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One hundred years of the history of pharmacy studies in Turkey

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As an inheritor of the rich medico-pharmaceutical heritage in Asia Minor, Turkey constituted a critical junction of exchange and dissemination of pharmacy knowledge between East and West throughout history. This greatly contributed to the rapid development of pharmacy as an established profession. The 20th century saw scholarly examination of the field's history: the first book on the history of pharmacy appeared in Turkish (1911); a history of pharmacy course was offered for the first time in the pharmacy curriculum (1945); the first history of pharmacy museum was founded (1960); and national conferences on the history of pharmacy were launched (1990). In addition to providing information on the milestones of the history of pharmacy studies in Turkey in the last hundred years, this study aims to statistically evaluate the change in the number of history of pharmacy-related publications per decade as well as discuss the current situation of history of pharmacy education at Turkish universities. The history of pharmacy has become a stronger and more independent academic discipline in Turkey, particularly in the last two decades. As of 2014, history of pharmacy undergraduate courses are taught at all faculties of pharmacy in Turkey, except the Yuzuncu Yil University (Van), mainly between first and fourth semesters.

1. Introduction

Turkey possesses a rich medico-pharmaceutical heritage and a unique blend of Eastern and Western medical traditions due to its special location astride Asia and Europe. It is one of the oldest continuously inhabited regions in the world in which a number of major civilizations reigned; including the Hittites, the Phrygians, the Byzantines, the Anatolian Seljuks, and the Ottomans (Tekiner 2009).

Being a receptor of such a rich cultural inheritance, Turkey, previously referred to as *Asia minor*, witnessed the emergence of a stimulating environment, especially for the fields of medicine and pharmacy; the works of Dioscorides of Anazarbus (1st century AD), Aretaeus of Cappadocia (2nd century AD), and Galen of Pergamon (2nd century AD) exemplify this. One of the most prominent recension of these works is the 6th century well-illustrated Greek version of Dioscorides' *De materia medica*, completed in Constantinople about 512, and was presented to the Princess Juliana Anicia (462–527), daughter of the Anicius Olybrius, emperor of the Byzantine Empire (Janick and Stolarczyk 2012). The Battle of Manzikert in 1071, however, culminated with the decline of the Byzantines and gradual Turkification of *Asia minor*. Hence, ancient Greek and Byzantine medico-pharmaceutical knowledge met with shamanistic and Arab-Islamic traditions, which would soon allow a new pharmaceutical climate to flourish (Bayat 2003).

Pharmacies appeared for the first time inside hospitals during the Anatolian Seljuk dynasty between the 11th and 13th centuries. As one of the oldest hospitals comprising a pharmacy, the Gevher Nesibe Darussifasi was built in the city of Kayseri (Caesarea) in 1206 (Tekiner 2006). By following the pharmacy tradition of the Seljuks, the Ottomans maintained the surviving

health institutes from previous centuries and founded others in which pharmacy practices were predominantly based on herbal treatments under the influence of Arab-Islamic medicine. In the Ottoman period, the first European-styled community pharmacies were set up by those who graduated from pharmacy schools around Europe. The first pharmacy, named the Two-Gate Pharmacy (Iki Kapili Eczahane), was opened in the Bahcekapi district of Istanbul in 1757. This was soon followed by others, and the number of pharmacies increased especially after the second half of the 19th century and finally reached 300 when the century ended (Baytop 2000).

Until the middle of the 19th century, pharmacy apprentices were trained under the direction of a master pharmacist. This practice was discarded in 1839 when pharmacy education was offered for the first time at the Imperial School of Medicine (Mekteb-i Tibbiye-i Adliye-i Sahane) in Istanbul. The pharmacy class was founded in this school by Dr. Karl Ambros Bernard (1808–1844), who was invited from Vienna specifically for this purpose (Altintas 1993). Courses were initially given in French, and this continued for nearly 35 years (Tekiner and Mat 2009). The pharmacy class was upgraded to the Pharmacy School (Eczaci Mektebi) in 1909 and then to the Faculty of Pharmacy (Eczacilik Fakultesi) in 1962 (Baytop 2001). While all these developments enriched Turkey's pharmaceutical heritage, it was not until the first quarter of the 20th century that studies on the history of pharmacy would begin.

