

# Hakim Mohammad: A Persian Military Surgeon in Safavid Era (1501–1736 CE)

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## Abstract

**Background** Wars and injuries have accompanied mankind throughout history. Physicians and surgeons from various civilizations made difficult attempts to manage wounds and injuries. Among various civilizations, the Persian Empires had great armies which were well equipped. One of the most important organizations in Persian troops was the military surgery. **Methods** This study presents a brief biography of Hakim Mohammad (a military surgeon in Safavid era) and introduces his book, *Dhakhira-yi-Kamilah*.

**Results and Discussion** Safavid kings (1501–1736 CE) with unifying all of Persian regions and provinces reconstructed the Persian Empire. Great scholars and physicians were raised in this era. It seems that Persian physicians and surgeons were well trained in Safavid era and many of them were even employed by other countries like Ottoman Empire and India. Hakim Mohammad as a military surgeon was one of such physicians who served in Ottoman Empire for some time. He gathered his surgical experiences and others in the book of *Dhakhira-yi-Kamilah*. This book was written in Persian. He has mainly written about the management of wounds and practical techniques. Later, he came back to his homeland and dedicated his book to the king of Persia.

## Introduction

Hippocrates (460–370 BCE) said: “He who wishes to be a surgeon should go to war” [1, 2]. Great wars were usually accompanied with many wounded. Furthermore, surgical experiences obtained in these wars have led to advance methods of wound treatment. In other words, without the help of military surgery, the science of surgery would not have progressed as much as today [2]. Warfare, wound and surgeon are intimately interlinked through all of history [3]. The growth of medico-military management helped armies to win in wars [4, 5]. History reveals that military surgery has grown by supporting a strong central government in the field of medicine, resulting in excellent services to both military and community.

Although military surgery has achieved significant progresses in recent centuries [6, 7], the treatment of wounds and fractures should be related to events from earliest human history [5].

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Egyptian evidences show the history of military medicine came back as early as 2600 BCE. They had methods for treatment of wounds and traumas. Also, these evidences mentioned that the Egyptian physicians used the splint in bone fractures for the first time in history [8]. In Assyrian Empire (2500 BCE–612 BCE), military surgery was carried out by a group of physicians occupied at the royal court in Mesopotamia. It was created by the military state, and for the first time in recorded history, an army was equipped with adequate medical facilities by military state [5].

In mythology, Homer mentioned wound management in the Trojan War (thirteenth-century or twelfth-century BCE) in his epic poem, Iliad (circa 700–800 BCE). He wrote about the treatment of numerous war wounds sustained during the battle of Troy and described 130 wounds [9, 10].

The role of military medicine is outstanding in the Persian antique cultural history, which is a combination of myths, drama and facts. Based on old Persian literature, Freidoon (*Treata*)—known as the first Persian surgeon—with knife, fire and several herbal remedies treated wounded soldiers. Also, based on the *Shahnameh* (the book of Kings, the most famous epic poem-drama in Iranian literature), Simorgh treated Rostam wounds at his war with Esfandiar, the Persian prince [11]. Also, there were global and great Empires who ruled Persia in ancient era. Achaemenid Empire (550–330 BCE), the Parthian dynasty (274 BCE–224 CE) and the Sassanid Kingdom (224–637 CE) had large and powerful armies [12]. Military medicine and providing solutions to health issues for the soldiers were the main priorities for the Persian army, in order to sustain their ability and continued success [13]. There are many quotes of Persian kings like Cyrus the great (circa 600–530 BCE) and the Achaemenid Emperor on the importance of military medicine in the historical texts like Cyropaedia [14]. Also, Herodotus pointed that in contrast of Greeks, Persians used clean dressing on the wounds of soldiers in the Achaemenid era [12]. According to Herodotus report, myrrh dressings and flaxen bandages were utilized for wound healing in Persian armies [15].

