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Corona Virus problem: A systemic review

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Abstract
COVID-19 is caused by a coronavirus called SARS-CoV-2. Older adults and people who have severe underlying medical conditions like heart or lung disease or diabetes seem to be at higher risk for developing more serious complications from COVID-19 illness. It is thought to spread mainly from person to person, mainly through respiratory droplets produced when an infected person coughs or sneezes. These droplets can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs. Spread is more likely when people are in close contact with one another (within about 6 feet). It may be possible that a person can get COVID-19 by touching a surface or object that has the virus on it and then touching their own mouth, nose, or possibly their eyes. This is not thought to be the main way the virus spreads, but we are still learning more about this virus.
The virus that causes COVID-19 is spreading very easily and sustainably between people. Information from the ongoing COVID-19 pandemic suggests that this virus is spreading more efficiently than influenza, but not as efficiently as measles, which is highly contagious.

Keywords: introduction, description, conclusion

Introduction
The first cases of corona virus infection in Saudi Arabia, specifically Jeddah, were reported on June 13, 2012; after this outbreak, corona virus continued to spread overseas to many countries in Asia, Africa, Europe, and America. During this outbreak, most cases occurred in Middle Eastern countries, including those in the Gulf region (Saudi Arabia, Qatar, United Arab Emirates, Oman, Bahrain, Kuwait, and Iraq), as well as Jordan, Syria, Lebanon, Palestine, and Egypt. These countries were considered to be at high risk for corona virus infection according to the European Centre for Disease Prevention and Control (ECDC). Thus, any person arriving from any of these countries should be screened at the airport before entering, particularly after several cases of infection were reported in European countries, including France and the United Kingdom [1].

The corona virus responsible for this outbreak was a novel virus that mainly affected adults. The transmission mechanism and potential treatment strategies were still unclear. Notably, although this virus initially appeared to only affect adults, cases have also been observed in pediatric patients. Thus, this novel, potentially fatal virus represented a substantial public health risk. In this review, we discuss the history, epidemiology, and molecular mechanisms of this novel virus, called the Middle East respiratory syndrome corona virus (MERS-CoV) [1].

History of the corona virus
Corona virus was first identified as a cause of the common cold in 1960. In one study carried out in Canada in 2001, more than 500 patients presented with flu-like symptoms. Virological analyses showed that 3.6% of these cases were positive for the HCoV-NL63 strain by polymerase chain reaction (PCR). Until 2002, corona virus was considered a relatively simple, nonfatal virus; however, an outbreak in 2002–2003 in Guangdong province in China, which resulted in spread to many other countries, including Thailand, Vietnam, Taiwan, Hong Kong Singapore, and the United States of America, caused severe acute respiratory syndrome (SARS) and high mortality rates in over 1000 patients. After this outbreak, microbiologists and infectious disease experts focused on the understanding the pathogenesis of the disease and discovered that this infection was caused by a new form of corona virus. A total of 8096 individuals were infected with this virus, resulting in 774 deaths; thus, in 2004, the Centers for Disease Control and Prevention (CDC) [2] and World Health Organization (WHO) declared a state of emergency. In another report from Hong Kong, 50 patients presented with SARS, and more than 60% of these patients were positive for corona virus. The evolution of this virus demonstrated that coronavirus is not a stable virus and can adapt to become more virulent, even lethal, to humans. Indeed, another outbreak in Saudi Arabia in 2012 resulted in many [3] deaths and spread first to other countries in the [4] Middle East and [5] then worldwide, resulting in renewed interest in studies [6] of this new form of coronavirus [1].

Animals, virus and cells
The Veterinary Science Animal Care Committee (VSACC) and Health Science Animal Care Committee (HSACC) have approved the use of specific pathogen free (SPF) chickens used in all our experimental procedures. One day old unsexed SPF layer chickens (White Leghorn) were obtained from the Canadian Food Inspection Agency (CFIA), Ottawa, and raised

to six days of age for use in these experiments. These chickens were not immunized and were housed in high containment poultry isolators at the University of Calgary's Spyhill campus or at the Foothills campus, with ample access to a standard food ration and water.

