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REVIEW ARTICLE

TRANSFORMING PHARMACY EDUCATION IN UNANI SYSTEM OF MEDICINE: A CRITICAL EVALUATION OF ANCIENT, PRESENT, AND FUTURE

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Abstract

This review article illuminates; a brief historical outline of the origin, evolution and current scenario of the Unani system of Medicine (USM) and *Ilmul Saidla* (Pharmacy), major issues in Pharmacy (Unani) education, training, practice, including lacunas in; course, curriculum, research, and innovation. The promising and constructive revolutionary idea of the educational system that should be implemented by the establishment of the Bachelor, Master, Doctor of Pharmacy, and Doctor of Philosophy degrees in Pharmacy (Unani) is also given. The objective of this futuristic vision is to produce skilled pharmaceutical professionals in USM to meet the requirements of Unani pharmaceutical industries, supervision of dispensaries of hospitals, public healthcare services and to upgrade the text and knowledge of Pharmacy (Unani). This paper offers a unique opportunity to spark meaningful discussions, encourage critical reflection, and guide strategic planning, making it an essential resource for the ongoing enhancement of the new Pharmacy education system in USM, to achieve impactful and positive outcomes.
Keywords: Education policies, Pharmacy (Unani), *Ilmul Saidla*, Unani.

INTRODUCTION

We are entrenched in the 21st century, an era marked by rapid transformations in lifestyle with each passing day. This is particularly evident in the domain of scientific advancement, where groundbreaking innovations and discoveries are made daily, continuously reshaping our existence. The Unani System of Medicine (USM), intricately linked to human health, has undergone a parallel evolutionary process[1]. As human civilization progressed, USM too evolved, adapting and expanding through various phases to attain its contemporary state.

Medical history verifies that USM is one of the most accepted systems of cure throughout the world from the pre-historical era to till date, but due to unfavorable circumstances, this universal medical science has been squeezed, personalized and encircled as Eastern medicine. Later on, the Eastern world too took it as a glossary of their culture but not as a universal and progressive medical science. As a result, the credibility and use of knowledge of USM faded over time[2].

The core principles of USM are grounded in the laws of nature, which can be regarded as timeless truths. However, footprints are ephemeral and do not endure for long and new times necessitate novel changes; USM belongs to the same realm. In the contemporary age of scientific and technological advancements, ancient texts on pharmaceutical formulations and the preparation of Unani medicines warrant comprehensive re-evaluation, revision, and refinement with respect to novelties, especially with the help of advanced pharmaceutical scientific facts. Theories, concepts and principles of Pharmacy described in USM should be reconsidered with due demand and in accordance with the need of the hour[3].

Arab scholars were very logical in the execution of the knowledge, its development and application. They were the first to propose the vision of detaching pharmacy from medicine and they successfully implemented this approach in their era[1]. Modern medicine also followed their precedent and kept pharmacy separate from medicine in their system of education. The same concept and vision must have been pursued by the recent scholars of USM, but may

be due to various constraints, it could not be enacted. To strengthen USM and make it more progressive, it is very essential to construct new education policies in the field of Pharmacy (Unani). This approach will be highly conducive to the development and advancement of USM, facilitating progress in research, uncovering new dimensions, and actively addressing them. Advanced pharmacy knowledge should be integrated with the fundamental principles of pharmacy of USM to enhance its acceptance among the masses at national and international levels. In the following sections, a brief historical outline of the origin, evolution and current scenario of USM and *Ilmul Saidla* (Pharmacy), major issues in teaching and learning of Pharmacy in USM including lacunas in the course, curriculum, research, and innovation are discussed[4].

Outline of foundation and advancement of Unani system of medicine: Greek logician and philosopher, Buqrat also known as Hippocrates (460-370 BC) was the first to establish medical concepts based on a logical and practical methodology[2,3]. In the 4th century BC, under the rule of the Greek emperor Alexander the Great, the first formal medical curriculum was founded and instructed at the School of Alexandria, in a city situated along the Mediterranean coast. Herophilus (Father of Human Anatomy), 325-255 BC, and Erasistratus, (Father of Physiology) 304-250 BC, were the leading scholars of this institution[4,5].

Galen, also referred to as Jalinus was a prominent physician and scholar in ancient Rome whose contributions to the preparation and formulation of medicinal substances significantly influenced Western pharmacology for over 1,500 years. His name remains associated with a category of pharmaceuticals, known as Galenicals, which are compounded through mechanical processes. Galen was also the first to develop methods for extracting and utilizing the active components of plants. Many procedures pioneered by Galen have analogs in contemporary compounding laboratories[6]. Hence, he is considered as the father of polyherbal pharmaceutical preparations. Since that period, Greek and Arab physicians have diligently refined Galen's techniques and have innovated new dosage forms to meet ever-evolving demands. Under the Roman Empire, Greek medical knowledge underwent further refinement and was subsequently patronized to a great extent by the Sassanian Empire, particularly during the reigns of Shapur and Khosrow I (Nausherwan)[7,8,9].