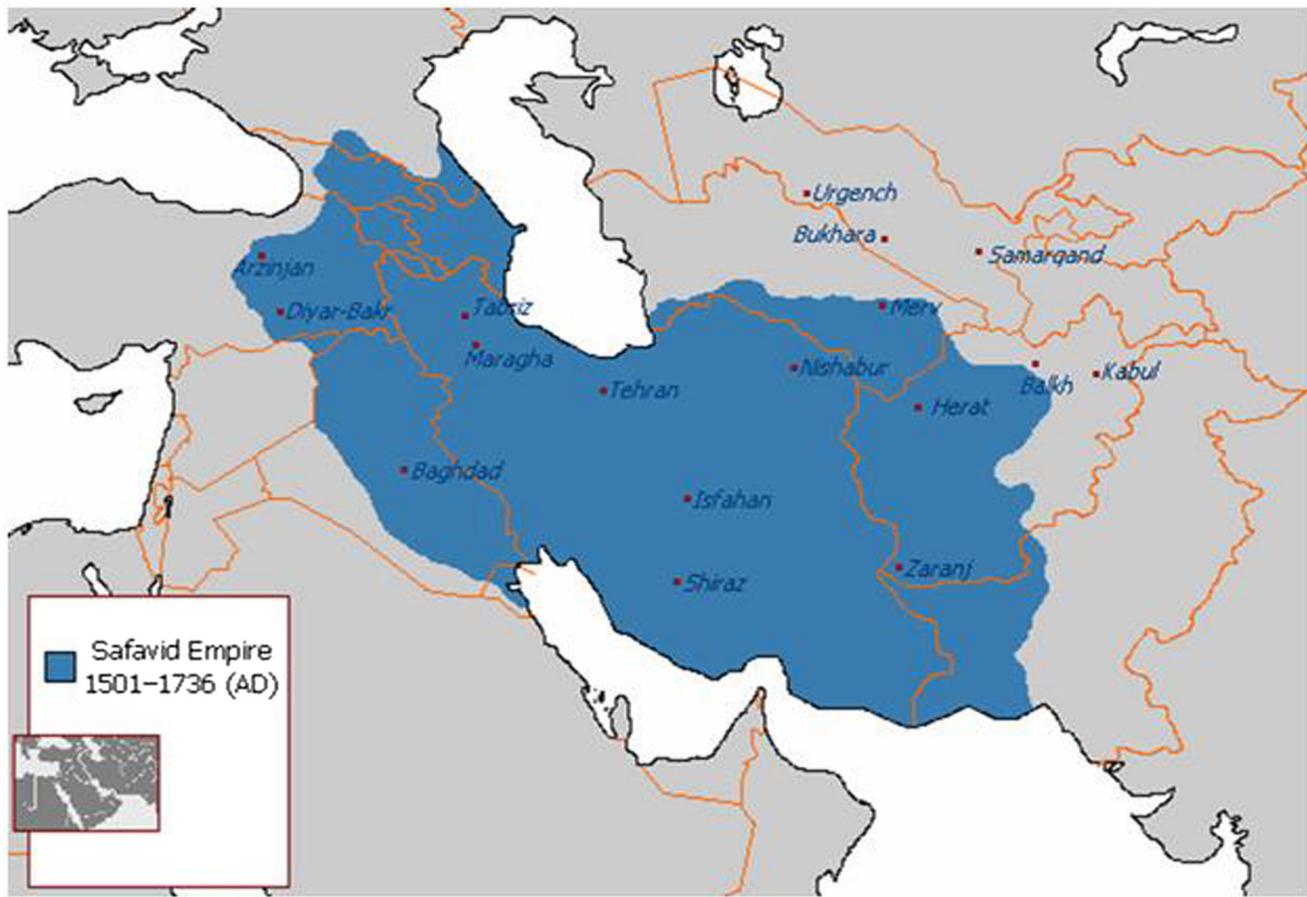
One of the most important priorities in ancient Persian armies was the health of soldiers in order to continue their victories and keep their power. Also, in all these areas, prevention was prior to treatment and was more affordable [13]. To this end, Melampus-Persian physician proposed iron fillings to be added to the soldiers' drinks in year 400 BCE to increase their potency for the first time [16]. Additionally, disability rehabilitation was important, and the first recorded utilization of prosthesis was related to the use of a wooden prosthesis for a Persian soldier's leg in the year 484 BCE [17].

Later, in Islamic era when Sassanid kingdom, the last ancient Persian Empire in pre-Islamic age was ended by Muslims in 637 CE, a large number of physicians migrated from the Jondishapour University (Ancient Persian University and hospital, located in southwest of Persia) to Baghdad, as the capital of Abbasid caliphate in the eighth-century CE. They establish hospitals and Islamic medical schools in this city based on the Jondishapour pattern [18–20]. In that era, Muslim scholars, mostly Persians gathered medical knowledge from the ancient civilizations such as Greece and Persia and translated them to Arabic language as the *lingua Franca* in that time [21]. Abu Maher Shirazi, another Persian physician who was born in the tenth-century CE wrote the first book in the field of surgical instruments and surgical procedures in the Islamic period. Also, it can be claimed that he compiled surgical sessions into medical books for the first time in Islamic era [22]. Muslim military physicians insisted on proper sanitation and suitable camp location. Avicenna (980–1037 CE), Albucasis (930–1013 CE) and Rhazes (841–926 CE) acquired their skills while serving in the army. Abbasid Caliphate expanded tent hospitals, which were carried by camels. These mobile hospitals were equipped with facilities and trained staff and followed the troops [23].

