Bubonic plague in Eyam, 1665–1666

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Abstract

Historically, the term plague has been used to refer to many human calamities, epidemics and pandemics. Among the most deadly infectious diseases throughout mankind, Yersinia pestis bacteria has been implicated as far is known in three bubonic pandemics. The bubonic plague had been around in England for centuries since the second pandemic but 1665 was the worst outbreak of plague since the "black death" of 1348. The bubonic plague raged severely in a number of towns, while it lingered on in London. It killed about 100.000 people during 1665-1666 in all England. Meanwhile in Eyam village, 80 % of the population died during the 14 months of the bubonic plague, a greater percentage than any other community in England. The villagers suffered self-quarantine in order to save the county and neighboring towns from the bubonic plague, in lack of precise pharmaceutical treatments (as nowadays in the covid-19's pandemic). Eyam's self-quarantine's measures combined with nowadays medical knowledge can help contain infection, delay the spread of pandemics, reduce mortality rate and maintain the infrastructure of society.

Keywords

Bubonic pandemic, "black plague", Eyam, self-quarantine.

Résumé

Le mot 'peste' a historiquement été utilisé pour nombre de calamités, épidémies et pandémies dans le monde. Parmi les maladies infectieuses, la peste, produite par la bactérie Yersinia pestis, était la plus mortelle, et a été impliquée dans au moins trois grandes pandémies. Depuis la seconde pandémie, la peste bubonique avait été présente en Angleterre durant des siècles, mais en 1665 s'est manifestée la plus grave épidémie depuis la 'Peste noire' de 1348. La peste bubonique a ravagé un grand nombre de villes et villages, tandis qu'elle continuait à persister à Londres. L'épidémie a coûté la vie à environ 100.000 personnes en Angleterre pendant les années 1665-1666. En cette période, dans la communauté de Eyam, 80 % de la population a perdu la vie pendant les 14 mois de peste bubonique. Ceci représente le plus grand pourcentage de décès de toutes les communautés en Angleterre. A défaut de traitements pharmaceutiques efficaces (comme aujourd'hui avec la Covid-19) les villageois se sont mis eux-mêmes en quarantaine afin de sauver la province et les villages environnants de la peste. Un tel confinement spontané, comme celui des habitants d'Eyam, combiné avec d'autres mesures actuellement connues peuvent limiter l'infection, retarder l'extension de la pandémie et réduire la mortalité en maintenant l'infrastructure sociale.

Mots-clés

Pandémie de peste bubonique, 'mort noire', Eyam, confinement spontané.

Introduction

Historically, the term plague has been used to refer to many human calamities, epidemics and pandemics. Yersinia pestis bacteria have been implicated as far as known in three deadly worldwide bubonic pandemics, in addition to many other lethal outbreaks of smallpox and cholera, up to the 1918 influenza pandemic[1] and nowadays the covid-19 pandemic.
Plagues, epidemics and pandemics have ravaged humanity throughout its existence, often changing life's conditions and even their future.
The aim of this paper is to provide a brief historical overview of self-quarantine's measures in the English locality of Eyam during the bubonic plague of 1665–1666.

The bubonic plague or "black plague", caused by Yersinia pestis bacteria, has been one of the most deadly infectious diseases throughout mankind. It is a zoonosis, primarily found in rodents, although most mammals can be infected. Yersinia pestis bacteria[2] can be transmitted to humans through the bites of infected fleas (Xenopsylla cheopis) living on black rats, or through the bite of infected rats or other rodents[3].
The term *bubonic* is derived from the Greek word βουβών, meaning "groin", and refers to the "buboes" or swollen lymph nodes in the groin[4].
The three types of the plague caused by Yersinia pestis, depending on the route of infection are bubonic plague, septicemic plague, and pneumonic plague. Bubonic plague is mainly spread by infected fleas from small animals as rats. It may also result from exposure to the body fluids from a dead plague infected animal. In the bubonic plague, the bacteria enter through the skin through a flea bite and travel via the lymphatic vessels to a lymph node, causing it to swell[5].
One to seven days after exposure to the bacteria, flu-like symptoms develop and a few days later the victim's skin turns black in patches and inflamed glands or 'buboes' in the groin, neck or axilla's, combined with compulsive vomiting, swollen tongue and splitting headaches, leading to a terrible agonizing death.
The precise diagnosis is made since 1894 by finding the Yersenia pestis bacteria in the blood, sputum, or fluid from lymph nodes.

