

ORIGINAL ARTICLE

A Comparative Study of the Demographic and Economic Consequences of the Spread of the Plague in the Urban Communities of Herat and Cairo in the 9th Century AH

Abstract

The persistent presence of the plague, following the first wave of the Black Death in the 14th century AD, continued to affect human societies. In the 15th century, this disease had destructive effects on the social situation of the cities of Herat during the Timurid period and Cairo during the Mamluk era, as they were administrative centers of government and centers of various social classes. The present research, employing a descriptive-analytical approach, aims to compare the social consequences of the disease in these two cities. The findings of this study show that, despite the absence of a well-equipped hospital like the one in Cairo, Herat suffered less devastation from the disease due to the construction of a hospital after estimating the plague casualties and its geographical extent. The mortality rate in Herat was significantly lower, and its population structure underwent fewer changes. This is because Herat had recently been chosen as the capital under Shahrukh's rule, which led to a transition from a nomadic to a settled lifestyle, resulting in a lower population density than Cairo. Herat's mountainous climate and limited trade accessibility through land routes made it less susceptible to recurrent disease outbreaks and their enduring adverse effects. Conversely, Cairo's hot, humid climate, flourishing maritime trade, and dependence on land and agriculture contributed to its economic recession during the plague. The economy of Herat, still a young city in the 15th century, was less vulnerable to economic recession due to the plague.

Key words: Plague, Herat, Cairo, Social Consequences, 15th Century, Economic Recession, Population Density

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Introduction

The 15th AD Century is considered one of the most critical periods for the spread of the plague in Iran and Egypt. During this period, parts of western Iran, including Azerbaijan, Arab Iraq, and Ajam, were under the rule of Qaraqyunlu Turkmens (1378-1469 AD), followed by the Agh-Quyunlu (1467- 1501 AD). Meanwhile, the remnants of Timur's weakened government maintained control over Khorasan, with Semnan situated at the border of the Timurid and Turkoman territories (Khwandmir, 1983, Vol. 4, p. 429). On the other hand, the Burji Mamluks (1382- 1517 AD) had recently taken control of Egypt and Syria from the Bahri Mamluks (1250- 1382 AD). This research focuses on the confrontation of the urban communities of Herat and Cairo with the plague during this period. The selection of these cities is significant, as both Herat and Cairo served as key administrative capitals and vital centers of planning and policymaking, boasting thriving populations and commercial hubs during the 15th Century.

In examining the historical sources from the Timurid period, we notice that historians generally discussed the occurrence of plague outbreaks without going into the details of its social and economic aspects. In contrast, Mamluk historians provide more details about the devastation caused by the epidemics. The research background of the subject shows that no previous research has conducted a comparative analysis of the social impacts on the urban communities of Herat and Cairo during this time. Although some authors have dealt with epidemic diseases and their effects, their focus has been more specific or limited in scope. For instance, Al-Jamil (1917) limited himself to a brief history of cholera and plague epidemics but did not mention their consequences. Borsch (2005) examined the direct impact of the plague's depopulation on the economic infrastructure of medieval Egypt. Kasiri and Afshari Far (2014) investigated the connection between the plague outbreaks in Iran and the concurrent Black Death in Europe. Fazlinejad (2015) studied the factors and consequences of the outbreak of plague in Iran during the 8th and 9th centuries of Hijri. Also, he (2017) studied the causes and consequences of the spread of the Black Death in all societies in the late Middle Ages. Dashti (2020) compared the performance of Bahri and Burji Mamluks against the plague. Abdul Rahim (2022) also investigated the epidemic's impact on Egypt during Sultan Nasser Hassan's era.

The current research aims to investigate and compare the demographic and economic consequences caused by the outbreak of plagues in the 9th century AH within the governmental centers of the Timurid Empire (Herat) and Mamluk Sultanate (Cairo). To achieve this goal, the study examines these two cities before and after the plague outbreaks, analyzing the social and economic transformations and their lasting impacts on the urban communities.

The condition of Dar al-Shafa (hospital) in Herat and Cairo in the 9th century of Hijri

The establishment of the hospital was a crucial development for the Timurid royal family and government officials. Hospitals of this period were part of a complex that included a mosque and a school, similar to the Ilkhanate period. There were five Dar al-Shafa in Herat: Dar al-Shafa Abdullah Amr, Dar al-Shafa Malake Aqa, Dar al-Shafa Shahrokh, and Dar al-Shafa Sultan Hossein. The latter was part of the Ekhlasiyeh multi-purpose complex. Medicine was taught at Dar al-Shafa Malake Aqa, reflecting the institutions' commitment to both healing and learning. The year of construction of the first



four Dar al-Shafa dates back to 1480 AD, and the fifth one was established about ten years earlier (Flore, 2021, pp. 57-58 and 61-62). However, it is noteworthy that these institutions emerged amidst the 9th century AH epidemics that inflicted significant casualties on Herat. The pressing need for patient care facilities became evident in the wake of these devastating outbreaks.