After the thirteenth-century CE, because of various factors, the golden period of Islamic civilization weakened, but many medical works from the Islamic-Persian scholars were translated into Latin in the Middle Ages [24]. During this period, various strong or weak governments ruled in Persia. This land was repeatedly attacked by enemies in particular, the Mongol hordes. Finally, at the beginning of the sixteenth-century CE, Shah Ismail 1 (1487–1524 CE) founded the Safavid Empire—an independent government which united all fragmented Persian rules. They had great conflict with Ottoman Empire and other enemies. They also had strong and well-developed armies. In this era, the various sciences such as medicine and in particular military medicine were partly grown. The aim of this study is to introduce Hakim Mohammad—an unknown great military surgeon in Safavid era—and his book *Dhakhira-yi-Kamilah*.

### Safavid period (1501–1736 CE)

At the end of the fifteenth-century CE, Safavid dynasty, having formed a successful and long-term stable government, reconstructed the Persian Empire (Fig. 1). They encouraged education and the arts and followed Persian medicine as the main medical paradigm in that era [25]. Baha'al-Dawlah Razi (circa 1455–1508 CE), Imad al-Din Mahmud Shirazi (1515–1592 CE) and Seyyed Muhammad Mumin (died in 1697 CE) were the renowned physicians in



**Fig. 1** Map of Iran in the Safavid Period under Shah Abbas the Great

that era, who had important roles in the progress of medicine [26–30]. Safavid kings had many conflicts against internal and external enemies. Also, they had great and well-equipped armies which led to many successes in the wars against powerful enemies like Ottoman and Uzbek troops. Furthermore, Qazvin was the center of military hospitals in Shah Tahmasb period (1513–1576 CE). Alongside, there were mobile hospitals in Safavid armies where the injured were treated in wartimes. Sick soldiers received medical care in these hospitals in peacetimes. Hakim Abu Nasr Gilani, Hakim Mirza Mohammad Shirazi, Hakim Emad-al-din Mahmoud Shirazi, Hakim Saif-al-din Mozaffar Kashani and his son Mohammad Shamsa were physicians who had served in the military hospitals in Safavid era [31].

### Biography of Hakim Mohammad

Hakim Mohammad was a surgeon contemporary with Shah Abbas the Great (1571–1629 CE) and Shah Safi I (1611–1642 CE), the fifth and sixth kings of the Safavid

dynasty. He is the author of the book of *Dhakhira-yi-Kamilah* (The Perfect Treasury or the Treasury of perfection). There is insufficient information about this great surgeon, but he introduced himself in the preface of his book. It is only clear that he was born in Persia. Then, according to the contents of his book, it seemed he migrated to the Ottoman Empire in youth and had served as a medical officer in the Ottoman army. He accompanied the Ottoman army at least in one of the failed battles for the capture of Baghdad. In one case, he wrote that at least 20,000 soldiers had been wounded in his army during 3 days of war [32–34]. In another case, he reported that despite the efforts of 19 surgeons in the Hafiz Ahmad Pasha camp, 4000 people died from 18,000 injuries [34]. Later, he came back to his homeland and dedicated his book to the king of Persia [34]. Also, he mentioned his pilgrimage to Imam Reza tomb, the Eighth Imam of Shia Muslims [34]. Therefore, it seems that he was probably Shia, or became Shia when he came back to Iran.

## Dhakhira-yi-Kamilah book

“*Dhakhira-yi-Jarrahi*” (the Treasury of surgery) is another name of this book according to the manuscript of the book in the library Paris. This is a unique clinical book which was totally written about the surgery in the Safavid period. The language of the book is Persian and was dedicated to Shah Safi I, the Persian king (Fig. 2). Because of the absence of a comprehensive book on the subject of wounds and injuries, Hakim Mohammad wrote his book, by the study of many medical books and limited surgical manuscripts as well as his own long-term experiences. He also quoted more than of 30 Surgeons and authors in his book. Additionally, he wrote brief biography of some surgeons in the book (Table 1). There are many Persian names among these physicians like Jamshid Tajvar, Zakhmband, Ajhdarkush and Hamadani. It shows that surgery was well advanced in the Safavid period and Persian surgeons worked even in other countries [34].

