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Research Article

Urgent Prevention of Corona Virus Disease 2019 (COVID-19): Chinese Eating and Mask-Wearing Cultures

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Abstract

Chinese people have a very good mask-wearing culture; it is normal to wear masks to protect their faces from wind and pollution. Thus, they easily accept the wearing of masks to prevent infectious diseases, as seen with the Coronavirus Disease 2019 (COVID-19) in China today. However, Chinese people have a dangerous eating culture: they share foods or soups from the same bowls and pots using their personal chopsticks/spoons and emphasize loud talking when eating at banquets or at homes. We think this eating culture has raised the infection risk of COVID-19 from person to person by contamination. Therefore, in this paper, we propose models to elucidate how people are infected with COVID-19 through droplet transmission when eating with Chinese cultural context to address the urgent need to change Chinese eating culture; we believe these study models can help not only the Chinese people, but also other national people, to raise mindfulness of public health, prevent COVID-19 and other infectious diseases, during the present pandemic and in the future.

Keywords:
COVID-19; Droplet Transmission; Mask-Wearing; Eating Culture; Disease Prevention; China

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Introduction

An outbreak of coronavirus disease 2019 (COVID-19) started in Wuhan city, Hubei province of the People's Republic of China at the end of 2019. COVID-19 can be characterized as a pandemic [1], [2]. There are now more than 167,515 cases in 150 countries and 6,066 people have lost their lives as of 03/16/2020 [3].

There is evidence of COVID-19: person-to-person transmission in hospital and family settings, and reports of infected travelers in other geographical regions [4,5,6]. Human-to-human transmission has occurred among close contacts since the middle of December 2019. Considerable efforts to reduce transmission will be required to control outbreaks. Measures to prevent or reduce transmission should be implemented in populations [7], [8].

The coronavirus epidemic appeared to be nonlinear [9]; or exponential growth rate of the incidence [10], and was responsive to effective interventions [9]. The general public health professionals, clinicians and decision-makers need to take coordinative and collaborative efforts to control the epidemic [9], [11].

There is no proven treatment for COVID-19 at this early stage [12]. Although COVID-19 involves mostly mild infections among the majority of the general population, the risk of death among young adults is higher than that of seasonal influenza, and the elderly with underlying comorbidities require additional care [13].

A computational tool to assess the risks of novel coronavirus outbreaks was developed to estimate the key epidemiological parameters of 2019-nCoV. The estimating results show: uncertainty range is given where provided; rapid implementation of the control generates much smaller case numbers; risk of major outbreaks is a function of cumulative number of infectious cases [14].

In this study, we propose a possible relationship between infection pathways and the Chinese eating culture and we suggest that Chinese people change or improve their eating ways to prevent the diseases, especially contagious infectious diseases, at the present and future. To our knowledge, there is not any published model like ours in this study.

Finally, in the discussion of this article, we compare the Chinese and American eating and mask-wearing cultures, to reduce the infection and fatality rates of COVID-19.

Methods

We develop our models by analyzing Chinese eating culture, using the published official data and infection and virus theory [1,2,3,4,5,6,7,8,9,10,11,12,13,14].

Models

People in Wuhan city had a huge banquet with thousands of guests on 01/18/2020; and according to traditional culture, Chinese people have banquets every day from the day before the Chinese New Year (01/25/2020) to the 5th day after the New Year.