[1] Qiu et al 2016-2017
[2] Named after Alexander Yersin, bacteriologist, co-discoverer of the bacteria in 1894, together with Shibasaburō Kitasato. See Bibel and Chen 1976, Chugh 2018.
[3] Pechous et al 2016
[4] Marcovitch 2005
[5] Rosenstiel and Bateman 1951

The bubonic pandemics

As far as is known in western civilization, there have been three major deadly bubonic pandemics during the course of the mankind's times.

The first bubonic pandemic recorded about 541–767 a C. affected the Byzantine Empire and was named after emperor Justinian I, who was infected but survived. The pandemic resulted in the deaths of an estimated 25 million in 6th century outbreak to 50 million people in two centuries of recurrence. The first bubonic pandemic is estimated to have killed over 40% of the population in Euro-Asia[6].
The second bubonic pandemic occurred in the Late Middle Ages. Europe experienced the most deadly plague outbreak in mankind's history, whence the name "black death". The pandemic of bubonic plague hit in 1347, killing a third of the European human population, and an estimated 50 million people through Asia, Europe, and Africa[7].
The third bubonic pandemic (1855–1859) started most likely in the Yunnan province of China, where several natural plague foci existed. The bubonic pandemic remained localized in southwest China for several years before spreading to port cities throughout the world in the second half of the 19th century and early 20th century via shipping routes. It spread to all inhabited continents and killed over 10 million people in India alone[8].

The Bubonic plague of 1665-1666 in England

Life in seventeenth century in England was difficult for most people living at the bottom of the social order. Demographic and economic changes, alongside political turbulence, resulted in huge increases in numbers of poor people.
The bubonic plague had been around in England for centuries since 1348. In London 40,000 people had died only in 1625. Nevertheless the worst outbreak of bubonic plague in England since the "black death" occurred in 1665. About 15-20% of the population perished during this second bubonic plague in England[9]. It is possible that the geographic isolation of Britain and maybe also the climate explain why it was relatively spared by seventeenth century bubonic plague, both in terms of territorial pervasiveness of the bubonic plague and of mortality rates[10].
It began in London in the poor, overcrowded parish of St. Giles in the Field. It started slowly at first but in May of 1665, 43 had died although 6.137 people perished in June. At its peak in August, 31.159 people died.

[6] McCormick 2007
[7] Qiu et al 2016-2017
[8] Carmichael 2008
[9] Walløe 2008
[10] Dyer 1978

The first English quarantine regulations, drawn up in 1663, provided for the confinement in the Thames estuary of ships with suspected bubonic plague infected passengers or crew[11].

Incubation took four to six days and when the plague appeared in a household, the house was sealed. These houses were distinguished by a painted red cross on the door and the words, "Lord have mercy on us"[12].

King Charles II and his court left London in July 1665 for Hampton Court and then Oxford. Parliament was postponed and was relocated in October at Oxford. Court cases were also moved from Westminster to Oxford. Most doctors, lawyers and merchants equally left London; those people could send their families away from London during these months, but the poor had no recourse but to stay.

The authorities did not much, they left to help for themselves. Only a small number of clergy included the Archbishop of Canterbury and the Bishop of London, few doctors and pharmacists stayed in London with the intention of helping overcome the bubonic plague.

Those who remained tried to stop the infection from spreading with the use of flaming torches night and day, believing it would keep the air clean, and spices such as pepper and resins were used as incense to combat *miasma*. In addition, the authorities urged citizens to consume tobacco[13].

When the House of Lords lastly met to discuss the crisis in the summer of 1666, it was decided that, instead of delivering relief measures and aid, a policy of silence concerning infected persons and their household would be kept; this would however not apply to persons of note; moreover plague hospitals would not be built near to the homes of the nobility.

This movement of the rich, together with the normal trade pattern of England, meant that the bubonic plague spread quickly across the country. Rural areas that may previously have been safe from the diseases of urban areas, were also exposed. The bubonic plague extended to Essex, Deptford and Greenwich; another intense center of bubonic plague was Kent. Subsequently bubonic plague reached Sandwich, Dover and Canterbury. In addition it got spread in Norwich, Ipswich, Harwich, Woodbridge and the Eastern counties among others. Portsmouth had considerable outbreaks in the summer and Maidstone in the autumn of 1666. Infections significantly dropped off by May 1666, and people presumed the bubonic plague to be over but mutated to become pneumonic. This meant that instead of fleas having to bite humans to transmit the disease, humans could now transmit it to one another directly[14].