The book of *Dhakhira-yi-Kamilah* included an introduction, 6 chapters and 33 subtitles (Table 2). Recently this book was corrected and republished in Persian language in Iran.

In the beginning, the author wrote about the general practices, then, he went further to explain about wounds,

injuries and practical techniques in details. The author believed that calling the saints can reduce fear of patient. He also did not believe in magic and so forth in the treatment of diseases. Hakim Mohammad has explained in detail the treatment of abdominal and intestinal wounds and suture of intestinal perforation with ant bites in two different sections of his book. Also, he stated that the patient with these wounds had to avoid eating food and water for several days (chapter 2 and subtitle 1). Furthermore, in chapter 2, he described the treatment of a chronic skin disease with needles. Also, he discussed supportive surgery for cancerous tumors (subtitle 11). Besides, he indicated the injured person’s foods in a separate section (subtitle 12). Hakim Mohammad described the bites of snakes, scorpions, insects, animal bite wounds, signs of rabies and its treatment in his book (subtitle 6). Furthermore, he explained in detail luxation and subluxation and types of fractures (subtitle 24, 25). In another section (final portion), Hakim Mohammad gave information about five different methods of anesthesia in his book [34]. Hakim Mohammad presented many ethical issues and important practical subjects for surgeons in his book. In chapter 3, he stated that surgeons should trust in God and prophets during wounding. The surgeon should not scare the injured



**Fig. 2** The first page (right) and second page (left) of book of *Dhakhira-yi-Kamilah*

**Table 1** The names of surgeons who are quoted in the book of *Dhakhira-yi-Kamilah*

The name of surgeon	Biography of the surgeons mentioned in the book/explanations
1 Abu Edrees	The surgeon of Murad Pasha (Murad IV: 1612–1640 CE), the king of Ottoman Empire
2 Abu Ishaq Gharus	
3 Abu Joryh Jarrah	-/ Jarrah means surgeon in Persian language
4 Abu Musa Jarrah	-/ Jarrah means surgeon in Persian language
5 Abu Naqash Dameshghi	-/ Naqash means painter in Persian language; Dameshghi means born in Damascus (the capital of Syria)
6 Abu Ommal Heravi	He was a highly skilled surgeon contemporary with Sultan Husayn Mirza Bayqara (1438–1506 CE)/ Heravi means from Herat, one of the important cities of Khorasan in Persia in Safavid era and the center of Herat Province in current Afghanistan
7 Abu al-Qazy Naqash	-/ Naqash means painter in Persian language. This surgeon was from Sura Istanbul
8 Abu Rayhan Kharazmi	-/ Kharazmi means from Kharazm. This region was the center of the Iranian Khwarezmian civilization and a series of Persian kingdoms were founded there. Nowadays, this region belongs partly to Uzbekistan, partly to Kazakhstan and partly to Turkmenistan
9 Aflatun-e-Zakhamband	He was a servant of the European Kaiser. He was arrested by Ottoman forces. Due to his great talent, Aflatun was sent to learn surgery from childhood. At the time of the Shah Nowruz Noor (Egyptian surgeon) in Istanbul, he was his attendant and bookkeeper/Zakhamband is a Persian word which means wound dresser
10 Alazar ALae Dameshghi	-/ Dameshghi means born in Damascus (the capital of Syria)
11 Alazar Jarrah Baghdadi	-/ Baghdadi means from Baghdad (the capital of Iraq)
12 Amir Ahmad Ibne Mohammad Zanji	
13 Amir Chalabi Baghdadi/ Chalabi Baghdadi	He is a Baghdad-born surgeon. Sultan Murad Pasha (Murad IV) brought him to Istanbul two times. Many patients came to him and were treated
14 Amir Jand Nowruzi	-/ Nowruz, the traditional Iranian festival of spring which starts at the exact moment of the vernal equinox, commencing the start of the spring. It is considered as the start of the New Year among Iranians. Its history dates back to thousands years ago
15 Amir Moezy Jarrah	-/ Jarrah means surgeon in Persian language
16 Dastyghus Jarrah Ibanak	-/ Jarrah means surgeon in Persian language
17 Filan Navid Jarrah	-/ Jarrah means surgeon in Persian language
18 Hossein Hamadani	-/ Hamadani is means from Hamadan, a Persian city
19 Jamshid Tajvar	
20 Kavoos Khan Istanbuli	-/ Istanbuli means from Istanbul
21 Khalife Mesri	-/ Mesri means from Egyptian
22 Malek Toofan Jarrah	-/ Jarrah means surgeon in Persian language
23 Masih-al-Zaman Jarrah	-/ Jarrah means surgeon in Persian language. He was a surgeon of Hafiz Ahmad Pasha (1564–1632 CE)—Grand Vizier of Sultan Murad IV—in Baghdad for sometimes
24 Mir Halabi Nagshband Jarrah Istanbuli	-/ Nagshband means painter, a Persian word/Jarrah means surgeon in Persian language/Istanbuli means from Istanbul
25 Mirza Edrees Istanbuli	-/ Istanbuli means from Istanbul
26 Mirza Jebely Baghdadi	He was a great surgeon contemporary with Caliphate of Baghdad
27 Saru Khan Farangi	This surgeon treated a 3 years old wound of Hakim Mohammad in 3 days. He treated a 7 years old wound of Ali Mardan Khan (a famous commander) in 10 days. Hakim Mohammad wrote in his book, that he learned some experience about surgery and wound healing from Saru khan/Farangi means from European
28 Saru khan Jarrah	-/ Jarrah means surgeon in Persian language
29 Saru khan Nowruzi	He was an Egyptian surgeon who treated an old wound (since 3 years) of the Caliphate in 6 days
30 Shah Nowruz Noor (Nowruzi)	-/ Shah means king in Persian language. He was a great Egyptian surgeon and pharmacologists. Also, he was skilled in surgery. Furthermore, he was kind and obedient. He was brought to Istanbul by order of the Sultan Murad Pasha
31 Sheikh Abu-al-Mu'alla Zarkub	
32 Yuhanna Ajhdarkush	He was a surgeon from Kashmir, who came to Khorasan with the king Humayun (1508–1556 CE). Because of killing an Ajhdar (dragon) in the area of Kashmir, the King called him by this title. He stopped in Neyshabur (a Persian city in Khorasan) and did not return to Kashmir. Ajhdarkush is a Persian word which means killer of dragon