There were three Dar al-Shafa inside the city (Abdullah Amr, Malake Aqa, Alishir) and two Dar al-Shafa (Shahrokh and Sultan Hossein) outside the city (Flore, 2021, pp. 61-62). Notably, many epidemic victims resided in the city's outskirts and peripheral areas, further emphasizing the importance of healthcare accessibility.

Of course, before this, hospitals had been established in other cities of Iran in the 3rd to 8th centuries of Hijri (Isa-Bek, 1992, pp. 159-162; Najmabadi, 1996, pp. 765-769). This indicates a broader recognition of the need for healthcare institutions across the region, particularly in response to the ongoing threat of epidemics and the necessity of providing care for affected populations.

On the other hand, before the plague, Cairo was home to several well-equipped hospitals, suggesting that the city was better prepared to manage the plague than Herat. Al-Maqrizi gives the historical characteristics and location of five hospitals in Cairo (Al-Maqrizi, 2001, Vol. 2, pp. 405-408). The most notable hospital in Cairo, Mansouri Hospital, was built by Sultan Mansour Qalawon in 1284 AD. Notably, the Sultan himself took part in the construction of the hospital (Al-Maqrizi, 2001, Vol. 4, pp. 268-272). The hospital enjoyed numerous administrative offices and physicians; its building had balconies, bathrooms, and various medical departments. In terms of size, this hospital was compared to Rabi-Rashidi Hospital in Tabriz. Sultan Mansour appointed male and female servants to serve patients in this hospital and provided them with unique uniforms. Furthermore, he arranged beds and necessary equipment for the patients (Al-Maqrizi, 2001, Vol. 2, p. 405).

Hospitals in the Palestinian region in Ramla, Nablus, and Gaza were built by the Mamluk governor of Gaza in the late 14th century (Isa-Bek, 1992, pp. 274, 260). Earlier, at the beginning of the 8th century AH, a hospital was also built in the city of Safad in Palestine (Dashti, 2020, p. 59). Additional hospitals built during the Mamluk hospital construction movement include Kirk Hospital, Hesn Al-Akrad Hospital (1319 AD), Arghun Al-Kameli Hospital or Aleppo New Hospital (1355 AD), Al-Daghani Hospital in Damascus (1362 AD) and Madinah Al-Nabi Hospital (1264 AD) (Isa-Bek, 1992, pp. 247-248 and 252 and 259 and 265). These hospitals were staffed by a chief and supervisor. The Hasba institution, which was affiliated with the judiciary, was responsible for overseeing hospital doctors' work and verifying their licenses to practice medicine.

Plagues of the 9th Century AH in the Cities of Herat and Cairo

In 1406-1407 AD, Tabriz and other areas of Iran were affected by the plague, which spread to Isfahan in 1407, resulting in significant loss of life (Fazlinejad, 2017, p. 128). In 1416 AD, Isfahan was once again the victim of the plague (Al-Asqalani, 1994, Vol. 3, p. 87). Concurrently, in 1429-1431 AD, the plague afflicted Tabriz, Baghdad, and other parts of the Middle East (Al-Asqalani, 1994, Vol. 3, p. 48). The last recorded reports about the plague's resurgence in Iran during the 9th century AH are related to the widespread plague in 1486-1490 AD in Azerbaijan, especially the city of Tabriz. This outbreak also spread to neighboring states and areas of the Middle East (Fazlinejad, 2017, p. 131). However,



Herat and its surrounding cities were affected in two instances: In 1434- 1435 AD, a plague lasted over five months in Herat (Samarqandi, 1993, Vol. 2, p.311 and 454). The author Khold-i-barin considered the year of its occurrence to be 1433 AD, which caused terror and devastation among people (Valeh Isfahani, 2000, p. 482).