2. History of pharmacy studies in Turkey

2.1. Milestones in the history of pharmacy studies

Apart from short articles in French on the history of pharmacy appearing in the early 1900s in Ottoman medical journals like

the *Revue Médico-Pharmaceutique*, the first book on the history of pharmacy, the *History of Drugs and Treatments (Edviye ve Tedavi Tarihcesi)*, appeared in Turkish in 1911. It was written by Tevfik Vacid (1858–1935), a military physician and professor of pharmacology at the Ottoman School of Medicine in Istanbul (Etiker 2000; Gunergun 2003). This 71-page book covers the period between antiquity and Galen's time (Vacid 1911). Even though it was stated on the cover that it was the first volume, our findings suggest that the second volume never appeared.

A year later, pharmacist Nail Halid [Tipi] (1886–1957) published the *Pictorial Yearbook of Pharmacists (Musavver Eczaci Nevsali)* that also provides rich biographical accounts of some famous Turkish pharmacists and chemists as well as some other history of pharmacy-related subjects (Halid 1912). In 1914, partly due to World War I, publications on the history of pharmacy ceased and it was not until 1927, four years after the proclamation of the Republican regime, that new articles were to reappear in a pharmacy journal named the *Turkish Pharmacists' World (Turk Eczaci Alemi)*. Thanks to pharmacist Fuad Mehmed [Mirel] (1901–1996), who wrote a series of articles spanning from the history of quinine to the life of a pioneer Turkish pharmacist, Ethem Pertev Bey (1871–1927), Turkish pharmacists' interest in the history of pharmacy reawakened. Beginning in 1932, articles on the history of pharmacy began to appear regularly in Turkish pharmacy journals like the *Pharmacologist (Farmakolog)*, the *Chemist (Kimyager)*, the *Clinics of Therapy (Tedavi Seririyati)*, and others.

In 1945, a history of pharmacy course was given for the first time in Turkey, this subject will be discussed in the following chapter in detail. Four years later, pharmacist Remzi Kocaer (1904–1977) published a pictorial almanac that included lists of pharmacy school graduates and a detailed biographical account on Turkish pharmacists (Tekiner 2008).

In terms of pharmacy museums, several attempts were made in the 1950s to collect historical objects from old pharmacies and pharmacists to create a new museum for the history of Turkish pharmacy. This museum was founded in 1960 by Turhan Baytop (1920–2002), professor of pharmacognosy and former dean of the Istanbul University Faculty of Pharmacy. His private collection initially constituted the core of this museum which was also enriched with different objects taken from some old pharmacies as well as the court pharmacy of the Topkapi Palace in Istanbul (Tekiner 2008). A recent study indicates that the earliest drugs in the collection of this museum are the first local preparations of the Ottoman era, namely the Syrup of Pertev and the Elixir of Sureyya, among a total of 1167 drugs in the collection of which 27% were produced by 102 Turkish drug companies (Hayiroglu and Mat 2014).

In Turkey, currently there are 15 pharmacy museums in four different categories: I) museums opened within the universities, (i.e., Ankara University, Ege University in Izmir, Hacettepe University in Ankara, Istanbul University, Marmara University and Yeditepe University in Istanbul); II) museums opened by drug companies, (i.e. Abdi Ibrahim Drug Company and Mustafa Nevzat Drug Company in Istanbul); III) museums opened by foundations or institutes, (i.e. Museum of the Surp Pirig Armenian Hospital Foundation in Istanbul and the Eagean History of Pharmacy Museum in Izmir); and IV) personal museums created by businessmen or pharmacists like Rahmi M. Koc (Istanbul), Niyazi Capa (Eskisehir), and pharmacist Melih Ziya Sezer (Istanbul) (Mat and Tekiner 2014).

In 1990, the first national conference on the history of Turkish pharmacy (NCHTP) was organized in Istanbul. This was followed by 10 other conferences held almost biannually, as will be mentioned in the following chapter in detail.

