Black Death spread by humans, vindicating rats

By Meera Senthillngam, CNN

CNN) - One of the worst pandemics in human history, the Black Death, along with a string of plague outbreaks that occurred during the 14th to 19th centuries, was spread by human fleas and body lice, a new study suggests.

It was previously suggested that rodents, whose fleas can also transmit the bacteria behind the plague, were the main culprits behind Europe's second pandemic of the disease that saw a string of outbreaks occur in succession.

Plague is caused by infection with the bacterium Yersinia pestis and is typically spread through the bite of infected fleas, frequently carried by rats, causing bubonic plague. Symptoms include painful, swollen lymph nodes, called bubos, as well as fever, chills and coughing.

Pneumonic plague is more virulent or damaging and is an advanced form characterized by a severe lung infection. The infection can be transmitted from person to person via airborne droplets -- coughing or sneezing. Outbreaks still occur today, with an outbreak in Madagascar last year infecting more than 1,800 people.

To understand the historic outbreak, scientists from the University of Oslo modeled the three transmission routes for the disease -- rats, airborne and human fleas and lice -- using mortality data for nine outbreaks that spanned the time period of the second pandemic. Their analysis found that human ectoparasites, such as fleas, reflected the death trends most accurately.

The model outcomes therefore suggest the spread of the plague back then was mainly attributable to human fleas and body lice, according to the study published Monday.

"Our results support that human ectoparasites were primary vectors for plague during the Second Pandemic, including the Black Death," the authors write.

This challenges "the assumption that plague in Europe was predominantly spread by rats," they added.

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"This study uses mathematical modeling to try and determine how exactly the plague spread in Europe during the pandemic known as the 'Black Death'," said Raina MacIntyre, professor of Infectious Diseases Epidemiology at the University of New South Wales in Australia, who was not involved in the study.
Most naturally occurring plague is bubonic (affecting the lymph nodes, rather than the lung). Studies like this can help better understand rapid transmission of plague, which then points to the most suitable control measures.

**Brief Summary:** Studies have shown that human fleas and lice could have been more of a cause, rather than rats, of the Black Death.

**Local Impact:** Raised prices at local drug stores for lice treatment medicines.

**National Impact:** CDC regulations for lice strengthened.

**International Impact:** Precautions for lice and human flea treatments could become stricter across seas. Doctors and nurses could be retrained to look for signs of lice and human fleas in people and patients.

**Bibliography:**


**GP Prompt:** Section 2: Should there be limits to scientific research?

Without scientific research, our society would be clueless. I do not think there should be any limits to science because there is always something important to discover, like the fact that human fleas and lice could’ve spread the "Black Death" faster than rats, which was what scientists and medical professionals believed at the time. By increasing our knowledge, we can make life-saving advances in medicine that wouldn’t be possible if we held on to old beliefs and assumptions. Placing artificial limits on research can cost productivity and lives. Science gives us a better understanding of our universe and our society.