In the 9th century AH/ 15th AD, numerous plague outbreaks were recorded in Cairo, with some occurring closely together. The plague of 1403 AD caused the spread of other diseases and a shortage of medicine (Al-Asqalani, 1994, Vol. 1, p. 354). The spread of the disease in 1405- 1407 AD led to the depopulation of certain areas (Al-Maqrizi, 1997, Vol. 6, pp. 160-161 and 181-183). The plague of 1415 AD lasted for four months (Al-Asqalani, 1994, Vol. 3, p. 54). And in 1416 AD, all the lands of Egypt and Syria were affected by the plague (Al-Maqrizi, 1997, Vol. 6, p. 409). In 1417 AD, the plague spread in Alexandria, Damietta, and Cairo (Al-Maqrizi, 1997, Vol. 3, p. 139). During the plague of 1419-1420 AD, religious scholars called for fasting and prayers to combat the disease due to the high fatalities (Al-Maqrizi, 1997, Vol. 6, pp. 491 and 495-499). The Mamluk sultan's failure to assist Shah Qaraqyunlu in the war against Agh Quyunlu during the plague of 1429 AD was because of the large number of military casualties (Ibn Toghri Bardi, 1911, Vol. 14, p 172). In 1436 AD, the disease entered Egypt and Cairo through the cities of Syria. Scholars related a large number of deaths to the sins people committed, and advocated for repentance (Al-Maqrizi, 1997, Vol. 7, p. 345). The disease lasted for two more years, resulting in the death of a large number of people in Cairo, Alexandria, Al-Bahira, and other cities. Hence, their names were removed from the Diwan al-Mawarith (There was an office for dealing with confiscated property and property without heirs) (Al-Maqrizi, 1997, Vol. 7, p. 409). The Divan of Inheritance recorded a high child mortality rate during the 1444 AD plague (Al-Asqalani, 1994, Vol. 4, p. 224). The outbreak of the plague in 1449 AD killed many princes and elders (Ibn Toghri Bardi, 1911, Vol. 15, p. 141). In the plague of 1459 AD, according to the statistics recorded in the Diwan's offices, the number of daily victims in Cairo reached hundreds. The dead were piled up in various places (Ibn Toghri Bardi, 1911, Vol. 16, p. 117). Towards the end of the 15th century, Dols documented three more outbreaks in Egypt in 1468, 1476- 1477, and 1491- 1492 AD (Dols, 2016, pp. 255-256).

The fact that the plagues of Herat and Cairo did not occur simultaneously in the 9th century suggests that there was no transmission of the disease from east to west at that time. The higher frequency of plague occurrences in Cairo compared to Herat could be attributed to the expansive communication and commercial network that Cairo shared with other regions, including its connection with the port of Alexandria through the Nile River. Although the farmers in both Herat and Cairo irrigated their fields with canals and streams, the Herat River did not play a role in initiating and transmitting the disease since, unlike the Nile, it did not serve as a navigable waterway. Today, one of the reasons for the spread of the plague is considered to be commercial ports. In general, the pattern of disease transmission via marine contact (as seen in Cairo) and terrestrial dissemination (as observed in Herat) is different.

Social consequences of plague transmission in the urban communities of Herat and Cairo

The plague epidemic was a biological event that brought a wide range of social consequences in different demographic and economic aspects. In the long term, the effects and



consequences cannot be clearly predicted or measured because other factors can also intervene. It is more feasible to ascertain whether the event has led to improvement, stagnation, or decline on a general level (Bavel, et al, 2020, p. 145). What is investigated in this area is the short-term effects of the recurring outbreaks of the plague in these societies.

1- Demographic Consequences

A. Decrease in Population and Change in Population Structure

The review of historical sources shows significant discrepancies in how contemporary historians documented the consequences of the plague outbreak in Herat and Cairo; Compared to the historian of the court of Cairo, those of the court of Herat provided fewer detailed accounts of the impact of the disease on the social history and population of the people. Indeed, the consequences of this disease were diverse among different social groups and ethnicities of both societies. Epidemics can show a range of intensity levels and geographical reach. Factors such as pre-existing vulnerability, inadequate preparation, and governmental inefficiencies can turn a moderate shock into a complete disaster (Bavel, et al, 2020, pp. 3-4).

The 9th century was the peak of nomadic life in Iran. Also, the invasions and subsequent rule of the Mongols (616-750 AH) resulted in a substantial population decline in Iran, from about 5 million to 3.5 million people. This loss was notably more significant than the initial outbreak and subsequent recurring periods of the plague in the 8th and 9th centuries AH. It can even be claimed that during the epidemic periods, the population was recovering because it started to grow towards 4 million people. Consequently, the disease might be considered as having only slowed the pace of population growth rather than causing a drastic decline (McEvedy, and Jones, 1978, pp. 152-153). However, the plague disease in Egypt between 800 and 900 AH slowed the population growth, decreasing the population from about 5 million to 4 million people (McEvedy, and Jones, 1978, pp. 226-228).

Since none of these areas had precise and reliable census or burial records, it is difficult to estimate overall mortality from the recurring waves of the plague. However, historians have struggled to estimate the death rate, which currently ranges from 40 to 60 percent among afflicted individuals. (Byrne, 2008, Vol. 1, p. 56; Aberth, 2011, p. 23; Pamuk, and Shatzmiller, 2014, p. 210). In general, with the recurring waves of the disease from the mid-8th to the end of the 9th century AH, the population of the Middle East (including Iran) decreased by more than one-third (Byrne, 2008, Vol. 2, p. 518). There were about twenty major plague epidemics in Cairo during this period, which occurred on average every eight to nine years. However, the intensity of these recurring outbreaks gradually decreased over time (Aberth, 2011, p. 37).