Figure 1 shows a scatter diagram of new confirmed infected cases of COVID-19 in China vs. date based on the national official data [2]. The peak value is on 02/04/2020, about 2 weeks after the banquets for

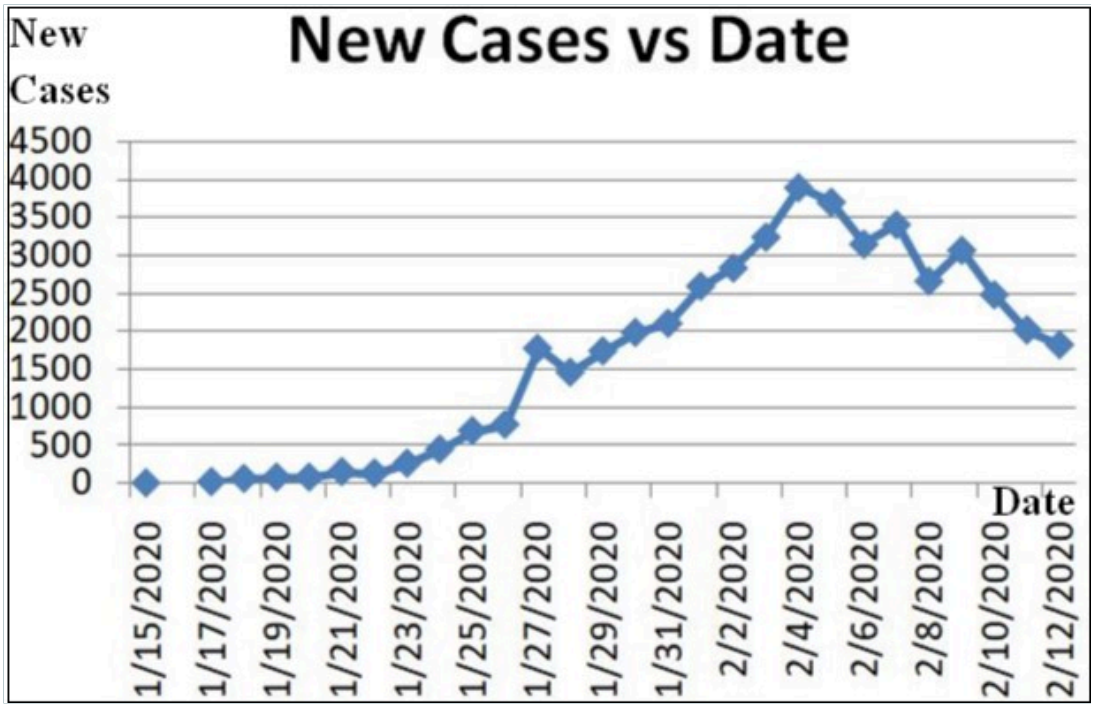


Figure 1. A scatter diagram of new confirmed infected cases (China) of COVID-19 in China vs. date 2.

the Chinese New Year; and the time interval between the banquets and the disease outbreak correlates with the incubation period of the disease [2].

Figure 2 illustrates a scattered diagram of new added deaths of COVID-19 in China vs. date. The peak values are from 02/12/2020 to 02/23/2020, about 45 to 55 days' delay from the discovery of the infectious disease and about 8 to 18 days' delay from the disease outbreak peak values.

Based on the above published official data [1], [2], we confirm the thought that COVID-19 is mostly spread by dispersion droplets into the air; the infectious agents are transmitted from one person to



Figure 2. A scatter diagram of new added deaths (China) of COVID-19 vs. date 2.

