Different age pattern of COVID-19 cases in Hong Kong and Singapore by March 4, 2020

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Research note

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Abstract

Objective Coronavirus disease 2019 (COVID-19) now poses a huge threat to global public health and economics. It was found that elderly is more vulnerable to the infection. In this work, we compare the age structure of confirmed COVID-19 cases in Hong Kong SAR China and Singapore by March 4, 2020.

Results We find significant difference in age patterns of confirmed cases in these two localities. We highlight the potential importance of population age structure in confirmed cases, which should be considered in evaluation of the effectiveness of control effort in different localities.

Introduction

Singapore and Hong Kong are both praised as having taken “very effective” measures to intervene in the transmission of new coronavirus by a WHO official. To date, there are 112 cases in Singapore and 106 cases in Hong Kong. It seems that there is no significant difference in these two numbers given the fact that the measures adopted by Singapore are not as strict as those adopted by Hong Kong but both cities are at high importation risk due to the high proportion of mainland Chinese population flow. Therefore, some media held the view that Singapore adopted a plausibly proper but very effective strategy. In order to scientifically investigate the difference in the effectiveness of Singapore and Hong Kong, we performed several statistical tests of the new coronavirus cases of Singapore and Hong Kong in regard to their age distributions. We found that the situation in Singapore may attribute to the relatively large proportion of young generations in its population and there is no significant difference between the effectiveness of the measures adopted by Hong Kong and Singapore government.

Main Text

We obtained the data of the COVID-19 cases of Singapore and Hong Kong from Singapore and Hong Kong’s governmental websites. The imported cases and local cases of both districts were studied separately. And we obtained the age structure data of Hong Kong and Singapore separately from public websites. In order to compare the difference of age distributions of the two infected population and the effects of age structure. We performed the Wilcoxon rank-sum test to compare the age distributions of the infected patients in Hong Kong with those in Singapore. And then we divided age into age groups, and we counted the number of cases in each age group. We then used the Wilcoxon rank-sum test to compare the difference of age-specific incidence between the two populations. Lastly, we obtained the age-specific incidence rate by dividing the number of cases in each age group by the population of that group and then compared the age-specific incidence rate by the Chi-square test.

From the onset of COVID-19 to March 5, there have been 23 imported cases in Singapore and Hong Kong, respectively. The age distribution of imported and local cases can be seen in Table S1 and Figure S1, which was similar to an epidemiological analysis using outsourced data in Mainland China. Considering that Hong Kong has a total population of 700 million and is more geographically close to Mainland

China, the risk of importing COVID-19 cases should be higher than Singapore which has a total population of 500 million and less pressure of population mobility with Mainland China. Results by Wilcox test reported a significant difference in age patterns of both imported cases and local cases between the two places, with Hong Kong taking up a higher percentage of elderly cases. Nevertheless, this difference is no longer significant after the standardization of imported and local case numbers by each age category in Hong Kong and Singapore respectively, shown in Table 1 and Fig. 1. Therefore, it is reasonable to assume that the variation in age distribution of the cases might arise from the age structure of the population per se.

Table 1
The results of statistical tests

	Hong Kong Local Cases	Singapore Local Cases	Hong Kong Imported Cases	Singapore Imported Cases
p-value of age distribution (raw data)	1.66e-06		0.00182	
p-value of age-specific cases (5-year-bin group)	1.00		0.851	
p-value of age-specific incidence rate	0.111		0.006	

Since the elderly are more vulnerable to get infected after exposure and develop into severe cases, thus the population age structure, among other factors, should be considered when comparing the effectiveness of control measure in different localities.

Limitations

In this work, we only focus on the pattern of age of both local and imported COVID-19 cases in Hong Kong and Singapore. We argue that one should consider the population age structure when evaluating the risk of spreading and burden of COVID-19. We did not consider other factors such as occupation of patients and location of transmission such as in family or in community. A following work focusing on those factors is warranted.

Declarations

Ethics approval and consent to participate

The ethical approval or individual consent was not applicable.

Consent to publish

Not applicable.

Availability of data and materials

All data and materials used in this work were publicly available.

Competing Interests

DH was supported by an Alibaba-Hong Kong Polytechnic University Collaborative Research project. Other authors declare no competing interests.