Sudden death, population decline, impoverishment, economic destruction, and social chaos were among the expected short-term consequences of the plague (McNeil, 2013, p. 234). However, the nature and extent of social damage varied between different cities. The secondary waves of the plague caused heavy losses and widespread deaths in the urban population (Varlik, 2015, p. 108) because of the higher population density, neglect of the homeless, immoral behavior, and civil unrest in urban areas (Engelmann, Henderson and Lynteris, 2019, p. 1). Certain segments of society, such as doctors, who were in closer contact with patients, were more exposed to destruction (Byrne, 2008, Vol. 1, p. 59; Bavel, et al, 2020, p. 101). Following this, street vendors and gravediggers experienced high mortality rates due to their exposure to infected individuals' belongings. Addition-



ally, millers and bakers were also at increased risk as rats, the primary disease carriers, were attracted to grains (Snowden, 2019, p. 42).

More detailed estimates of population loss in Cairo in the 9th century AH are recorded, but not precise. This is mainly because of the inconsistencies in the methods used to document the deceased. Different sources recorded various categories of victims separately, such as those taken for burial from the city gates, property owners, or individuals associated with the Mamluks. For example, Maqrizi wrote: During a period of illness, in one single day, the number of dead people who were taken from Cairo Gate for burial was more than 1200 people. However, only 390 cases were registered at Cairo's registration office during the same period. Maqrizi attributes this discrepancy to the fact that individuals who relied on donated shrouds and possessed no assets were not recorded in the official register (Al-Maqrizi, 1997, Vol. 2, p. 826).

In 1407 AD, the widespread outbreak of the plague in Cairo and its spread to Egypt and the Levant led to a significant loss of life in the Mamluk territory (Ibn Hajar, 1994, Vol. 2, p. 389; Ibn Toghri Bardi, 1911, Vol. 13, p. 178).

During the plague outbreak in 822 AH, when the severity of the disease somewhat reduced, the number of fatalities was recorded as 75 individuals per day. Maqrizi documented the total number of deaths in Cairo (7,652) over a period of 38 days as follows: 1065 men, 669 women, 3969 children, 544 Slavic men, 1369 Slavic women, 69 Christians, and 32 Jews. (Dols, 2016, p. 154). Ibn Toghri Bardi noted that the overall mortality rate in 822 AH was significantly lower than in 833 AH (Dols, 2016, p. 155).

The global pandemic reached Cairo in 833 AH and had devastating consequences, with thousands of daily fatalities and widespread depopulation of villages and cities (Ibn Toghri Bardi, 1911, Vol. 14, pp. 340-337; Ibn Hajar, 1994, Vol. 3, p. 438). Contemporary Arab historians of the 9th century mentioned the plague of Cairo in 1429-1430 AD as the "Great Extinction" (Byrne, 2008, Vol. 2, p. 517). Maqrizi reported that during this period, daily deaths in Cairo and its suburbs reached staggering numbers, ranging from 8,000 to 10,000 per day (Al-Maqrizi, 1997, Vol. 1, p. 492; Ibn Toghri Bardi, 1911, Vol. 18, pp. 69-76 and 181-189). Historians stated that in the same period, the worshipers at Sukkur Gate prayed for 505 dead in one day of Jumadi al-Sani (Ibn Toghri Bardi, 1911, Vol. 18, p. 71). Ibn Toghri Bardi reported that during the month of Jumadi al-Sani of that year, 12,300 coffins were carried outside the city gate. This number was documented by government officials in charge of counting the dead (Ibn Toghri Bardi, 1911, Vol. 18, p. 72). Therefore, at least one-third of Cairo's population was lost during the entire period of the disease. (Borsch, 2005, p. 24; Pamuk and Shatzmiller, 2014, p. 210). This statistic is more plausible when considering the possible population size at the time. In 1437 AD, the majority of victims of the plague were mostly children, Slavs, and servants in Cairo (Dols, 2016, p. 154).