After the 5th century AD Arabs nurtured and nourished different kinds of knowledge including Medicine for the next 700 years, from the 6th to 13th Century AD, covering the Umayyad dynasty (660-750 AD) and the Abbasid dynasty (750-1258 AD). Harun al-Rashid (786-809 AD) founded a monumental center of intellectual and scholarly activity in Baghdad during the Abbasid period, known as Baital-Hikmah (House of Wisdom). This institution was an epicenter of medicine and a beacon of various other subjects of education in its era. The conquest of the Roman and Persian empires by the Arabs strengthened the development of Greco-Arab medicine in these territories[9,10,11]. The physicians of this transformative period made groundbreaking inventions of techniques such as calcination, fermentation, distillation, and sublimation and also compiled an official formulary named *Aqrābāzeen*. Various eminent physicians like Geber also known as *Jabir bin Hayyan* (721-815 AD), *Rabban Tabri* (810-895 AD), *Rhazes* also known as *Abu Bakr al Razi* (AD 850-923), and *Haly Abbas* known as *Ali ibn Abbas Majusi* (930-994 AD) belong to this era. Avicenna/Ibn Sina (980-1037 AD), the preeminent scholar and physician of his epoch, promulgated the influential *"Al-Qanoon fit-Tibb"* (The Canon of Medicine). This seminal work was widely referenced, translated into many languages, and remained a staple in European medical curricula until the 17th century[3,4,9,12,13].

Evolution of the *Unani System* of medicine in the Indian sub-continent:

In the mid-14th century AD, as the Mongol invasions ravaged Central Asia and Persia, numerous scholars of USM migrated to India. Supported by the Khilji, Tughlaq, and Mughal dynasties, these experts facilitated the dissemination of USM throughout the Indian subcontinent[6,9,14]. Prominent physicians of this period were Zia Mohd Masood Rasheed, who Contributed to healthcare in the Tughlaq dynasty, and Ali Gilani (1554-1609 AD), a celebrated physician and esteemed medical authority at the court of Akbar the Great. Gilani authored several influential books leaving a significant impact on the field. S.M. Hashim Alvi Khan (1669-1749 AD) authored 16 exceptional treatises on Indian medical systems. Azam Khan (1813-1902 AD), a renowned Unani practitioner in the British colonial period in India, composed the notable works *"Ikseer-e-Azam"* and *"Muheet-e-Azam,"* these books hold a prestigious place in ancient text of Unani medicine to this day. Kabeeruddin (1889-1976 AD) rendered 88 pivotal Unani manuscripts from Arabic and Persian into Urdu, with his erudite translations forming the foundation of academic instruction in numerous Unani institutions across the Indian subcontinent[7,9,15,16].

Unani medicine faced a profound decline during British rule, largely owing to the discontinuation of state support and patronage. Though, assistance and support of the Azizi lineage of Lucknow, Usmani family of Allahabad, the Shareefi clan of Delhi, patronage of Nizam of Hyderabad, and the Hamdard family in Delhi helped in ensuring the survival of Unani medicine in the late 18th and the dawn of 19th centuries.

The Shareefi family of Delhi produced several shining stars in the USM. For Instance, M. Shareef Khan (1725-1807 AD) and Mahmood Khan (1819-1891 AD), started a school for USM in Delhi, Ajmal Khan (1863-1927 AD), established 'Hindustani Dawakhana', a pharmaceutical company of Unani medicine in Delhi in 1905 AD. He undertook the analysis of Asrol (Rauwolfia serpentina) to derive its various alkaloids such as Ajmalin, Ajmalacin, Ajmalanin and Reserpine, which were found to be efficacious for controlling hypertension. He founded the All India Vedic and Unani Tibbi Conference in 1906 AD to address stringent policies of British authorities towards Indian

Systems of Medicine (ISM). Additionally, he established a College of Unani Medicine for female students in Delhi in 1911 AD and a general college for Ayurveda and Unani Medicine named Ayurvedic and Unani Tibbia College in Karol Bagh, New Delhi, India, in 1916. In 1920 AD, He constituted a Council intending to reform the Unani curricula and foster a culture of rigorous research and intellectual innovation within the discipline[7,9,17].