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Authors' Contributions

All authors conceived the study, carried out the analysis, discussed the results, drafted the first manuscript, critically read and revised the manuscript, and gave final approval for publication.

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Figures

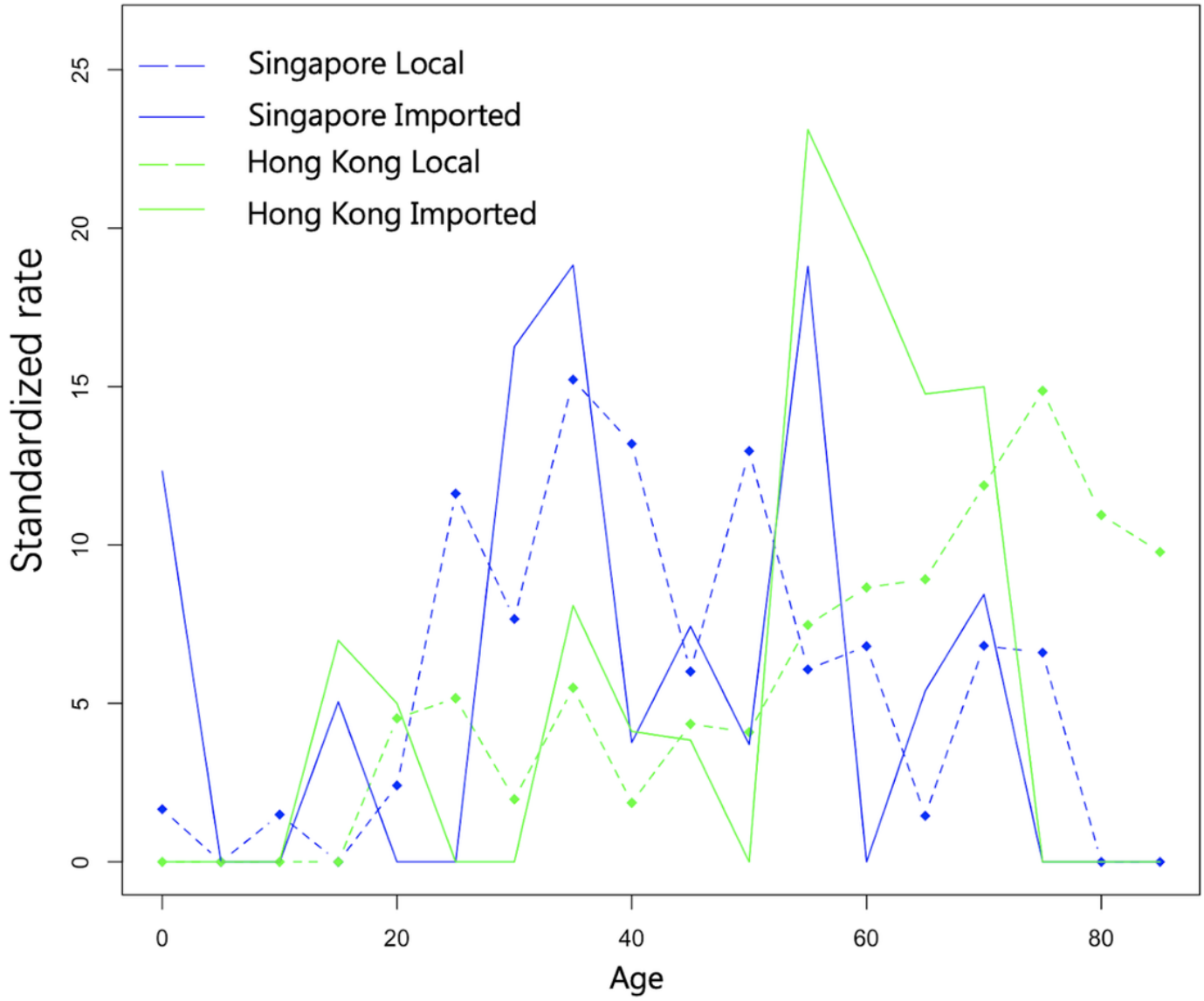

Figure 1

Standardized incidence rate of the four groups

Supplementary Files

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- AppendixTableandFigureofrawdata.docx