However, unlike the "black plague" in 1348, which had affected the whole countryside, the 1665-1666 bubonic plague remained mainly confined to the towns.

At last, from 1667 onwards, there was no epidemic of bubonic plague any more in any

[11] Roberts 1966
[12] Creighton 1891
[13] Creighton 1891, Charmichael 2006
[14] Rosenstiel and Bateman 1951, Pechous et. al 2008

part of England, though sporadic cases appeared up till 1679[15].
In all Britain people's lives and businesses suffered terribly because so many were shut in their homes. Countless were forced to beg or steal food and money because the bubonic plague had such a bad effect on their lives and trade.

Bubonic plague in Eyam during the years 1665–1666

The bubonic plague arrived in Eyam in late August 1665. Eyam was a small village in Derbyshire, lying between Buxton and Chesterfield.
Eyam village is approximately 12 kilometers west of Sheffield and 56 kilometers southeast of Manchester. It is just north of Bakewell in the Peak District[16]. Eyam had around 1666 three hundred and fifty inhabitants, living amongst the meadows, around which the hills towered. It had no resident doctor, but it had two ministers William Mompesson and Thomas Stanley, among the most educated people in the village[17].
Typically rural, most of its population consisted of farmers. In the early 1660s it did not stand apart from any of the other numerous villages that lined the trade routes from London to the rest of England.
In Eyam the first deaths occurred on September 6, and before the 30th four more had died; in the course of October twenty six more people with bubonic plague were buried. The deaths in November declined until June 1666, when the infection was revived. By August 78 new deaths occurred and another 15 had perished before October, when the mortality ceased[18].
Reverends Mompesson (Fig. 1) and Stanley established and agreed a plan with the villagers. The most important part of this was the instauration of a quarantine. The people built a boundary line around the outer edge of the village and no Eyam resident was allowed to pass it. Signs were built along the line to advise travelers not to enter. There were almost no attempts to cross the line during the time of the quarantine even at the peak of the bubonic plague in the summer of 1666. Eyam needed provisions and it was supplied with food and essentials from surrounding villages. To pay for these supplies the villagers left money in water troughs that were filled with vinegar. With the limited understanding they had, the villagers realized that vinegar helped to kill off the bubonic plague[19].

[15] Alfino 2013
[16] Howell 1969
[17] Race 1995
[18] Creighton 1891, Charmichael 2006
[19] Coleman 1986

Fig. 1. The plague's death at Eyam. Stained glass window at Church of St Lawrence in Eyam**.** Image 6/21. https://wherefivevalleysmeet.blogspot.com/2020

Other measures taken included the burying of all bubonic plague victims as quickly as possible and near to the place they died rather than in the village cemetery. They proved correct in their belief that this would reduce the risk of the bubonic plague spreading from corpses waiting to be buried. This was combined with locking up the church to avoid parishioners being crammed into church pews. They instead moved to open air services to avoid the spread of the bubonic plague[20].
Through 1665 to 1666; during 14 months, 80 % of the population died (Fig.2).