Some renowned Unani physicians from the Azizi family of Lucknow, India; like Abdul Aziz and Abdul Lateef also had bright visions for USM. Abdul Aziz (1855-1911 AD) built Takmil-ut-Tibb College for the Unani System of Medicine in Lucknow, India, in 1902. Abdul Lateef (1900-1970 AD) was highly acclaimed for his work *Kitabun-Nabz*, and his *Urdu* rendition of *Avicenna's* treatise, *Advia Qalbia*[7,14,18]. The Usmani family of Allahabad also gave well-known thinkers of USM like Ahmad Husain Usmani and Hammad Ahmad Usmani during the 20th century A.D. They started a College for USM in Allahabad, India. [7,14]

Abdul Majeed (1883-1922 AD) started Hamdard Dawakhana in Delhi, India, in 1905, one of the prime Unani pharmaceutical companies in the Indian sub-continent currently. His elder son, Abdul Hameed (1908-1999 AD), established Jamia Hamdard in Delhi, India (1989 AD), while the younger son, Mohammad Said (1920-1998 AD) set up Hamdard University in Karachi, Pakistan (1985 AD), both institutions were established with the main aim to advance and strengthen education and training of USM[19,20,21].

Unani System of Medicine (USM) in India today: At present, USM and its Pharmacies have become an essential part of the Indian System of Medicine (ISM) and play an essential part in the National Health Plan (NHP), which is governed by Ministry of AYUSH, Government of India[22]. India is the chief and prime country across the globe where the research, development, and education of USM is at its peak with a bright future. We can say that India nowadays is the center of USM to the world. There are more than 58 colleges of education and research for USM in India approved and regulated by the National Commission of Indian System of Medicine (NCISM), where graduation courses named Bachelor of Unani Medicine and Surgery (B.U.M.S.) and some of these institutions also offer post-graduate courses namely, Doctor of Medicine/Masters in Surgery (MD/MS) in USM [23,24] National Institute of Unani Medicine in Bengaluru (in 2004 AD) and Ghaziabad (in 2023 AD) are also established by Govt. of India for the inclusive and extensive research and development in USM.

Government bodies like the "Central Council for Research in Unani Medicine" (CCRUM) and the "National Commission for Indian System of Medicine" (NCISM) erstwhile known as Central Council of Indian Medicine (CCIM), administer, regulate, standardize and promote the education and research policies in USM[23,24,25]. Drug Standardization Research Unit (DSRU), at New Delhi; Central Research Institute of Unani Medicine (CRIUM), at Hyderabad; Drug Standardization Research Institute (DSRI), at Ghaziabad; Regional Research Institute of Unani Medicine (RRIUM), at different cities of India have been established by Govt. of India for the pharmaceutical research of USM especially. The Standardization of approximately 300 single drugs and about 400 compound formulations; physicochemical standards of more than 350 compound drugs has been done, with the publication of National Formulary of Unani Medicine in six volumes encompassing standards of nearly 1228 formulations[26,27]. The standardization of drugs is also undertaken by competent institutions of central government e.g. Pharmacopoeial Laboratory for Indian Medicine (PLIM), Pharmacopeia Commission of Indian Medicine and Homeopathy (PCIMH), Unani Pharmacopeia Committee (UPC) and CCRUM, Hyderabad[28].

In India presently, there are more than 485 licensed pharmacies for the manufacture and preparation of Unani medicinal products, out of which 88 are certified with Good Manufacturing Practice (GMP). Manufacturing and sale of Unani drugs are governed by Drug & Cosmetic Act 1940 with strict adherence to GMP. In the private sector, Hamdard Laboratories (India) stands as the preeminent enterprise, endowed with cutting-edge pharmaceutical technology and a resolute focus on Research & Development in Unani pharmacy. It is closely followed by Dawakhana Tibbiya College Aligarh, Dehlvi Remedies, New Shama Laboratories (P) Ltd, Rex (U&A) Remedies Pvt. Ltd, and others, all of which have secured a notable share of the capital market over the past few years, both domestically and internationally. Additionally, Govt. of India also established "Indian Medicine Pharmaceutical Corporation Limited" (IMPCL) for the production of herbal formulations which is one of the primary manufacturers of Unani preparations delivering to the requirements of Central Government Unani dispensaries[26,27].

***Ilmul Saidla* (Pharmacy):** Etymologically, *Ilmul Saidla* (Pharmacy) is the science of preparing and dispensing drugs, in Arabic language it is called as *Ilmul Saidla* (which is composed of two words i.e., Ilm which means knowledge and Saidla means Pharmacy). The transliteration of *Ilmul Saidla* is 'Ilm al-Ṣaydala, it can also be called as Dawā Sāzī or Ṣaydna[29]. *Ilmul Saidla* is defined as that "it is a science in which various single drug/drugs are rendered into a suitable dosage form by composition/mixing and analysis for therapeutic indications. It deals with every aspect of the collection, identification, purification, processing, detoxification, enabling drug delivery, dosage form development and potentiating their actions, until the final stage of formulation." This system of medicine employs various pharmaceutical techniques to enhance the palatability, assimilation, absorption, metabolism, and excretion of drugs, while also ensuring the safety, effectiveness, and quality of both individual drugs and compound formulations[30].

