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Letter to the Editor

The Plague (Black Death) Is Still Around and May Come Back

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Abstract
Plague has been among the most devastating infectious diseases in human history. The decrease in the plague in recently reported cases and studies implies that the plague should not recur, but the fact is that it (Black Death) is still around and may appear again. The disease can be occult for many years. The reemergence of the plague epidemic with unusual clinical form, magnitude, and rapid expansion at any place and time without prior notice could pose a serious risk to public health. Plague outbreaks most likely result from the reactivation of organisms in local foci. The reemergence of foci suggests that environmental or climatic changes could be favorable for an epidemiological cycle of *Yersinia pestis*. Thus, countries harboring plague foci can be at risk of outbreaks in the future. Different epidemiological aspects of the plague must be emphasized in prophylactic medical plans and health education systems, and healthcare workers should be alert and aware of the natural cycle, as well as clinical symptoms and signs of plague. Finally, surveillance, education, and research are also suggested regarding this fatal infection and other emerging diseases.
Keywords: Plague, Black Death, Epidemic, Infectious Diseases, Epidemiology

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Dear Editor,

In 1894, Alexandre Yersin, a French and Swiss microbiologist, isolated a pathogen from the plague gland of a corpse in Hong Kong and named it Coccobacillus Yersinia. The causative agent of the plague (Black Death), as a fatal disease caused by *Yersinia pestis* with devastating impacts on human populations, has long been discussed between historians and scientists.[1] As the primary mode of transmission, *Y. pestis* is the only bacterium that uses an insect vector for successful transmission.[2]

Medical history has recorded three great pandemics of plague, namely, the Justinian plague in the 6th century A.D., the Black Death in 1347, and the third pandemic that started in 1855 in Yunnan Province of China.[3]

Currently, only Europe and Australasia are free of the plague and have not been reported as active areas for this disease while several regions are contaminated by the plague in the remaining continents. During the activity period of rodents and fleas in the active areas of the plague, several annual outbreaks of plague are associated with mortality and morbidity.[4]

At present, the Democratic Republic of Congo, Peru, Madagascar, and the USA are among the areas where the plague is most prevalent.[5]

Since members of the Canidae family feed on many resistant rodents in their habitat, serological studies on these animals can provide valuable information on the existence of infections in an area. Therefore, the study of any type of Canidae such as dogs, jackals, foxes, and the like is similar to the study of hundreds of rodents.[6]

Strict geographical distribution of plague takes the form of natural plague foci. Plague frequently occurs, fades out, and re-occurs whereas some natural foci of plague disappear and others reappear after a period of latency for many years. The reasons for the persistence and sudden disappearance of plague in the environment have not been understood yet. One of the main studies by Pasteur Institute of Iran has been announced that has raised the hypothesis of buried plague and the plague transmitted from the soil. The obtained result has rejected all kinds of theories about the secret of survival and persistence of plague germ in natural and permanent foci by plague experts.[7]

According to historical records, the plague has been active in several countries for centuries. Invalid documentation, insufficient information, and plague classification as other factors have hindered the detection of outbreaks over time. The rapid expansion of plague associated with high mortality rates may be related to a poor public health system, sparse treatment centers, the absence of effective quarantine settlements, and corpse washing in rivers before burial.[8]

Plague outbreaks are most likely derived from the reactivation of organisms in local foci. The reemergence of foci indicates that environmental or climatic changes could be favorable for an epidemiological cycle of *Y. pestis*.

Accordingly, countries harboring plague foci are probably at the risk of outbreaks in the future.[9] The presence of plague depends on the ecological interaction between resistant and susceptible rodent species in close contact with humans.[10]

Comprehensive studies of outbreaks and location records of plague can help clarify the current status of the disease in the world. Otherwise, the prevalence of the plague can continue without sufficient preparation and knowledge. Decreased case reports and studies of plague over the recent decades confirm its lack of re-occurrence. The disease may be silent for many years. Various epidemiological aspects of the plague should be emphasized in medical preventive plans and health education systems. On the other hand, healthcare workers should beware of the natural cycle and clinical signs and symptoms of plague. Moreover, surveillance, education, and research should also be recommended regarding this fatal infection and other re-emerging diseases.

Overall, there is a public health risk reappearance of an epidemic in an unusual clinical form, magnitude, and rapid expansion of plague at any place and time with no prior notice. Therefore, health care workers worldwide should be aware to prevent epidemics. In this condition, global multidisciplinary cooperation is essential to support surveillance capacity and community sensitization, improve microbiological testing, and protect healthcare staff. Eventually, more scientific plans are needed to improve diagnostic frames and immune response mechanisms in humans, present alternatives to effective treatment, and conduct studies to distinguish the causes of re-occurrence.

Ethical Approval

Not applicable.

Conflict of Interest Disclosures

The authors declare that they have no competing interests.

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