In 2011, Turkey's first national group for the history of pharmacy, the Turkish Research Group for the History of Pharmacy

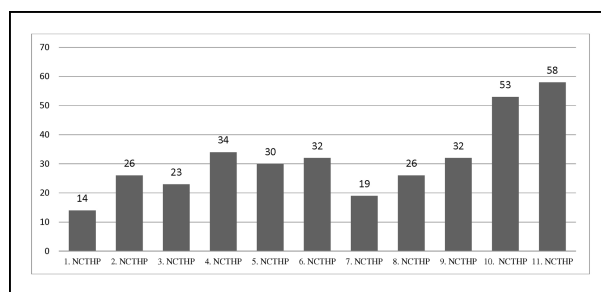


Fig. 1: Number of communications presented at the NCHTPs, 1990–2014.

(TETAG), was founded by Afife Mat, Mert Sandalci and Halil Tekiner. TETAG soon became a member of the International Society for the History of Pharmacy (ISHP). It organized many events, including a joint conference with the French Society for the History of Pharmacy on May 2, 2011, in Istanbul, and history of pharmacy excursions to places in Turkey, such as the Asklepon of Pergame (Izmir) from 4th century BC, the Gevher Nesibe Darussifasi (Kayseri) from the 13th century, and the Bajazet II Darussifasi (Edirne) from the late 15th century.

In 2013, the first independent department for the history of pharmacy in Turkey was founded at the Istanbul University Faculty of Pharmacy (Mat 2014a). Furthermore, the 42nd International Congress for the History of Pharmacy (ICHP) is going to be organized on September 8–11, 2015, in Istanbul.

2.2. National conferences on the history of Turkish pharmacy

It was in May 1990 that the first NCHTP was held in Istanbul under the guidance of Turhan Baytop. A total of 14 communications were presented at this meeting, which was also attended by some 70 French pharmacy historians (Gul and Tekiner 2014). This event was followed by 10 other conferences held nearly biannually in different cities of Turkey (Table 1).

NCHTPs were usually held in the last week of May or the first week of June. A majority (5) of the NCHTPs were organized in Istanbul, which were followed by Ankara (2) and Eskisehir (2), then Izmir (1) and Kayseri (1). The number of communications presented in the first 7 NCHTPs varied between 14 and 34; while this number continually increased thereafter and finally reached the highest point in the 11th NCHTP with a total of 58 communications (Fig. 1).

Over the course of 11 conferences, a total of 347 communications were presented by 176 researchers, seven of whom were the following foreign researchers: Alain Legrand (France); Alois Kernbauer (Austria); Christiane Staiger (Germany); Marcel Chaigneau (France); Michèle Nicolas (France); Mona Khorshidtalab (Iran); and Sabine Anagnostou (Germany). Among the top three researchers with highest number of communications presented at the NCHTPs are Seref Etiker (21 communications), Afife Mat (19 communications), and Halil Tekiner (19 communications).

The proceedings of conferences were not published regularly; only 165 of the oral and poster presentations appeared as full articles in print. The subjects of these presentations included biographies of pharmacists or important figures in the field of pharmacy (14%); folkloric medicine, history of medicinal plants and flora research (14%); pharmaceutical manuscripts, books, and pharmacopoeias (13%); historical pharmacies (7%); history of the pharmacy education (6%); history of the medications and pharmaceutical forms (5%); history of pharmacy museums (5%); and miscellaneous topics.

Table 1: Dates, venues and host universities of the NCHTPs, 1990–2014

| Conference no. | Date | Venue | Host University | Total no. of communications |
|------------------------|----------------|-----------|------------------------------|-----------------------------|
| 1 st NCHTP | 11 May 1990 | Istanbul | Istanbul University | 14 |
| 2 nd NCHTP | 6–7 May 1994 | Ankara | Gazi and Ankara Universities | 26 |
| 3 rd NCHTP | 3–4 June 1996 | Eskisehir | Anadolu University | 23 |
| 4 th NCHTP | 4–5 June 1998 | Istanbul | Marmara University | 34 |
| 5 th NCHTP | 22–24 May 2000 | Izmir | Ege University | 30 |
| 6 th NCHTP | 5–7 June 2002 | Istanbul | Istanbul University | 32 |
| 7 th NCHTP | 27–28 May 2005 | Ankara | Gazi University | 19 |
| 8 th NCHTP | 29–30 May 2008 | Istanbul | Marmara University | 26 |
| 9 th NCHTP | 24–26 May 2010 | Eskisehir | Anadolu University | 32 |
| 10 th NCHTP | 6–8 June 2012 | Istanbul | Istanbul University | 53 |
| 11 th NCHTP | 26–28 May 2014 | Kayseri | Erciyes University | 58 |
| | | | | <i>Total 347</i> |