Drugs obtained from plants, animals and minerals are infrequently administered or dispensed to patients in their natural states Instead, they are meticulously transformed into formulated dosage forms designed to guarantee consistent product quality, precise dosage

administration, predictable therapeutic outcomes, ease of prescription and usage, and enhanced patient adherence to prescribed instructions[31].

The term pharmacopeia was coined by *Dr. Foes* in 1561 A.D. A pharmacopeia is an authoritative compendium that delineates directions for the authentication of specimens and the preparation of compound medicines, issued under the aegis of a governmental body or a recognized medical or pharmaceutical society[32]. Similarly, the term *Qarābādhīn*/*Aqrābādhīn* was derived from an *Arabic* word *Aqrābāzeen*[33].

In India, the Ministry of AYUSH has officially approved fourteen *Qarābādhīn* (pharmacopoeias), pivotal to the regulation and standardization of Unani medicinal formulations. These pharmacopeias, which are instrumental in preserving the integrity of Unani medicine, include works such as *Al Qarābādhīn, Al Qarābādhīn-e Jadeed*, and *Bayaz-e-Kabeer* Volume II, both authored by *Kabeeruddin*, *Elaj-ul-Amraz* written by Shareef Khan. Other distinguished texts include *Kitab al-Taklees* by *Kabeeruddin* and *Sanat ul Taklees* authored by *Abdul Hafeez*, *Ma'dan al-Akseer* by *Firozuddin*, and *Makhzanul-Murakkabat* by *Ghulam Jelani*. The National Formulary of Unani Medicine and Unani Pharmacopoeia of India, both compiled by CCRUM. Additional notable works include *Qarābādhīn-e-Azam* by *Azam Khan*, *Qarābādhīn-e-Kabeer* by *Mohammad Husain Khan*, and *Qarābādhīn-e-Qadri* by *Akbar Arzani*. These pharmacopeias are indispensable to the practice and advancement of Unani medicine in India, ensuring the precision and quality of therapeutic formulations[34,35].

Mostly all *Unani* pharmacopeias broadly classify Unani Classical Dosage Forms (UCDF) into four broad categories: (1) Jamid Advia (Solid dosage forms), (2) Neem Jamid Advia (Semi-solid dosage forms), (3) Saiyyal Advia (Liquid dosage forms), (4) Bukhari Advia (Gaseous dosage forms)[36-40]. These dosage forms are given below in tabular form (Table 1).

Table 1: Unani Classical Dosage Forms (UCDF) Described in Unani Classical Text: [29,36-38,40-45]

S. N.	***Jamid* (Solid formulations)**	***Neem Jamid* or *Neem Saiyal* (Semi Solid or Semi Liquid)**	***Saiyal* (Liquid)**		***Bukhari* (Gas or Vapours)**
1.	*'Aṭūs* (Snuff)	*Fālūda*	*Naqū'/Khīsānda* (Infusion)	*Sa'ūṭ* (Nasal drop)	*Bakhūr/ Dhūnī* (Incense)
2.	*Barūd* (Eye dusting powder)	*Ḍimād* (Poultice)	*Maḥlūl* (Solution)	*Gharghara* (Gargle)	*Shamūm* (Olfaction)
3.	*Damam* and *Argaja*	*Anoshdārū* (Gooseberry based Electuary)	*Mā' al-'Asal* (Honey water)	*Ṣibgh/Ṣibgha* (Dye)	*Inkibāb, Bhapara* (Vapour bath)
4.	*Firzaja* (Vaginal pessary)	*Dawā' al-Misk* (Musk based Electuary)	*Sharāb/Khamr* (Wine)	*Pāshoya* (Foot bath)	*Lakhlakha* (Inhalation)
5.	*Fatīla* (Bougie)	*Qayrūṭī* (A kind of ointment)	*Nashūq* (Liquid Snuff)	*Naḍūḥ* (Spray)	*Tadkhīn* (Fumigation)
6.	*Ghāliya* (Perfumed powder)	*Barsha'shā* (Opium Electuary)	*Dohan (Oil)*	*Wajūr* (Throat drop)	-
7.	*Ghāza* (Face powder)	*Ma'jūn* (Electuary)	*Sharbat* (Syrup)	*Ābkāma* (a type of fermented condiment)	-
8.	Kushta (Calx)	*Yāqūtī* (Ruby based electuary)	*Mā' al-Jubn* (Whey)	*Ṭilā* (Liniment)	-
9.	*Ḥabb* (Pill)	*Jawārish* (Digestive electuary)	*Dayāqūza* (Poppy rind- and seed based medicinal preparation)	*Sakūb* (Irrigation)	-
10.	*Halva* (Sweet)	*Mufarriḥ* (Exhilarant Electuary)	*Mā' al-Sha'īr/Āsh-i-Jav* (Barley water)	*Masūḥ* (Oily liquid preparation)	-
11.	*Ḥamūl* (Pessary)	*Marham* (Ointment)	*Mā' al-Fawākih* (Fruit juice)	*Ḥammām* (Bath)	-
12.	*Kabūs* (Disc-shaped preparation for local application)	*Labūb* (Kernel based electuary)	*Qaṭūr* (Drops)	*Naṭūl* (Irrigation)	-
13.	*Kuḥl/Surma* (Collyrium)	*Lazūq/Laṣūq* (Adhesive medicine)	*Laṭūkh* (Epithem)	*Ḥasw/Ḥarīra* (Semi-liquid preparation with high nutrient value)	-
14.	*Maḍūgh* (Masticator)	*Khamīra* (Blended whitish and frothy preparation)	*Ḥalīb* (Emulsion)	*Maḍmaḍa* (Mouth wash)	-
15.	*Mishtri*	*Itrifal*	*Sirka* (Vinegar)	*Khiḍāb* (Hair dye)	-

