachelor degree curriculum in Iraqi college of pharmacy

Year/Semester	Subject	Total Unites	Theory	practical
1/1	Analytical Chemistry	4	3	1
	Human Biology	3	2	1
	Mathematics and Biostatistics	3	3	0
	Principles of Pharmacy Practice	2	2	0
	Medical Terminology	1	1	0
1/2	Human Anatomy	2	1	1
	Medical Physics	3	2	1
	Organic Chemistry I	4	3	1
	Pharmaceutical Calculation	3	2	1
	Histology	3	2	1
	Human right	1	1	0
2/1	Organic Chemistry II	4	3	1
	Physiology I	4	3	1
	Medical Microbiology	4	3	1
	Physical Pharmacy I	4	3	1

Year/Semester	Subject	Total Unites	Theory	practical
2/2	Arabic Language	1	1	0
	Democracy	1	1	0
	Communication Skills	3	2	1
	Medical Virology and Parasitology	3	2	1
	Organic Chemistry III	3	2	1
	Pharmacognosy I	4	3	1
	Physical Pharmacy II	4	3	1
	Physiology II	4	3	1
3/1	Inorganic Pharmaceutical Chemistry	3	2	1
	Biochemistry I	4	3	1
	Pathophysiology	4	3	1
	Pharmaceutical Technology I	4	3	1
	Pharmacognosy II	3	2	1
3/2	Biochemistry II	4	3	1
	Organic Pharmaceutical Chemistry I	4	3	1
	Pharmaceutical Technology II	4	3	1
	Pharmacognosy III	3	2	1
	Pharmacology I	3	3	0
4/1	Pharmacy Ethics	1	1	0
	Biopharmaceutics	3	2	1
	Organic Pharmaceutical Chemistry II	4	3	1
	Public Health	2	2	0
	Clinical Pharmacy I	3	2	1
4/2	Pharmacology II	4	3	1
	Clinical Pharmacy II	3	2	1
	General Toxicology	3	2	1
	Industrial Pharmacy I	4	3	1
	Organic Pharmaceutical Chemistry III	4	3	1
5/1	Pharmacology III	2	2	0
	Applied Therapeutic I	3	3	0
	Clinical Chemistry	4	3	1
	Clinical Toxicology	3	2	1
	Industrial Pharmacy II	4	3	1
5/2	Organic Pharmaceutical Chemistry IV	2	2	0
	Advanced Pharmaceutical Analyses	4	3	1
	Applied Therapeutic II	2	2	0
	Pharmacoeconomy	2	2	0
	Dosage form Design	2	2	0
	pharmaceutical biotechnology	1	1	0
	Therapeutic Drug Monitoring	3	2	1
	Project undergraduate	1	1	0

Table 3. Number of students, academic staffs and articles

University Name	No. Of students (5 years)		Students accepted in 2012	Students graduated in 2012 ^a	Pharmacist staffs		Non-pharmacists staffs		Articles published per year
	Male	Female			M.Sc	PhD	M.Sc	PhD	
Baghdad	311	670	210	178	61	37	18	8	20-50
Mosul	235	393	222	85	30	10	12	4	< 10
Hawler Medical [*]	-	-	-	-	-	-	-	-	-
Kufa	146	315	107	103	18	4	34	13	< 10
Basrah	195	334	203	70	21	5	44	23	< 10
Mustansiriyah	200	300	125	90	20	12	55	22	< 10
Baghdad Pharmacy College	280	520	150	135	10	2	4	2	< 10
Tikrit [*]	-	-	-	-	-	-	-	-	-
Sulaimani	163	161	80	49	7	1	3	6	< 10
Kerbala	88	188	89	56	8	1	18	12	< 10
Al-Yarmouk	486	304	150	170	5	2	3	0	< 10
Babylon [*]	-	-	-	-	11	2	20	11	< 10
Duhok	72	96	51	-	5	0	3	2	< 10
Al-Rasheed	157	231	160	-	9	5	4	0	< 10
Al-Rafedin	92	135	124	-	5	4	1	3	< 10
Anbar	36	76	76	-	5	1	4	10	< 10
Thiqr	17	37	54	-	5	1	2	2	< 10
Missan	20	20	40	-	1	0	0	2	< 10