[20] Campbell 2013, Pechous et. al 2016

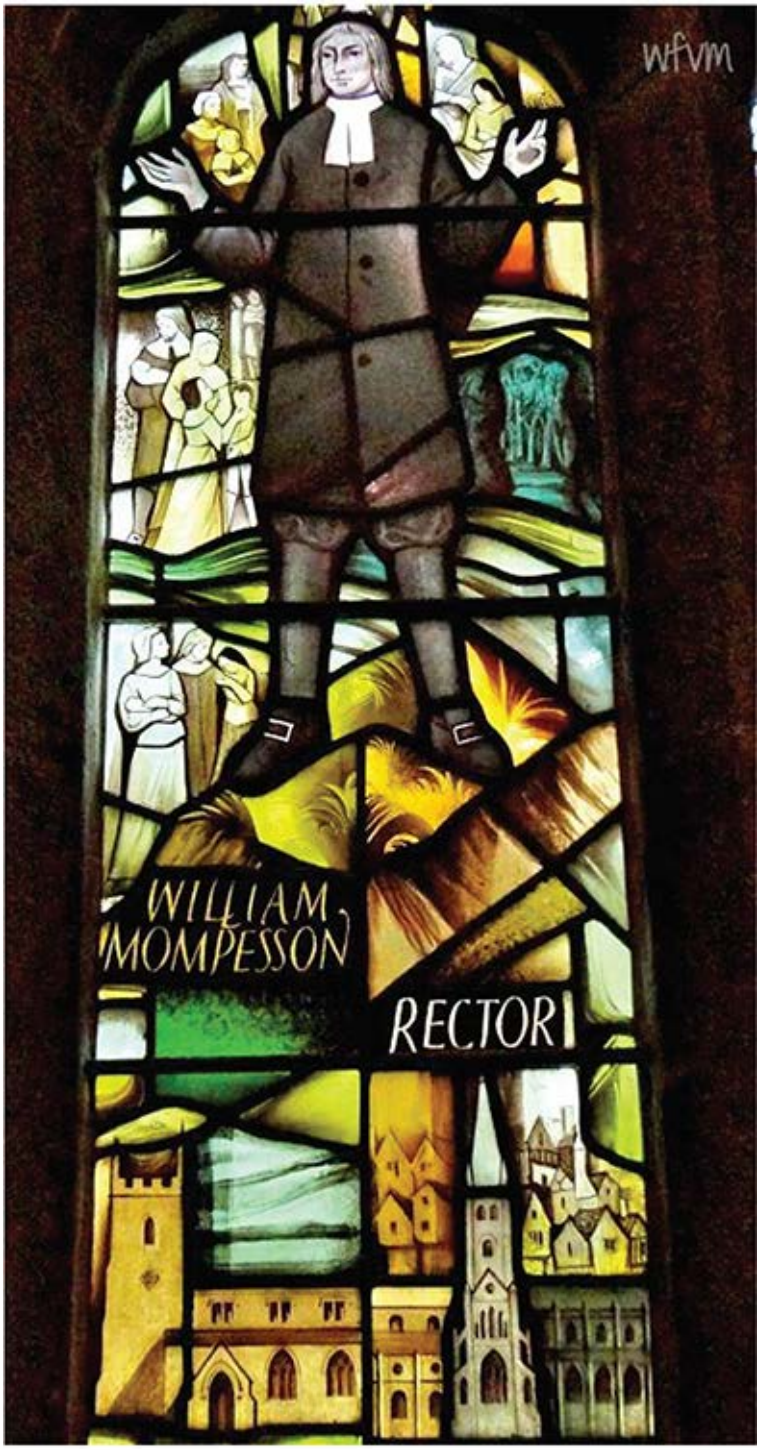

Fig. 2. Reverend William Mompesson. Stained glass window at Church of St Lawrence in Eyam**.** Image 8/21. https://wherefivevalleysmeet.blogspot.com/2020

The Eyam's villagers suffered self-quarantine in order to save the county and neighboring towns from the bubonic plague. Some of the survivors had passed through an attack of the bubonic plague, among them Stanley and Mompesson, who treated their buboes themselves[21].

[21] Creighton 1891, Race 1995

Discussion

A historical perspective can help to understand the extent to which people's ignorance concerning the origin of a disease, and the panic connected with social stigma and prejudice, frustrated public health efforts in controlling the spread of a pandemic. Since the fourteenth century, quarantine (from the Italian "quaranta," meaning forty) has been the cornerstone of a coordinated disease control strategy, including isolation, sanitary cordons, bills of health issued to ships, fumigation, disinfection, and regulation of groups of persons believed to be responsible for spreading the infection. Eyam's story remains a powerful example not only of how diseases were transmitted at that time, just as now, via trade routes and centers, but also of how successful social restriction can contain outbreaks. Medicine was helpless against the bubonic plague, the only way to escape infection was to avoid contact with infected persons and contaminated objects. In the small village of Eyam, this was done by paying for food supplies by dropping coins into pots of vinegar or water, preventing the coins from being directly handed over. This approach continues today with the use of sterilization of equipment and medical clothing. Most recently, lessons learnt from Eyam have been seen in the handling of the covid-19's pandemic.

Self-quarantine in a time of pandemics is also how we can battle a pandemic. The population of Eyam in 1665-1666 set a constructive pattern of how few courageous people can change the course of a vulnerable majority.

In the new millennium, the centuries old strategy of quarantine is becoming a powerful component of a public health response to emerging and reemerging infectious diseases. In the absence of precise pharmaceutical treatments (as nowadays in the covid-19's pandemic case), Eyam's self-quarantine's measures in combination with actual medical knowledge can help contain infections, delay the spread of pandemics, reduce mortality rate and maintain the infrastructure of society.

Dedication

This paper is dedicated to all worldwide health staff who are fighting against covid-19's pandemic.

Conflict of interest statement

The author declares that there are no conflicts of interest.

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