Cont..

16.	*Murabbā/ Parvarda* (Fruit preserve)	*La'ūq* (Linctus)	*Nabīdh* (Type of non-intoxicating fermented drink)	*Zarūq* (Syringing)	-
17.	*Nafūkh* (Insuflation)	*Tiryāq* (Anti-dote)	*Mā' al-Buqūl* (Vegetable juice)	*Huqna* (Enema)	-
18.	*Nawra* (Hair remover/ Depilatory)	*Kājal* (Eyeliner/Topical Ophthalmic medicament)	*Sikanjabīn* (Oxymel)	*Zulāl* (Decanted liquid)	-
19.	*Qurṣ* (Tablet)	*Amrūsiyā* (Saffron based electuary)	*Rūḥ* (Essence)	*Ghasūl* (Washing lotion)	-
20.	*Rubb* (Dry Extract)	*Anqardiyā* (Marking Nut based Electuary)	*Maṭbūkh/ Joshānda/ Sūlāqa* (Decoction)	*Marūkh* (Oil based liniment)	-
21.	*Safūf* (Powder)	*Gulqand* (Flower preserve)	*Tamrīkh* (Embrocation/anointing)	*Dalūk* (Rubbing agent)	-
22.	*Sanūn/Manjan* (Tooth powder)	*Gulangbīn* (Rose petal conserve)	*Lu'āb* (Mucilage)	*Roghan* (Oil)	-
23.	*Shiyāf* (Suppository)	*Ubtana* (Semi-solid oily preparation for local application)	*Qaṭūr-i-Chashm* (Eye Drops)	*Ābzan* (Sitz bath)	-
24.	*Sardārūj/Sardārū* (Powder drug meant for sprinkling)	-	*Qaṭūr-i-Udhun* (Ear Drops)	*Qaṭūr-i-Anf* (Nasal Drops)	-
25.	*Dharūr* (Dusting powder)	-	*Mā' al-Sha'īr Muḥammaṣ* (Water of Roasted Barley)	*Mā' al-Laḥm* (Distillate of meat)	-
26.	*Bunduqa/Banādiq* (Big Pill)	-	*Mā' al-Sha'īr Mulḥam* (Water mixture of barley and meat)	*Mā' al-Rā'ib* (Curd water)	-
27.	*Bāsalīqūn* (Vision improver)	-	*Dawṣ* (Water repeatedly treated with iron)	*Mā' al-Ḥadīd* (Iron treated water)	-
28.	-	-	*Jullāb* (Preparation of rose water and sugar)	*Shīra* (Milky emulsified product)	-
29.	-	-	*Mazīj* (Mixture)	*Dar Bahra* (Liquid - product prepared by fermentation)	-
30.	-	-	*'Araq* (Distillate)	*'Ūṣāra/Afshurda* (Extract)	-
31.	-	-	*Fuqqā'* (Barley beverage)		-