Conn A5968 and M41 strains of IBV as well as avian fibroblast cells line (DF-1) were purchased from American Type Culture Collection (ATCC, Manassas, Virginia, United States). The macrophage cell line, Muquarrab Qureshi-North Carolina State University (MQ-NCSU), which is derived from mononuclear cells harvested from the spleen of a chicken was kindly gifted by Dr. Shayan Sharif (University of Guelph, Canada). MQ-NCSU cells were maintained in LM-HAHN media and fungizone (250μg/ml) at 40°C and 5% CO_2The vesicular stomatitis virus tagged with green fluorescent protein (VSV-GFP) was obtained from Dr. Markus Czub, University of Calgary, Canada [7].

Discussion

In response to the epidemic, China has launched the first-level response to major public health emergencies. As of 24:00 on February 5th, the National Health Commission has received a total of 28 018 confirmed cases reported. The number of confirmed cases is far more than the total number of confirmed cases of a severe acute respiratory syndrome (SARS) worldwide, which indicates that the infectivity of SARSCoV-2 is higher than that of SARS coronavirus. There have been 3859 severe cases, 563 fatal cases, and more than 110 confirmed cases in children. The disease is still in progress.**3** SARSCoV-2 is the seventh coronavirus that can infect humans and belongs to the β-coronavirus group. Current research shows that SARSCoV-2 may come from wild animals, but its specific source needs further study. SARSCoV-2 is a new β-coronavirus, and its gene sequence is most similar to that of viruses isolated from bats, but there is likely an unknown intermediate host. At present, it has been found that patients with SARSCoV-2 infection are the main source of infection, and the transmission effect of asymptomatic patients should not be underestimated. According to the current data, the main routes of transmission are respiratory droplet transmission and contact transmission. Close contact with patients with SARSCoV-2 infection and asymptomatic infection is the main way to cause children's infection. It has also been reported that SARSCoV-2 can also be transmitted through aerosols, the fecal-oral route, and suspected mother-to-infant transmission.

The incubation period of SARSCoV-2 infection in children is 1 to 14 days, generally 3 to 7 days. The clinical manifestations are asymptomatic or include fever, fatigue, and dry cough; a few patients have upper respiratory tract symptoms, such as nasal obstruction, runny nose, and sore throat; and a few patients have gastrointestinal symptoms, such as abdominal discomfort, nausea, vomiting, stomachache, and diarrhea. From the current situation of pediatric cases, most of the clinical manifestations are relatively mild, with no fever or pneumonia, and have a good prognosis. Most children have recovered within 1 to 2 weeks, but some pediatric cases may progress to lower respiratory tract infection. The clinical classification of COVID-2019 is divided into four types. (a) Asymptomatic infection (recessive infection): the SARSCoV-2 etiology test is positive, but there are no corresponding clinical symptoms, and imaging examination is normal. (b) Acute upper respiratory tract infection: only fever, cough, pharyngeal pain, nasal obstruction, fatigue, headache, myalgia, or discomfort are observed. There is no pneumonia manifestation on imaging examination or pyemia. (c) Mild pneumonia: with or without fever and accompanied by respiratory symptoms such as cough; chest imaging examination shows pneumonia manifestations but does not reach the threshold of severe pneumonia. (d) Severe pneumonia: any of the following: (i) respiratory rate increase: RR ≥ 70 times/min under 1-year old or RR ≥ 50 times/min over 1-year old, excluding the effects of fever and crying; (ii) oxygen saturation <92%; (iii) manifestations of anoxia: auxiliary respiration (moaning, nasal flaring, and triretraction sign is positive), cyanosis, and intermittent apnea; (iv) disturbance of consciousness: drowsiness, coma, and convulsion; and (v) food refusal or feeding difficulty and dehydration signs. (e) Critically ill children: those who meet one of the following conditions and need ICU monitoring and treatment: (i) respiratory failure with mechanical ventilation; (ii) shock; and (iii) combination with other organ failures.