^{*}Not enough information^a Not all students graduated from universities

3. Students and Academic Staffs

The number of pharmacy students (under- and post-graduate) varies across universities, cities and from year to year within each program, as shown in table 3. A large number of students graduated in Baghdad (Capital city of Iraq) due to a large number of public and private colleges of pharmacy in Baghdad. The pharmacy education in the public universities is free for Iraqi student. Till 2003, many international students (especially from Arabic countries) accepted as a students in Iraqi colleges of pharmacy [1]

From 1936 to 1994, the number of female students higher than male students, while from 1994 to 2004, there was a higher proportion of male students than female students due to some regulations related to competition between male and female students. Ministry of Higher Education and Scientific Research in Iraq cancelled these competition rules in 2004. Now, the percentage of female students in Iraqi colleges of pharmacy is higher than the percentage of male students [19-20].

Regarding academic staffs, pharmacists and non-pharmacists are working in the colleges of pharmacy as an academic staffs and all the academic staffs must have master or doctorate degree. As shown in table 3, the number of non-pharmacist academic staffs is higher than pharmacist academic staffs in all public Iraqi universities except the staffs in colleges of pharmacy in Baghdad and Mosul universities, that the pharmacists higher than non-pharmacist staffs.

4. College's Departments, Conferences, and Researches

Most of colleges of pharmacy in Iraq consist of six departments: clinical pharmacy, pharmaceutics, pharmaceutical chemistry, pharmacognosy, pharmacology/toxicology, and Basic medical sciences [1].

Although there are many pharmacy departments in each colleges and all the academic staffs have master degree and PhD in the pharmacy, but the scientific conferences, researches, and published articles still lower than expected as shown in table 3.

5. Barriers of Pharmacy Education in Iraq

In the last years, the direction of pharmacist in the world changed from products to the patients care. While the roles of pharmacists in the hospital and community pharmacies have rapidly evolved in other countries, the pharmacy education in Iraq have not adequate to prepare pharmacists as a professional health care. Many barriers to the improvement of quality pharmacy education include:

1. Pharmacy programs focus heavily on the basic sciences and the curriculum is still product oriented. Laboratory-based courses are still seen as an

important method of teaching skills, but clinical training and practical experience have not received adequate attention.

2. There is a lack of qualified pharmacy academics and a poor institutional infrastructure (basic facilities as well as learning and teaching resources are insufficient).
3. There is a lack of new teaching methodologies as Electronic problem based learning (EPBL) , case based learning (CBL), Objective structure clinical examination (OSCE) and others
4. Places in postgraduate clinical pharmacy programs are limited.
5. Continuing pharmacy education (CPE) opportunities for life-long learning for old and new pharmacists are few and not compulsory.

6. Conclusion and Recommendations

With the rapid expansion in the number of pharmacy college and degree programs, ensuring high-quality pharmacy education is a major challenge in Iraq. Identifying the specific needs of Iraq, and using these to develop comprehensive education is considered as a first step towards improving the quality of pharmacy education in our country. Clinical pharmacy education is not integrated into patient care.

To improve the quality of pharmacy education, some strategies include:

1. Set up a national guideline of pharmacy programs for pharmacy colleges to develop curriculum.
2. Promote a new learning and teaching methods.
3. Provide updated textbooks with advanced content.
4. Improve the quality of postgraduate pharmacy programs.
5. Promote cooperation between pharmacy colleges and research centers and hospitals.
6. Train pharmacy academics through cooperation with overseas organizations.
7. Enhance the research capacity of pharmacy colleges.
8. Offer continuing pharmacy education (CPE) to upgrade the knowledge and skills of the pharmacists.
9. Perform quality control and accreditation of pharmacy education programs.

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Conflict of Interest Statement

We would like to declare that there was no conflict of interest in conducting this research.

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