Focusing solely on Unani Classical Dosage Forms (UCDF) as described in the field of Pharmacy (Unani) (Table 2), there are more than hundreds of medicinal formulations based upon botanical, mineral, and animal ingredients present that are prescribed for the various bodily conditions in every possible and effective dosage forms. Every UCDF has its own principles of formulation, processing and medicinal properties described in the Unani classical text of Pharmacy.However, most of the UCDFs are readily embraced by the majority of patients as their preferred option. Hence, it is critical to innovate and convert these dosage forms into potential novel dosage forms through the application of advanced pharmaceutical technologies to increase their; efficacy, patient compliance, duration of drug activity, bioavailability, solubility, pharmacological activity and application. To work on these formulations, in terms of their analysis of conventional processing with the advanced pharmacy, one has to research in various dimensions on each classical dosage form, which will require many years. A single form has various parameters to research with respect to its physio-chemical analysis, pharmaceutical approach, pharmacokinetics, pharmacodynamics and many more. To reform these UCDFs, the scholars of USM have to construct a well-oriented platform to make it possible in upcoming decades. The hypothetical but practical approach to strengthen and consolidate Pharmacy (Unani), especially in terms of educational research policies is discussed in the upcoming sections.

Current prospects of educational policies in pharmacy (Unani): In India, formal Pharmacy (Unani) education is included in the bachelor course of USM named Bachelor of Unani Medicine and Surgery (B.U.M.S.). Its minimum standard of education (MSE),

course and curriculum is regulated by the National Commission of Indian System of Medicine (NCISM) and governed by the Ministry of AYUSH, Govt. of India[51]. A two-year diploma in *Ilmul Saidla* (Pharmacy)-Unani is also available which is also under the patronage of above said commission and ministry[52]. There is also a postgraduate degree in *Ilmul Saidla*, i.e., M.D. *Ilmul Saidla* after acquiring a bachelor's degree (B.U.M.S.) in different institutions such as Ayurvedic and Unani Tibbia College, Karol Bagh, New Delhi, National Institute of Unani Medicine (NIUM) Bangalore, India, Ajmal Khan Tibbia College, AMU, UP, etc[53]. These institutions have proactively harnessed cutting-edge technologies in the field of pharmaceutical research, but the net result is not up to mark in terms of utilization and benefits to the healthcare system.

Table 2: Unani classical dosage forms and their inventor[46-50].

S. N.	Dosage Form	Inventor
1.	*'Araq* and *Kushta, Anoshdārū*	Arab physicians
2.	*Afluniya*	Aflin
3.	*Afluniya Mahmoodi*	Imam Uddin Mohd Sheerazi
4.	*Anqarooya, Amrūsiyā, Ayarij*	Buqrat
5.	*Barsha'shā, La'ūq* and *Huqna*	Jalinus (Galen)
6.	*Barūd*	Salpanoos
7.	*Ḍimād*	Egyptian
8.	*Ḥabb, Banādiq*	Asqalibayus
9.	*Ḥabb-e-Qoqaya, Majun Sara,*	Jalinūs
10.	*Ḥabb-e-Zahab*	Ibn Sina
11.	*Ḥamūl, Firzaja* and *Fatīla*	Bukhtishu
12.	*Itrifal Zamani*	Mir Mohd Muhammad Momin
13.	*Itrifal, Quṛṣ, Majun Flasafa*	Andromachus II
14.	*Jawarish* and *Gulqand*	Iranian physicians
15.	*Jawarish Baladur, Namak Sulemani*	Suleman
16.	*Khamīra*	Unani Physicians of Mughal Era
17.	*Kushta Halzoon*	Rofas
18.	*Kushta Marjan, Kushta Sadaf*	Ateenoos Romi
19.	*Kushta Marvareed*	Arkhatoos
20.	*Kushta Sammul-far, Kushta Shangraf*	Jabir Ibn Hayyān
21.	*Kushta Ṭilā*	Imhotep
22.	*Kushta Zamrad*	Arkhajinas
23.	*Ma'jūn*	Hermes
24.	*Majun Baladuri*	Zakariya Razi
25.	*Namak*	Greek Physician
26.	*Safūf*	Arastu
27.	*Sharbat, Sikanjbeen, Bāsalīqūn, Kuḥl*	Feesagorus (Pythagoras)
28.	*Sharbat Deenar*	Ibn Deenar
29.	*Tiryāq Farooque*	Andromachus I