Compared with the clinical characteristics of adult cases, the obvious phase of symptoms lasts for 1 to 2 weeks after the disease, and the detoxification period can lasts for 3 to 4 weeks or longer. The condition of children is obviously milder, recovery faster, and have a better prognosis. We observed that the SARSCoV-2 infection in the two children was characterized by familial aggregation, which further proved that SARSCoV-2 had the characteristics of human-to-human transmission. And the conditions of the two cases were relatively mild, while the six adults who were in close contact with them all had symptoms such as high fever and dyspnea. Case 1 with SARSCoV-2 infection had only mild respiratory tract infection symptoms, the chest CT indicated pulmonary infection, and case 2 had no clinical manifestations of infection. The laboratory examination, including the blood test, CRP, liver, and kidney function and myocardial zymogram, and so forth of the two infected children were not significantly abnormal, which was different from the SARSCoV-2 infection in an adult. In addition to the symptoms of severe respiratory tract infection, most of the adult patients with different degrees of abnormal liver function. At present, there were no obvious manifestations of abnormal liver function among the children infected with infection in domestic reports.Among the confirmed cases of the SARS, there were only 135 cases of infection in children, and there were no deaths in children under 12 years old. The MERS caused 2143 people infected and 750 fatal cases, while 11 children been confirmed to be infected with MERS, the symptoms were mild. The symptoms of children infected with SARSCoV-2 are mild or even asymptomatic, which may be its characteristic. With the wide application of pathogen detection, whether the number of cases in children will increase needs to be observed with more clinical data.

According to the current epidemiological data, the infection rate of SARSCoV-2 to children is low. Studies have demonstrated that SARSCoV-2 has a similar binding receptor

and binding properties to SARS-CoV, namely the S protein of coronavirus, which is mainly responsible for binding to the receptor protein of the infected host, enabling the virus to invade and infect host cells. Studies have shown that angiotensin-converting-enzyme-2 (ACE2) is the receptor protein of S protein, which provides evidence for human infection of SARSCoV-2. The study analyzed the mononuclear RNA sequencing data of more than 430 000 human lung cells (non-SARSCoV-2 infection), and found that more than 80% of the ACE2 in the lung was distributed on the surface of type II alveolar epithelial cells (AT2). ACE2 is necessary for SARSCoV-2 to enter into cells and may be one of the receptors of SARSCoV-2. The reason for the low susceptibility of children to SARSCoV-2 may be related to the imperfect development and function of ACE2 protein, or the intracellular response induced by ACE2 in alveolar epithelial cells of children is lower than that of adults. In addition, it may also be related to the imperfect innate immune development of children, and the subsequent low level of adaptive immune response. The symptoms of COVID-2019 in children are mild which may be related to areduce inflammatory response because the immune system in children is less well developed. Epidemiological studies show that 43 of 99 adults infected with SARSCoV-2 have different degrees of abnormal liver function. Further studies showed that the abnormal liver function of the patients infected with SARSCoV-2 may be caused by bile duct cell dysfunction and other reasons, but not related to the direct damage of hepatocytes. In addition, children are susceptible to a variety of viruses, such as influenza viruses, parainfluenza viruses, adenoviruses, respiratory syncytial viruses, and rhinoviruses. Antibodies produced after infection may cross-react with the coronaviruses to provide some protection. Further studies are needed to confirm whether these manifestations lead to differences in the clinical manifestations of children and adults were infected, whether there are still unexplored mechanisms.

In view of the fact that SARSCoV-2 infection has caused serious social harm and adverse effects, seriously affected people's normal life, therefore, early detection, diagnosis, and timely treatment is an urgent task at present.