Herat was a plain twenty-five farsakhs (a unit of measurement equal to 3 miles) long and four farsakhs wide, resembling a city (Khalili, 1930, p. 78). When the Sultan was not present in Herat, events and news of the court as well as that of the influential people were regularly communicated to him and his agents, particularly during times of crisis like the plague outbreak in 838 AH. Concerned about the fear and demoralizing impact of the rising death toll on those around him who went to ward off the evil of Iskandar ibn Qarayousef, Shahrukh attempted to hide the severity of the outbreak (Esfazari, 1959, p. 93; Samarqandi, 1993, Vol. 2, p. 455). Despite these efforts, reports emerged indicating



the daily death of ten thousand people in the city and the countryside. Esfazari and Samarqandi also reported the same number of daily deaths. It was reported that in one day, four thousand and seven hundred coffins were taken out of the gates, with many bodies loaded onto donkeys and disposed of in mass burial pits. They buried them, and in the outskirts of the city, the number was more than that in the city (Esfazari, 1959, pp. 93-94; Samarqandi, 1993, Vol. 2, p. 452). Estimates of the total fatalities in Herat and its suburbs were staggering, with 600,000 reported deaths in the city and 400,000 in the surrounding areas, amounting to one million people. These figures did not include the homeless, who were often disposed of in mass graves or left unburied. (Esfazari, 1959, p. 94). In an attempt to maintain control over the situation, Shahrugh ordered that no one but the trusted ones be allowed to read the letters of Herat (Esfazari, 1959, p. 93; Khandamir, 1983, p. 625).

During the plague outbreak in Cairo in 864 AH, Ibn Toghri Bardi recorded 35 fatalities in a single day at Tahrir Anshaat, the city's public law enforcement office. This figure did not include those who died in hospitals, barracks, and on the roads. It is worth mentioning that only the names of the wealthy victims were recorded in the Book of the Dead (Ibn Toghri Bardi, 1911, Vol. 22, p. 91), suggesting that the actual death toll was higher. Also, the death of Mamluks was recorded separately due to its importance in the feudal system. Ibn Toghri Bardi stated that, on Monday, 15 Jumadi al-Sani of that year, out of the 300 victims, 75 were Mamluk, with 35 being emirs and the rest were the Sultan's mamluks (Ibn Toghri Bardi, 1911, Vol. 22, p. 97). In an effort to estimate the total number of deaths in Cairo and its suburbs, Amir Zain al-Din assigned an officer to supervise the counting of prayers for the dead along a designated route (Ibn Toghri Bardi, 1911, Vol. 22, pp. 93-94). However, Ibn Toghri Bardi expressed doubts about the accuracy of this method for estimating the actual death toll (Ibn Toghri Bardi, 1911, Vol. 22, p. 93).

In 867 AH, the plague outbreak in Herat caused widespread panic and led many people to leave their homeland. At that time, the sultan was not in Herat, but his deputy, the judge, the governor, and ministers went to Badghis and took refuge in the highlands. The remaining population also attempted to evacuate the city, taking their belongings with them in hopes of survival (Samarqandi, 1993, Vol. 2, p. 928). Samarqandi described the supply of the messengers of Mavara- Al-Nahar province and Samarqand from the deaths, the hardships of the people, and the suffering and devastation caused by the outbreak of cholera and plague as follows: "Cholera and pestilence appeared more devastating than expected, igniting the lightning of the cloud of suffering and the flame of the fire of the Nakba, leading the storm of events, uprooting the seeds of dreams from that paradise-like garden. The nightingales of that garden were silent, and the pomegranate buds of that flower garden were like red flowers, their faces were covered in blood. The beautiful faces became wrinkled like curly hair, and the black-eyed beauties became saddened like deer in the Tibetan desert. The outstretched hands and beautiful white forearms, instead of being around the king's neck, were buried with a hundred regrets. Red faces were blown away like flowers by the wind". (Samarqandi, 1993, Vol. 2, p. 929). After a while, when the disease subsided, they returned from Badghis and gathered the scattered people. Esfazari reported that the death toll was immeasurable (Esfazari, 1959, p. 262).

There is no other report available to evaluate the death tolls of plagues in Herat city at that time. Comparing the details of efforts made to record the number of victims in Cairo and Herat cities makes the extent of the progress of the administrative and executive apparatus of the Mamluk government clear. In Herat and other Eastern regions, only the



deaths of notable figures, scholars, and court officials were recorded.

The recurrent waves of plague disproportionately affected younger individuals, women, and children, resulting in a change in the composition of the population. Therefore, in many cities, there was a higher proportion of elderly individuals compared to younger people (Byrne, 2008, Vol. 1, p. 66). The population decline did not happen all at once. It was a gradual process resulting from successive epidemics, a decrease in marriage and fertility rates (Bavel, et al, 2020, p. 45 and 130; Pamuk and Shatzmiller, 2014, p. 197).

According to Varlik, nomadic communities were less affected by the plague than urban populations. This is because of the nomadic lifestyle that involved constant movement, limiting the spread of the epidemic within these communities (Varlik, 2015, p. 109). McNeil further elaborated on this phenomenon, noting that the risk of contracting the disease decreased mainly because of the limited interaction between the nomads and Herat's urban population. Moreover, compared to cities, nomadic communities generally enjoyed lower population density, which could limit the transmission of disease among them.