2.3. History of pharmacy medals and awards

Shortly before the first NCHTP, Turhan Baytop proposed a medal named after Avicenna to be given a foreign researcher who has significantly contributed in promoting the history of pharmacy at the international level. The first medal was given to Henri Bonnemain, president of the French Society for the History of Pharmacy and an attendee of the abovementioned conference in 1990 (Baytop 1990). The second medal was given to Michèle Nicolas, a French pharmacy historian and a turcologist, in Eskisehir in 1996. The third and last medal was given to Finn Sandberg (1920–2011), a Swiss pharmacognosist, in Istanbul in 2000 (Table 2).

Upon Baytop's suggestion in 2002, this medal was substituted with a new award named after Hamdi Bey (1855–1909), the first Turkish community pharmacist of the Ottoman era who set up his pharmacy in 1890 in the Zeyrek district of Istanbul, and soon became popular among his colleagues so that to be called as the paragon of pharmacists (*seyhul eczacıyan*) (Baytop 2000). The Pharmacist Hamdi Bey Awards were given to Gulnur and Mert Sandalci (2002), Halil Tekiner (2010), Emre Dolen (2012), and Afife Mat (2014) (Table 2).

Apart from this award, Turkish pharmacy magazine named the *Pharmacist (Eczaci)* has annually given pharmacy awards in many categories, including the history of pharmacy. This award is the Golden Mortar Award. The Golden Mortar Awards in the History of Pharmacy were offered to Nese Kirimer (2010), Afife Mat (2011), Mehmet Gonenc (2012), and the Eskisehir Chamber of Pharmacists (2013) (Table 2).

2.4. Publications on the history of pharmacy

The number of history of pharmacy-related publications appearing between 1911 and 2010 is 1274. The great majority (91.6%) of these publications are in Turkish while the rest include English (4.1%), French (3.2%), German (0.7%) and Italian (0.4%). There was a significant increase in the number of publications appearing, especially in the 1990s, almost three times more than the previous decade (Fig. 2). One of the main reasons for this was the NCHTP conferences (Ozcelikay and Tekiner 2009).

In terms of publication trends, the following subjects were mostly studied: biographies of pharmacists or important figures in the field of pharmacy (24%); folkloric medicine, history of medicinal plants and flora research (10.4%); pharmacy in the times of the Seljuks and the Ottomans (6.8%); pharmaceutical manuscripts, books, and pharmacopoeias (6.5%); historical pharmacies (6.3%), and others.

The Turkish academic peer-reviewed journals that accept history of pharmacy-related articles are as follows: *Studies in*

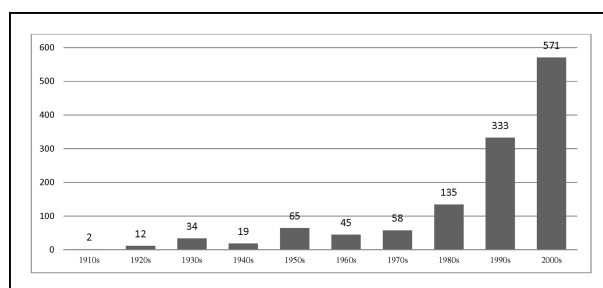


Fig. 2: Number of history of pharmacy-related publications per decade, 1910–2010.

Ottoman Science, Türkiye Klinikleri Journal of Medical Ethics-Law and History, Lokman Hekim Journal of History of Medicine and Folkloric Medicine, and New History of Medicine Studies. Generally since 2000, some pharmacy magazines like *Denge, Eczaci, and Hedef Saglik* have also shown interest in the history of pharmacy and have dedicated a special column to it.