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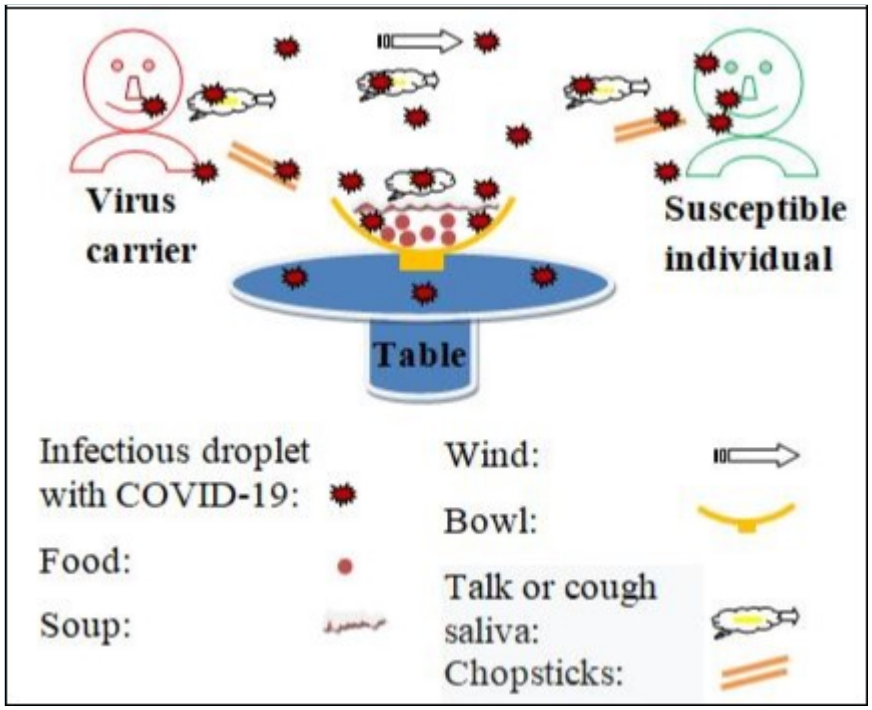


Figure 3. A possible correlation between the most disease infection ways and the Chinese eating cultures (style).

another by at least two routes when eating: (1) airborne, i.e., droplets are expelled from the upper respiratory tract through sneezing, coughing, talking; (2) materials, i.e., the droplets are transported by foods (soups) or eating tools, winds. The victim's breathing (inhalation) is the final and common way for the two routes.

If droplets contain virus, all people exposed to the virus droplets have the risk to be infected by the virus from the infecting agent. Virus carriers can infect susceptible individuals by all of the two routes.

Figure 3 demonstrates our model of possible correlation between the most disease infection ways and the Chinese eating cultures. When the Chinese hold banquets or eat with family members at homes, multiple people share public dishes, foods or soups with their personal chopsticks or spoons.

The details of Chinese eating culture are the following: people sit closely together around a table; on the table, each shared dish is put in one big plate, or a shared soup in one big bowl; there are usually four dishes and one soup for dinners at home, and more (even numbers) than eight dishes and two soups for a meal at a banquet or gathering; each person uses a pair of personal chopsticks to pick up the shared foods from the plates or bowls. Obviously, the Chinese style eating is not sanitary and healthy because the droplets with the virus can be transmitted from person to person by the contaminated materials including foods, soups, drinks, steam or water vapor, airs/winds or tools.

To exacerbate the sanitation situation, there is an emphasis to talk frequently and loudly throughout the meal: (assisted by natural or artificial winds, such as fans or air conditionings) the droplets with the virus can fly from the infecting agents **(**virus carriers) into other people's respiratory systems to directly infect the other people as well as fly into all of the dishes and soups, the tables and chairs, to indirectly infect other people, as long as the other people, dishes and soups or tables and chairs are close enough to the virus carrier.

The most unsanitary aspect of the Chinese eating culture is the tendency for people to pick, select or fiddle the shared foods with personal chopsticks that they have contaminated with their mouth, tongue, or saliva; after picking up a food with the contaminated chopsticks, they look at the food for a while, then they immediately drop the food back into the shared dish plate if they don't like it, leading to other people, from the plate, picking up and eating the contaminated food. Finally, disease infection occurs.

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Figure 4. A family banquet in a modern city of central China. We can see the steam or water vapor that came from the pot and could spread the droplets (The face blurring is to protect the eaters. The picture was taken by Changhua Zou).

Three recent case reports supported our models: (1) Nine of ten of a family members and relatives were infected with COVID-19 in the same house in late January 2020 [15]; (2) All nine people of a family were infected with COVID-19 in their family banquet, eating hot pot, in Hong Kong on 02/09/2020 [16]; (3) In a restaurant in Guangzhou, Guangdong Province, China, on January 24, 2020, three families who didn't know each other sat down at three adjacent tables for lunch. The two families were from Guangzhou with a total of 6 people; one family comes from Wuhan, a total of 10 people. The distance between the tables is only 1 meter. By early February, all six people from Guangzhou were infected with COVID-19; four of the ten people from Wuhan were carriers of COVID-19 [17].