B. Fleeing and population movements

Although it was forbidden to enter and leave plague-stricken areas (Bukhari, 2002, p. 1452), instances of people, including the wealthy and powerful, fleeing from afflicted cities like Cairo and Herat, were recorded. Muslim scholars recognized the risks associated with travel during times of epidemics, as it exposed individuals to disease and increased their vulnerability. However, sultans of the Islamic world relocated their families and relatives to safer areas to avoid the devastating effects of the plague. During frequent outbreaks, affluent urban residents moved to their permanent rural residences and remained there until the end of the outbreak (Byrne, 2008, Vol. 1, pp. 60, 214).

Having heard about the plague outbreaks, the urban population decided to flee from urban centers in search of safer areas. The people of Herat, recognizing from their experience from the first wave of the plague that the plague reached higher and more remote areas later, fled from densely populated areas to the heights of Badghis, as they did in 867 AH/1462 AD. Similarly, the people of Cairo escaped to Al-Rawzah Island because they held that the island's clean air would protect them against the disease (Dols, 2016, p. 150). In Egypt, there was an escape from the village to the city and vice versa. The reasons for migrating to the cities were diverse, driven by a variety of factors: to avoid contracting diseases, to escape from forced labor in agricultural fields, to pursue higher wages, and to access medical resources such as healers, exorcists, pharmacists, and food sources (Lapidus, 1969, pp. 6-8). In the meantime, the loss of the animals impeded migration (Al-Maqrizi, 1997, Vol. 3, p. 779). Moreover, the absence of specific laws to regulate population replacement in the urban periphery (Belyaev, 1969, pp. 229-230) may have contributed to a steady decline in population and significant changes in the demographic patterns of affected regions.

Historical reports showed that plague victims often faced stigma from the people, forcing them into isolation and distancing them from the general population. As described by Samarqandi, the poet, they were likened to tears falling from the eyes of society (Samarqandi, 1993, Vol. 4, pp. 928-929). Care for the sick was mostly done by pious people who were willing to put themselves at risk to help others or very poor people who sought financial gain in exchange for their help. The prevalence of the plague increased social



tensions, leading to unlawful activities, such as theft and violence. Moreover, a deterioration of moral values was observed, contributing to increased instances of vagrancy, begging, and prostitution (Bavel, et al, 2020, p. 138). In Cairo, the number of beggars increased dramatically due to the increase in migration from the village to the city (Ibn Toghri Bardi, 1911, Vol. 18, pp. 148-149).

The impossibility of individual burial and the accumulation of bodies in affected areas (Byrne, 2008, Vol. 1, p. 59; Bavel, et al, 2020, p. 210) led to various psychological reactions among survivors, including feelings of guilt, fear, anger, and sadness, which, in turn, accelerated the migration of people seeking to escape the disease (Byrne, 2008, Vol. 1, p. 59; Aberth, 2011, p. 44; Snowden, 2019, p. 32). During the plague of 867 AH, people fled to the north and Astarabad. However, due to the contagious nature of the plague, these migrants inadvertently carried the disease with them to their new destinations.

Samarqandi described the situation in a poem, as follows:

Astarabad, whose soil was more fragrant than musk was suddenly destroyed by the fire of cholera

And there was no one left in it, young or old when the fire falls into the forest, it burns the wet and the dry (Motrebi Samarqandi, 2003, p. 294).

Herat's land connection and Cairo's sea connection with other regions played significant roles in both the spread of the disease and the migration of people seeking to escape it. The speed of expansion through the sea was many times greater.

Regarding the importance of the consequences of epidemics, especially the plague among Muslim societies, it is appropriate to refer to Ibn Khaldun's observation. He stated: "The western and eastern civilizations suffered substantial population losses due to the plague, and their civilization infrastructure was tremendously weakened. As a result of this disease, their overall strength and dominance began to decline." Cities and settlements became emptied of people; roads and ways were destroyed; families became weak and life in the world changed" (Ibn Khaldun, n.d., p. 122).

2- Economic consequences

A. Market and trade recession

The plague changed the landscape of Cairo by dramatically reducing the labor force required to maintain and operate complex irrigation systems and other infrastructure (Al-Maqrizi, 1997, Vol. 2, p. 787; Ibn Toghri Bardi, 1911, Vol. 10, p. 160). The frequent outbreaks of the plague led to the devastation of irrigation systems and the associated social institutions that had been functioning for millennia. Massive population losses caused by the disease resulted in a significant reduction of the labor force needed to maintain, control, and effectively utilize the complex infrastructure initially designed by Vector (Borsch, 2005, p. 138). Skilled artisans and workers lost their lives due to the plague (Al-Maqrizi, 1997, Vol. 4, p. 84; Ibn Taoghri Bardi, 1972, Vol. 10, p. 162). To counteract this loss, guilds relaxed their hiring requirements (Al-Maqrizi, 1997, Vol. 4, p. 84) and reduced taxes for newcomers, aiming to attract fresh talent and replenish the workforce (Byrne, 2008, Vol. 1, p. 214). The reduction of agricultural opportunities (Bavel, et al, 2020, p. 130) and rural productivity dramatically affected the prosperity of urban areas (Byrne, 2008, Vol. 2, p. 518). Trading in the market was stopped (Ibn Toghri Bardi, 1911, Vol. 10, p. 158). Although some believe that in societies where the disease was more severe, a terrible short-term economic shock was experienced, in the end, they would ul-



timately emerge on more favorable long-term economic trajectories. (Bavel, et al, 2020, p. 146).