In the current ongoing syllabi of research of post-graduation in Pharmacy (Unani), we should follow the steps described below. Every newer research idea, drug dosage form discovery, and novel work done by a research scholar of *Ilmul Saidla* must undergo the required set protocols i.e. pre-clinical research, Clinical trials, Regulatory Approval at the national and international echelons, Manufacturing processes, and Post-market surveillance, should be systematically integrated to ensure that mankind can reap the benefits of innovative approaches of the USM. The research undertaken should not remain confined to its preliminary stages. Multidisciplinary, interdisciplinary, and sustained research endeavors must be pursued within the post-graduate departments of *Ilmul Saidla* (Pharmacy) in Unani institutions across India to elevate the status of USM. Any novel research hypothesis or protocol must adhere to the requisite methodological steps. If time constraints are a limiting factor, institutes and research councils within USM could initiate a propagative research continuum. If a research scholar at the institutional level be unable to advance an innovative concept to its conclusive form within the limited timeframe of post-graduate study (three years as per the NCISM curriculum), the ongoing research should be perpetuated by a subsequent research scholar or continued by the original or other researchers through structured projects or fellowships. Unani research councils, such as the Central Council for Research in Unani Medicine (CCRUM) under the Ministry of AYUSH, Government of India, must augment and broaden research schemes, fellowships, and support, particularly in providing access to modern pharmaceutical laboratories, advanced equipment, and other critical resources, thereby facilitating the progression of ongoing research towards a conclusive and productive outcome[54].

The product (medicinal novel form) must undergo *in-vivo* and *in-vitro* studies. After that, this product must be approved by clinical branches of the institutions where the post-graduation department is ongoing. The researchers of clinical branches should take these products for their research/thesis work. So that we could avail the research data on human subjects about the efficacy of that product. Then after getting satisfactory data and results, institutes should communicate with the councils and Unani drug manufacturers associations like UDMA to discuss the

result of their research work to incorporate that output into the USM and explore the product's new dimensions with respect to further steps regarding the application and acceptance of newer work. By doing this we can give an applied approach to USM, otherwise, the net result of all the hard work would remain zero until and unless, it is applied.

Educational policies of Modern Pharmacy: Bachelor's degrees in pharmacy have been awarded in the U.S. since at least the 1930s. The University of Southern California pioneered the implementation of the Pharm D program in 1950, followed by the University of California, San Francisco, which adopted the same in 1955. In 1992, the American Association of Colleges of Pharmacy (AACP) formally recognized the Pharm D as the exclusive professional degree in pharmacy, thereby rendering the Bachelor of Science in Pharmacy obsolete. Subsequently, in 1997, the American Council on Pharmaceutical Education (ACPE)- the authoritative body responsible for establishing educational standards and accrediting pharmacy schools in the United States, decreed that they would no longer accredit Bachelor of Science programs effective in 2000 and all colleges of pharmacy had to convert to the Pharm D as the sole professional degree. Since 2000, the ACPE has periodically revised its accreditation standards for colleges and schools of pharmacy[56].

If we talk about modern pharmacy in India, In 1948, the Pharmacy Act[57] was enacted in India as the nation's first legislation to establish the Minimum Standard of Education (MSE) qualifications for pharmacy aimed at regulating the practice, education, and profession of pharmacy. The provisions of the Act are administered by the Pharmacy Council of India (PCI)[58]. The Act mandates that each state establish its state pharmacy councils, entrusted with the authority to oversee and register pharmacists within their respective jurisdictions. The pharmacy education landscape in India offers a diverse range of programs across various levels, from diploma to doctoral studies, each catering to different specializations within the field. Below is a comprehensive overview of the courses and degrees available in modern pharmacy.

At the diploma level, the Diploma in Pharmacy (D. Pharm) is a two-year program, which encompasses a variety of specializations. These include Diploma in Ayurvedic pharmacy, diploma in unani pharmacy, diploma in pharmacy technician, diploma in clinical pharmacy, diploma in pharmaceutical pharmacy, diploma in herbal pharmacy, and diploma in AYUSH Pharmacy, each providing a foundational education in their respective fields.

At the undergraduate level, the Bachelor of Pharmacy (B. Pharm) is a four-year course that prepares students for careers in pharmaceutical sciences. Various specializations within this program include B. Pharm in Pharmaceutical Chemistry, B. Pharm in Pharmacognosy, B. Pharm in Ayurveda, B. Pharm (Hons), and B. Pharm in Pharmaceutics.

For those seeking advanced knowledge, the Master of Pharmacy (M. Pharm) is a two-year program available to students who have completed their B. Pharm degree. The second year of this program is research-oriented, culminating in a dissertation. Specializations available under M. Pharm include Pharmacology, Pharmaceutics, Pharmacognosy and Phytochemistry, Pharmaceutical Chemistry, Quality Assurance, Pharmaceutical Biotechnology, Pharmaceutical Analysis, Pharmaceutical Technology, Pharmacy Practice, Industrial Pharmacy, Biopharmaceutics, Drug Regulatory Affairs, and Hospital & Clinical Pharmacy.