**Table 2** Chapters of the book of *Dhakhira-yi-Kamilah*

Chapter	Chapter title	Chapter in detail
1	In the air and its causes harm to wounds and protects the body from it	Hakim Mohammad has described the effect of seasonal air on wounds. He believed that wounds must be protected from cold air as well as hot air. He expressed that in warm air, wounded patient must rest in a good weather in high places
2	In understanding and knowing the drugs their processing and their keeping	This chapter contains 401 simple drugs which were used for skin diseases, bites, wounds and surgery
3	About advising teachers and professors in this field and its rituals and self-protection	This chapter is about admiring learning surgery, and representing scientific and ethical characteristics of a surgeon
4	The impact of seasons on wound management and proper medication, as well as, resting site and suitable foods for injured persons	
5	In knowing and identifying cutting and splitting instruments, and their keeping	In this chapter, he introduced a detailed list of the instruments available to surgeons, including a special device for the removal of bullets, instrument to remove arrow shot from the wounds, a means to remove pegs and needles from a wound or foreign body in the nose, types of scalpels, means for cauterity and hook for removing the veins
6	About <i>Marahem</i> (salves) of <i>Monzej</i> and the method of its preparation and choosing the perfect <i>Marham</i> for suitable locations to treat	

patient even if he/she would be in danger, but should explain the true situation to the patient's companion(s). He stated that the injured patients should be kept in rooms with a high ceiling and patients had to wear clean clothes. Also, patient's visit should be limited. He also accented to the self-protection of the surgeons against contagious diseases like smallpox, leprosy, bruises and odorous ulcers (infectious sores). He suggested visiting ulcers without touching them, if it is not necessary. One of the interesting matters presented by Hakim Mohammad is introducing surgical gloves. He recommended using gloves made by skin of sheep testicles and thin layers of silver. It can be considered as one of the first reported surgical gloves in the history of surgery [34].

## Conclusion

This study can shed light on a part of history of military medicine, in particular surgery in medieval era. Hakim Mohammad was a military surgeon in the Safavid era who participated at least in one Ottoman–Persian battlefield. He wrote his surgical experiences and other ancestors and contemporary surgeons in his surgical textbook, *Dhakhira-yi-Jarrahi*. Furthermore, Hakim Mohammad mentioned some surgeons in Ottoman army who have Persian names. It shows that surgery and in particular military surgery was well developed and organized in Persia during Safavid era, while they were employed even by other countries [34].

Also, there are some other historical documents that show Iranian physicians had been invited to serve in the court of neighboring countries [35, 36]. In the Safavid era, long-term wars between the Ottoman Sultans and the Safavid Kings, led to the creation of various relations between Iranians and Ottomans. That is why Iranian physicians went to Ottoman Empire for learning, working or earning reputation [32, 35].

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