Contrary to Pamuk and Shatzmiller's standpoint, who acknowledged that, in the aftermath of the plague, the economic theories relating to Europe and the Islamic Middle East were similar, considering an initial increase in the wages of unskilled workers and a rise in the gross national product (Pamuk and Shatzmiller, 2014, p. 210), the disease had negative effects on the economy of Egypt and its important city of Cairo: in contrast to the position held by Pamuk and Shatzmiller, wages decreased, and rent rates and grain prices increased (Abd al-Rahim, 2022, p. 700), all of which led to the collapse of the economy which was heavily reliant on agriculture. Moreover, at the end of the Middle Ages in Cairo, silver coins disappeared in Cairo due to the popular belief in the effect of talismans in warding off the plague (Pamuk and Shatzmiller, 2014, p. 203), Hence, the value of gold fell against silver and the Mamluk national currency depreciated and prices rose.

In his book, by comparing the agricultural gross domestic product (GDP) in England and Egypt in the early 16th century, Borsch concluded that although the two started working under almost similar economic conditions before the Black Death in the early 14th century, England's GDP was twice that of Egypt's at the onset of the 16th century, following recurring waves of the disease (Borsch, 2005, p. 15; Aberth, 2011, p. 59). Borsch concluded that the reason for this issue was in land ownership systems in the two regions: in Egypt (Cairo) the Mamluk military elites owned the land in the villages on a non-hereditary and unstable basis. This system suppressed the efforts and productivity of farmers, ultimately hindering Egypt's capacity to adapt to the population decline in the same manner as England. Borsch added that if Egypt's land system was under local control, as in the pre-Mamluk period, Egypt could have adapted to the decline of the population better. The rapid transfer of lands in Egypt led to a lack of investment in land and crop maintenance, as landowners had little incentive to spend resources on properties they might not retain long-term. In addition, the complex irrigation network that maintained Egypt's agricultural estates along the Nile Valley suffered from depopulation caused by the plague, making Egypt's agricultural economy even more fragile. Borsch also held that the detrimental effect on agriculture was more severe than the damage caused by Egyptian trade (Aberth, 2011, p. 60; Borsch, 2005, p. 12). In Egypt, the market of luxury goods experienced a decline. Also, the market for buying and selling Slaves and foreigners, who were either Mamluks or natives, was closed because of the increased vulnerability of these populations to the disease (Al-Maqrizi, 1997, Vol. 2, p. 1047). As a result, the price of slaves that were brought to Egypt to replace the Mamluks increased. In the cities, the markets were mostly closed and destroyed, except for the spice market, which was for therapeutic uses. During the Mamluk era, there was direct supervision over the division of inheritance. Records were kept of the deceased to determine their heirs and in case there were no heirs, all their property was confiscated. Sometimes even the inheritance of religious minorities such as Jews and Copts was confiscated for the benefit of the public treasury (Al-Aini, 1987, pp. 176, 183, 198).

New professions, such as apothecary, which had not previously existed, began to emerge in the subsequent waves of the plague. Before this, local healers and religious leaders usually mixed their medicines and gave them to their patients (Byrne, 2008, Vol. 1, p. 53 and Vol. 2, p. 472). Therefore, this contributed to a change in the socio-economic



structure of society.

In contrast to the Mamluk government, the Timurid land tenure system was administered by the Mongolian Siyurghal. The owner of Siyurghal had special privileges that were not found in the feudal system of the Mamluks, including the owner's tax exemption, and civil, and military freedom. And more importantly, unlike the Mamluk fiefdoms, Siyurghalat was considered hereditary. For this reason, owners of Siyurghal had no fear of losing their lands upon their death, as these would be passed down to their heirs. Therefore, they were encouraged to invest in improving the productivity of the land. For example, when the owner of Siyurghal Radkan, Amir Elyas Khwaja, died due to the plague, his property and lands were bequeathed by Shahrukh to his son Seyyed Yusuf Khwaja (Khwandmir, 1983, Vol. 3, p. 625; Samarqandi, 1993, Vol. 2, p. 452). Therefore, economic resilience happened very soon. As agriculture did not require special expertise, there was always an alternative labor force for it. This was one of the reasons why Herat's agriculture-based economy suffered less damage than Cairo's economy. Although Esfazari was silent about the economic consequences of the plague of 833 AH/1429 AD in Herat, many of the immediate losses pointed out for Cairo, such as the market downturn and the loss of business and skilled craftsmen, can be generalized to Herat as well. Regarding the economic consequences of the disease in 867 AH/ 1462 AD, he briefly stated that the market, shops, and businesses experienced a decline. However, Esfazari mentioned a subsequent period of recovery after the decline of the disease mainly because of princes who encouraged the return and resettlement of people in the city and promoted the development of agriculture. (Esfazari, 1959, p. 262-263). This shows that the economic damage of the disease in Herat was not long-lasting and this could also be due to the adaptability and resilience of Herat's urban society.