In addition to M. Pharm, other postgraduate options include the Master of Science in Pharmacy (M. Sc Pharm) and the Master of Technology in Pharmacy (M. Tech Pharm), which offer further expertise in various pharmaceutical domains. For those with a deep interest in research, the Master of Philosophy in Pharmaceutics provides an advanced level of study in the field of pharmaceutical sciences.

The Doctor of Pharmacy (Pharm D) is a six-year course designed for students aiming for a comprehensive education in pharmacy. For post-baccalaureate students, the Pharm. D program is a three-year option. This program prepares individuals for clinical roles, offering them an in-depth understanding of pharmacy practice and patient care.

At the highest level of academic achievement, students with a Master of Pharmacy (M. Pharm) degree may pursue a Doctor of Philosophy in Pharmacy (PhD). This program typically requires a minimum of three years of additional study and research. Specializations within the PhD program include pharmacology, pharmacology with specialization in pharmacy practice, pharmaceutics, pharmaceutics with specialization in quality assurance, pharmacognosy & phytochemistry, pharmacognosy and phytochemistry with specialization in pharmaceutical biotechnology, phytopharmacy & phytomedicine, pharmaceutical chemistry, medicinal chemistry, pharmaceutical chemistry with specialization in pharmaceutical analysis, and pharmaceutical medicine. It is important to note that Ayurveda has adopted a similar structure in its pharmacy education system, offering both a Diploma in Pharmacy in Ayurveda and a Bachelor of Pharmacy in Ayurveda as part of its curriculum.

These varied programs, from foundational diplomas to advanced doctoral studies, offer a comprehensive and specialized education in pharmacy, allowing individuals to pursue careers in numerous sectors of the pharmaceutical industry, clinical research, and academia[59-62].

Regulations and Quality Issues: Modern Pharmacy education in India is regulated by the following administrative bodies: Pharmacy Council of India (PCI)[58], under the Pharmacy Act of 1948, and All India Council for Technical Education (AICTE)[64], which was established under the AICTE Act of 1987. The Pharmacy Council of India (PCI) formulates regulations pertaining to the Minimum Standard of Education (MSE) required for qualifying as a pharmacist. It is tasked with the registration of individuals who meet the prescribed eligibility criteria (at least a D Pharm) and the issuance of licenses authorizing them to practice within Indian states. Registration activities are decentralized, with state

pharmacy councils holding responsibility for the registration of pharmacists within their respective regions. Consequently, the PCI oversees the regulation of the D. Pharm program as well as the recently established Pharm D program. The B. Pharm program, however, must be recognized by the PCI for its qualifications to be valid for registration purposes. The PCI does not exercise authority over M. Pharm or other advanced academic degree programs[65].

Pharmacy education at all levels, excluding the Pharm D, is overseen by the All-India Council for Technical Education (AICTE), and all such programs must receive its approval. The AICTE plays a pivotal role in planning, formulating, and maintaining standards in technical education, including the field of pharmacy. In addition to the Pharmacy Act, pharmacy practice is also regulated by the Drugs and Cosmetics Act of 1940[66], which governs the manufacturing, distribution, and sale of pharmaceuticals. At present, no specific regulatory bodies or controls exist for clinical pharmacy practice. Furthermore, the AICTE is responsible for ensuring the quality of pharmacy programs (D. Pharm, B. Pharm, and M. Pharm) through accreditation by the National Board of Accreditation (NBA), which operates under the aegis of the AICTE.

CONCLUSIONS

The USM, originated in *Greece* and came to *India* in the 14th century after availing the patronage of Persian and Arab Empires for about 700 years. The traditional form of *Ilmul Saidla* should now be revisited for a possible refinement, wherever required, in the light of advanced knowledge and technologies available in modern pharmacy and allied sciences. Modern medicine has potentiated with the help of the advancement of pharmacy. The high rate of acceptance of modern medicine is just because of their modern pharmacy. It became possible due to the distinct systematically designed discipline of pharmacy since last many centuries. On the other hand, USM has been carrying its traditional pharmacy for more than the last 1000 years, which is the main cause behind the low acceptance of the system. It is not going to be easy to fill the huge gap but if USM accepts, follows, and executes the same educational and research policies and structure of course and curriculum (that is being practiced and applied in conventional medicine), USM can reach where it must be in coming few decades.

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AUTHORS' CONTRIBUTION

Amreen: Conceptualized the study, conducted the literature review, synthesized the findings and wrote the manuscript. **Saleem MN, Siddiqui AI:** critical feedback and contributed to the revision of the manuscript, ensuring the accuracy and clarity of the final version. Final manuscript was checked and approved by all authors.

DATA AVAILABILITY

The data will be available to anyone upon request from the corresponding author.

CONFLICT OF INTEREST

The authors have no competing interests to disclose.

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