3. History of pharmacy education in Turkey

A history of pharmacy course was offered for the first time at Istanbul University School of Pharmacy during the seventh semester of the 1945–1946 academic year and met two hours per week. Even though it was an obligatory course, students were exempted from a final examination (Maskar 1951; Mat 2014b). As of 2014, there are 23 faculties of pharmacy within 18 public and five private universities, offering pharmacy education in Turkey. The students admitted to faculties of pharmacy per year numbers approximately 1,760 (Tekiner 2014). All these faculties of pharmacy except the Yuzuncu Yil University Faculty of Pharmacy (Van), offer history of pharmacy courses as part of their core curricula, meeting one or two hours per week from the first to the ninth semesters, mainly before the fourth semester (Table 3).

In contrast with other universities, history of pharmacy is an elective course at Erzincan University (Erzincan), Istanbul Kemerburgaz University (Istanbul) and Trakya University (Edirne). Moreover, although their contents are different, the course is given together with pharmacy deontology and ethics under the name History of Pharmacy and Deontology or History of Pharmacy and Ethics at 15 faculties (65%). As an exception, a joint course entitled History of Pharmacy and Introduction to Pharmacy is given at Inonu University (Malatya).

In terms of European Credit Transfer and Accumulation System (ECTS), a standard for comparing the study attainment and performance of students of higher education in EU countries,

Table 2: History of pharmacy medals and awards offered in Turkey, 1990–2014

| Name of the Award | Year | Name of the Recipient | Nationality | Reason for Award |
|----------------------------------|------|--|-------------|--|
| Avicenna Medal (I) | 1990 | Henri Bonnemain (1911–2006) | French | contributions to the history of pharmacy at the international level |
| Avicenna Medal (II) | 1996 | Michèle Nicolas (1941) | French | academic studies focusing on French contributions on the modernization process of the Ottoman pharmacy |
| Avicenna Medal (III) | 2000 | Finn Sandberg (1920–2011) | Swiss | academic studies focusing on the history of natural remedies |
| Pharmacist Hamdi Bey Award (I) | 2002 | Gulnur (1959) and Mert Sandalci (1958) | Turkish | history of pharmacy collection published in a 9-volume catalogue |
| Pharmacist Hamdi Bey Award (II) | 2010 | Halil Tekiner (1983) | Turkish | bibliographical studies focusing on the history of pharmacy in Turkey |
| Pharmacist Hamdi Bey Award (III) | 2012 | Emre Dolen (1945) | Turkish | contributions to history of pharmacy education in Turkey |
| Pharmacist Hamdi Bey Award (IV) | 2014 | Afife Mat (1952) | Turkish | establishing the first independent chair for the history of pharmacy in Turkey |
| Golden Mortar Award (I) | 2010 | Nese Kirimer (1952) | Turkish | establishing a pharmacy museum at the Anadolu University Faculty of Pharmacy in Eskisehir |
| Golden Mortar Award (II) | 2011 | Afife Mat (1952) | Turkish | reorganizing the Istanbul University History of Pharmacy Museum |
| Golden Mortar Award (III) | 2012 | Mehmet Gonenc (1970) | Turkish | commissioning the first and only statue of Galen of Pergamon in the old town square of Pergamon, Izmir |
| Golden Mortar Award (IV) | 2013 | Eskisehir Chamber of Pharmacists | Turkish | sponsoring a book on the history of pharmacy in Eskisehir |

ECTS-credits given to the history of pharmacy undergraduate course at Turkish Universities vary from 1 to 4 as follows (Table 3): 1 ECTS (17.4%); 2 ECTS (39.1%); 2.5 ECTS (4.3%); 3 ECTS (13%); 4 ECTS (21.7%). Since the Yuzuncu Yil University, however, does not offer this course, no ECTS (4.3%) were given in their curriculum.

The Istanbul University Faculty of Pharmacy has the sole independent department for the history of pharmacy; consequently, in other faculties, this course is usually taught by academic staff from different disciplines in pharmacy without any specialty in the history of pharmacy.

