Epidemiological study on COVID-19 virus transmission network in northeast China

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Abstract

Objective: to analyze the epidemic situation of COVID-19 in northeast China, Liaoning and Jilin. To study the prevalence of COVID-19 virus in areas other than Hubei province. To understand the spread of COVID-19 in Liaoning and Jilin provinces by means of communication network. More in-depth understanding of COVID-19 epidemic, and put forward effective prevention and control recommendations.

Methods: We collected the demographic characteristics, exposure history and course of action of patients with laboratory-confirmed infection with COVID-19 published by Liaoning Provincial Health Commission and Jilin Provincial Health Commission as of February 15, 2020. We describe the demographic characteristics, case characteristics, spatial distribution characteristics and related interpersonal network of these patients. To analyze the transmission of COVID-19 in two provinces.

Results: By February 15, 2020, the cumulative number of infected people in Liaoning province was 119. The largest number was 27(22.7%) in Shenyang and the smallest in Fushun, with no reported cases of infection. Among them, 55(46.2%) have a history of sojourning in Hubei province. The mainly clinical symptoms of the infected patients were fever, and 67(56.3%) of them developed fever at the time of diagnosis. Cough, sneezing and other respiratory symptoms are less. The cumulative number of infected people in Jilin province was 89, with the highest number in Changchun city at 39(43.8%) and the lowest in Baishan city, with no reported infections. 21(23.6%) people with a history of sojourning in Hubei province. Most of those infected in the two provinces were related to Hubei province, and most of those infected in the second generation or more were infected by close contact with relatives.

Conclusion: The COVID-19 outbreaks in Liaoning and Jilin provinces are gradually stabilizing, but have not yet reached the time required to lower the prevention and control level. The fatality rate of the two provinces is relatively low. There is no evidence of super-spreader in either province.

Figures
Figure 1

the number of daily diagnosed cases and the cumulative diagnosed cases in Liaoning province

Figure 2

the number of daily confirmed cases and the cumulative confirmed cases in Jilin province
Figure 3

distribution of confirmed patients in Liaoning province. Note: The designations employed and the presentation of the material on this map do not imply the expression of any opinion whatsoever on the part of Research Square concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. This map has been provided by the authors.
Figure 4

distribution of patients in Jilin province. Note: The designations employed and the presentation of the material on this map do not imply the expression of any opinion whatsoever on the part of Research Square concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. This map has been provided by the authors.
Figure 5

Age distribution in the two provinces
Relationship of transmission among confirmed infected persons in Liaoning province. The arrow line represents an infected person with a transmissive relationship. The nodes connected by the arrowless wires indicate that they belong to the same family or participate in the same activity together.
Figure 7

Relationship of transmission among confirmed infected persons in Jilin province. The arrow line represents an infected person with a transmissive relationship. The nodes connected by the arrowless wires indicate that they belong to the same family or participate in the same activity together.

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