Figure 4 shows a family banquet in a modern city of central China. Typically, about 8 or 10 people sit closely together around a food table and enjoy delicious foods in hot pots (sometimes the foods are not boiling or boiled). Obviously, they were sharing the public foods with their personal chopsticks. They also share cold dishes in the same way.

Figure 5 illustrates a wedding banquet in a countryside village in deep mountains in southwest China. 10 people were eating closely with more people waiting for the next round.



Figure 5. A wedding banquet in a countryside village in deep mountains in southwest China (The picture was taken by Vivien Cheng).

Discussions

For analysis of the data on the subject in the models, the merits are that we propose some of the possible ways of COVID-19 infection, and correlations between the eating and masking cultures and the infections; and the demerits are that data are not complete; we will improve the models in our future studies.

Although the models of this study are about the impacts of Chinese eating and mask-wearing cultures on the propagations of COVID-19, we believe that they can provide inspiration or a clue (references) for how other cultures in the world can spread infectious diseases.

We believe it will be very helpful for curing the disease to drink more warm soup (or juice) with complete nutrients [18], because we often have no appetite when we are sick, according to our previous initial clinical trials of treating flu infection before [19], [20]. Of course, often cleaning our hands, faces and taking warm showers are very significant to prevent or cure the diseases too.

We suggest, during a virus epidemic season, turning off the central air conditionings because they are able to transmit virus from room to room as well as from person to person.

In Figure 1, because the statistical method has been changed since 02/12/20, the data lacks comparability before and after the date. Therefore, in Figure 1, we do not include data after 02/12/20.

In the pictures, we can see that Chinese eating culture, regardless of whether it is of people from villages of deep mountains or in modern cities, is the same or similar throughout the country. Sometimes, people will drink with the same wine glass to show brotherhood or friendships.

In some high-quality restaurants in China, public spoons are placed in each large plate or pan (pot) to help consumers consume food. However, many diners still do not use the public spoons and continue to use their personal spoons or chopsticks to obtain the communal food because they feel that using a communal spoon will hurt the feelings of other diners. Other diners are usually family members, relatives, friends or colleagues. They worry that the other diners would think feel prejudiced for being dirty.

Of course, Chinese and Asian people have a very good mask-wearing culture: they always or often use masks to protect themselves from pollution, such as smog, pollen, making it easy to accept masks as preventative measures against infectious diseases.

As a comparison, American people do not have the mask-wearing culture, because they don't like to use masks even if they are sick during flu season. In America, if someone uses a mask, it usually only means that they are sick and American people like to show they are healthy, strong and able to work/socialize. We believe that if the Americans have a culture of wearing masks like the Chinese, then the infection and fatality rates of COVID-19 (or influenza) will be greatly reduced.

Finally, in terms of eating culture, the American and Western eating culture is healthier and more sanitary than the Chinese. In the American style, everyone eats food pre-portioned in his or her own plate or bowl, similar to how people eat on an airplane. People eat food alone, closing their mouths when chewing, and talk more quietly and less frequently. Therefore, the American style reduces the risk of droplet infections compared to the Chinese style. We believe that if the Chinese have an eating culture like the Americans, then the infection and fatality rates of COVID-19 (or influenza) will be greatly reduced.

Conclusions

We believe that if the Chinese have an eating culture like the Americans, or the Americans have a culture of wearing masks like the Chinese, then the infection and fatality rates of COVID-19 (or influenza) will be greatly reduced respectively in their nations. Therefore, to urgently prevent COVID-19, Chinese people should learn eating culture from American people and American people should learn mask-wearing culture from Chinese people.

Competing Interests

The authors have declared that no competing interests exist.

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