A survey conducted in 2007 indicates that the intended purposes of this course are explained by the academic staff as follows: I) understanding the concept of the history of profession; II) gaining new perspectives on pharmaceutical issues of the past; III) acquiring the ability to learn lessons from the history of profession; IV) being willing to obey ethical and deontological rules; V) acquiring the ability to solve potential ethical and deontological problems in practice (Ozcelikay et al. 2007).

Furthermore, it has been observed that the history of pharmacy course lecturers have been referring to the following books: *The History of Pharmacy* (1968) by Nasid Baylav; *Courses on the History of Pharmacy* (1970) by Bedii Sehsuvaroglu; *The History of Pharmacy* (1982) by Aysegul Demirhan (1945); *The*

History of Turkish Pharmacy (1985, 2000) by Turhan Baytop; and *Course Notes on the History of Pharmacy* (1995, 1998) by Emre Dolen. Despite some slight differences, course contents are similar between different faculties. Courses mainly focus on the following topics: general history of pharmacy (separation of the profession from medicine, the progression of the profession in Europe, etc.); history of pharmacy during the Arab-Islamic period, the Anatolian Seljuks (1075–1318); the Ottoman Empire (1299–1922) and the Republic of Turkey (1923 to the present) (Ozcelikay et al. 2007).

4. Discussion

NCHTPs are propeller of the history of pharmacy studies in Turkey. These conferences not only allow pharmaceutical historians to meet and exchange their knowledge and expertise but also draw a national attention to different issues of the history of pharmacy. According to a recent survey based on the ISHP online database for oral presentations related to the history of pharmacy; Turkey is the fourth most active country (69 oral presentations) after Germany (549), the UK (155), and the USA (121). It was followed by France (68), Switzerland (64), Poland (59), Hungary (54), and Austria (50) (Staiger 2011). It is note-

Table 3: History of pharmacy courses given at faculties of pharmacy in Turkey, 2014

| Name of the Faculty | Name of the Course | Semester | Credit (ECTS) |
|--|--|-------------|---------------|
| Agri Ibrahim Cecen University Faculty of Pharmacy | History of Pharmacy & Deontology | 3. semester | 2 ECTS |
| Anadolu University Faculty of Pharmacy | History of Pharmacy | 1. semester | 2.5 ECTS |
| Ankara University Faculty of Pharmacy | History of Pharmacy & Deontology | 3. semester | 2 ECTS |
| Ataturk University Faculty of Pharmacy | History of Pharmacy & Deontology | 4. semester | 1 ECTS |
| Bezm-i Alem University Faculty of Pharmacy* | History of Pharmacy & Deontology | 1. semester | 2 ECTS |
| Cumhuriyet University Faculty of Pharmacy | History of Pharmacy & Ethics | 1. semester | 4 ECTS |
| Dicle University Faculty of Pharmacy | History of Pharmacy & Deontology | 3. semester | 2 ECTS |
| Ege University Faculty of Pharmacy | History of Pharmacy & Deontology | 5. semester | 1 ECTS |
| Erciyes University Faculty of Pharmacy | History of Pharmacy & Deontology | 3. semester | 1 ECTS |
| Erzincan University Faculty of Pharmacy | History of Pharmacy** | 6. semester | 2 ECTS |
| Gazi University Faculty of Pharmacy | History of Pharmacy & Deontology | 7. semester | 2 ECTS |
| Hacettepe University Faculty of Pharmacy | History of Pharmacy & Deontology | 1. semester | 3 ECTS |
| Inonu University Faculty of Pharmacy | History of Pharmacy & Introduction to Pharmacy | 1. semester | 4 ECTS |
| Istanbul Kemerburgaz University Faculty of Pharmacy* | History of Pharmacy** | 7. semester | 4 ECTS |
| Istanbul Medipol University Faculty of Pharmacy* | History of Pharmacy | 3. semester | 1 ECTS |
| Istanbul University Faculty of Pharmacy | History of Pharmacy & Deontology | 8. semester | 2 ECTS |
| Karadeniz Teknik University Faculty of Pharmacy | History of Pharmacy & Deontology | 1. semester | 4 ECTS |
| Marmara University Faculty of Pharmacy | History of Pharmacy | 9. semester | 3 ECTS |
| Mersin University Faculty of Pharmacy | History of Pharmacy & Deontology | 8. semester | 2 ECTS |
| Trakya University Faculty of Pharmacy | History of Pharmacy & Deontology** | 7. semester | 4 ECTS |
| Yeditepe University Faculty of Pharmacy* | History of Pharmacy & Deontology | 8. semester | 3 ECTS |
| Yeni Yuzyil University Faculty of Pharmacy* | History of Pharmacy | 2. semester | 2 ECTS |
| Yuzuncu Yil University Faculty of Pharmacy | not offered | – | – |