B. Reduction of food resources, famine and hunger

The loss of workers who dredged, repaired, and maintained the countless canals of the Nile every year disrupted the water distribution system, destroyed most of the canals, and prevented proper drainage and irrigation of the lands. In contrast, Herat's water canals were newly built, so they faced challenges different from those in Cairo. The decay of the irrigation system and the neglect of the annual review resulted in far-reaching consequences, including numerous floods caused by changes in the Nile water level after the disease that was followed by the devastating secondary famine.

Maqrizi believes that the decline of the irrigation system led to the famine of 806 AH/1403 AD. These famines drove people, especially the Bedouins, to Cairo in search of food and caused riots and the spread of epidemics. The Mamluks did not have a common culture and language with the local population, and hence they did not understand the poor conditions of the villagers and agricultural workers. Despite the worsening situation, the Mamluks continued to demand land rent at the same rates as before (Al-Maqrizi, 1997, Vol. 4 p. 3 and 131 and 165 and 205 and 226 and 306 and 943-942). Drought and lack of water also caused severe famine and starvation. The rising cost of food led to an increase in epidemic diseases such as cholera and plague among people (Al-Maqrizi, 1997, Vol. 2, p. 431; Ibn Toghri Bardi, 1911, Vol. 8, p. 243). In Iran during the same period, due to the occurrence of calamities such as famine and plague, invasions by hostile forces, corruption, and the insecurity of the roads, a large number of people died every day. Many people died because of hunger and disease due to the lack of bread and the



plague (Nizamshah, 1993, p. 24).

People's consumption patterns and eating styles appeared to have changed after each wave of disease. The decrease in population caused an increase in the share of food for the survivors. Additionally, medical knowledge focused more on the role of nutrition and eating habits in health. Therefore, the demand for food sources believed to be effective against the disease increased (Engelmann, Henderson, and Lynteris, 2019, pp. 34-37). The increase in the price of items needed by patients such as sugar, purslane seeds, and pears (Abdul Rahim, 2022, p. 700) during the return waves of the plague upset the balance between the available food resources and the population's needs. Scarcity, unavailability, and destruction of some important food sources led to famine, which in turn aggravated the spread of disease. As long as the productivity of the land was inherently limited, food shortages during periods of disease recurrence were seemingly inevitable. The inherent tension between population and resources made areas vulnerable to climate change, leading to hazards such as floods and crop failures. The consequence of these events caused extensive damage to people, infrastructure, and goods (Bavel, et al, 2020, pp. 16, 26, 100).

Conclusion

Plague in the urban communities of Herat and Cairo in the 9th century had various demographic and economic consequences. Although the types of damage in these two cities were similar, they were not the same in depth. Notably, the disease severely affected urban populations more severely than nomadic communities, rendering the established city of Cairo more vulnerable than the developing city of Herat during that century. Although several plague outbreaks directly reduced the population of Egypt and Cairo from 5 million to 4 million people, studies indicate a slower population recovery in Herat, following the Mongol invasions due to recurrent disease episodes. The experience of the people of Herat was to flee to the highlands and mountains to survive during the plague's return. In contrast, the people of Cairo found it compelling to flee the city to rural residences until the disease subsided. Of course, this escape often caused the disease to spread to other areas. Since the active and young population was crucial for maintaining economic and agricultural dynamism, the decrease in the population of Cairo was the reason for the destruction and stagnation of its economic and monetary system, along with the irrigation and agricultural system. In Herat, the effect of population decline on the agricultural economy was higher, but its recovery was more feasible since farming did not require specialized skills. However, it was impossible to compensate for the damage to Cairo's economic structure due to the loss of merchants and artisans who had become skilled in their work. The heredity of Siyurghal in Herat was the reason for its owner's attachment and investment for revival. By contrast, Cairo's non-hereditary land administration system discouraged owners from undertaking such efforts, hindering the city's ability to recover and compensate for losses.

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Ahmad Fazlinejad prepared the concept and the design. Acquisition of Data is done by



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