* privately operated ** selective course

worthy that apart from Turkey, national meetings on the history of pharmacy are organized regularly by national societies for the history of pharmacy in many of these countries, especially in Germany, France, and the UK. Therefore NCHTPs are recommended to be continued; to be organized regularly in different locations, particularly in the cities where a faculty of pharmacy is located.

In terms of education, history of pharmacy course deserves a special importance in today's pharmacy curriculum. In addition to getting to know their intended profession better, students also have an opportunity to benefit from the experiences of the past, gain a different professional and intellectual perspective and understand a common heritage, strengthening their solidarity and allegiance with other colleagues.

As of 2014, history of pharmacy undergraduate courses are taught at all faculties of pharmacy in Turkey, except the Yuzuncu

Yil University (Van), usually in the first or second year of the curriculum. This was probably due to a misinterpretation of the course syllabus by administrator faculty members who decide on the program whether the course's scope covers the introduction of the profession to new students. The case of Inonu University (Malatya) might be the best example of this perception since the course given there is entitled History of Pharmacy and Introduction to Pharmacy. The situation is very similar to faculties of pharmacy in many other countries (i.e., Bulgaria, Germany, Poland, UK, and USA) where history of pharmacy courses are usually offered during the first academic year (Colaizzi 2011; Helmstädter 2011; Medical University of Sofia 2014; Medical University of Warsaw 2014). This approach, however, has many disadvantages, such as pharmacy students in their early years lack the basic knowledge on different fields of pharmacy, hence are not truly eligible to understand scientific discoveries

in different disciplines such as chemistry, pharmacology, pharmacognosy, etc. Therefore, this course is recommended to be given not before the third year. For instance, history of pharmacy course is offered at the University of Rouen (France) in the fourth year and at the Cardinal Herrera University in Valencia (Spain) in the fifth year (Bertomeu-Sánchez 2007; Universidad Cardinal Herrera 2014).

The second problem is the inability of faculties of pharmacy to offer a specialization in the history of pharmacy. While an independent department for the history of pharmacy was recently founded, neither master's nor PhD programs are offered there or in any other faculties of pharmacy in Turkey due to a lack of academic staff. This also answers why history of pharmacy courses are given by academics from other disciplines in pharmacy (i.e., pharmacognosy, pharmaceutical chemistry, and pharmacy management). This presents a huge contrast with the situation in Germany where four different universities offer a PhD program in history of pharmacy on a regular basis and 82% of lecturers of this course possess a PhD in history of pharmacy (Helmstädter 2011). Apparently, the best way to overcome this problem should be collaborating with medical historian academics at faculties of medicine until a sufficient number of qualified pharmacy historians has been educated.

In terms of course materials, although there are five books on the history of pharmacy published between 1968 and 2002, none are currently available except in libraries and secondhand book-sellers. Furthermore, contents of these books do not always fit with the needs of history of pharmacy undergraduate courses since they comprehensively focus on the development of pharmacy profession in Turkey more than any other significant drug discoveries and pharmaceutical inventions occurred in foreign countries in history. Therefore, Turkish pharmacy historians should publish new course books with a broader perspective, which should also appeal to students.

As a result, the history of pharmacy has become a stronger and more independent academic discipline in Turkey, particularly in the last two decades. Yet the future of the history of pharmacy studies lies primarily in its success to be well-established within the academy, and then its ability to attract pharmacy students' interest should grow. Faculties of pharmacy can also help to ensure the survival of pharmaceutical legacy by procuring master's and PhD programs in the history of pharmacy and facilitating their use.

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