The viral nucleic acid detection is still the only gold standard, but clinicians will cross verify according to clinical manifestations and CT images to improve the accuracy. Viral nucleic acid testing is high specificity, but low sensitivity and high technical requirements and the disease changes of pathogen carriers may limit the timeliness of nucleic acid testing. Studies have shown that infection can be limited to the lower respiratory tract. Diagnostic swab samples, which are obtained from the upper respiratory tract, can be negative in the context of typical chest CT findings. In addition, false-negative results can be caused by the wrong collection method and the long storage time (degradation of viral nucleic acid). Early CT scanning may detect significant changes. The suspected diagnosis of children infected with SARSCoV-2 requires a clear epidemiological, including (a) travel or living history of Wuhan and surrounding areas, or other communities with the patients within 14 days before the onset of the disease; (b) contact history with SARSCoV-2-infected people (nucleic acid test is positive) within 14 days before the onset of the disease; (c) contacted the patients with fever or respiratory symptoms from Wuhan and surrounding areas, or from the community with the case report, have been within 14 days before the onset of the disease; (d) clustering occurrence. And two of the following three clinical manifestations can be diagnosed. The clinical manifestation: (a) fever and/or respiratory symptoms; (b) early chest imaging examination showed multiple small patch shadows and interstitial changes, which were obvious in the peripheral lung, and then developed into multiple ground glass shadows and/or infiltrating shadows in both lungs. Lung consolidation and pleural effusion were rare in severe cases; (c) the total number of WBC in the early stage of the disease was normal or decreased, or the lymphocyte count was decreased. Confirmed cases need to have met one of the two conditions: (a) nucleic acid of SARSCoV-2 test in respiratory or blood samples is positive; (b) the viral gene sequencing of respiratory or blood samples is highly homologous with the SARSCoV- This change clarifies the diagnosis of SARSCoV-2 infections in children, although a small number of cases need to be further assessed based on clinical dynamics.

In terms of treatment: the SARSCoV-2 vaccine is still under development, and there is no specific drug at present. It is mainly targeted at symptomatic and supportive treatment. Keep internal environment stable and and respiratory frequency of patient. Oxygen therapy according to the condition. Some antiviral drugs (such as interferon) can be effective, if combined with a [3] bacterial [3] infection, can be treated with appropriate antibiotics [8].

Respiratory infections stemming from influenza viruses and the Severe Acute Respiratory Syndrome corona virus (SARS-CoV) represent a serious public health threat as emerging pandemics. Despite efforts to identify the critical interactions of these viruses with host machinery, the key regulatory events that lead to disease pathology remain poorly targeted with therapeutics. Here we implement an integrated network interrogation approach, in which proteome and transcriptome datasets from infection of both viruses in human lung epithelial cells are utilized to predict regulatory genes involved in the host response. We take advantage of a novel "crowd-based" approach to identify and combine ranking metrics that isolate genes/proteins likely related to the pathogenicity of SARS-CoV and influenza virus. Subsequently, a multivariate regression model is used to compare predicted lung epithelial regulatory influences with data derived from other respiratory virus infection models. We predicted a small set of regulatory factors with conserved behavior for consideration as important components of viral pathogenesis that might also serve as therapeutic targets for intervention. Our results demonstrate the utility of integrating diverse 'omic datasets to predict and prioritize regulatory features conserved across multiple pathogen infection models [9].

A high diversity of corona- and paramyxoviruses have been detected in different bat species at study sites worldwide, including Africa, however no biosurveillance studies from Rwanda have been reported. In this study, samples from bats collected from caves in Ruhengeri, Rwanda, were tested for

the presence of corona- and paramyxoviral RNA using reverse transcription PCR assays. Positive results were further characterized by DNA sequencing and phylogenetic analysis. In addition to morphological identification of bat species, we also did molecular confirmation of species identities, contributing to the known genetic database available for African bat species. We detected a novel *Betacoronavirus* in two Geoffroy's horseshoe bats (*Rhinolophus clivosus*) bats. We also detected several different paramyxoviral species from various insectivorous bats. One of these viral species was found to be homologous to the genomes of viruses belonging to the *Jeilongvirus* genus. Additionally, a *Henipavirus*-related sequence was detected in an Egyptian rousette fruit bat (*Rousettus aegyptiacus*). These results expand on the known diversity of corona- and paramyxoviruses and their geographical distribution in Africa [10].

Since the National Health Commission identified COVID-19 as a B type infectious disease officially, COVID-19 influenced the psychological states of people across China. This study collected active Weibo users' data, and conducted sentiment analysis during 13–26 January, 2020. We used OER to acquire the psychological states, and found that Weibo users' psychological conditions significantly changed under the outbreak of COVID-19.

The findings showed that people's concerns by linguistic expression increased after January 20. We observe an increase in health and family, while a decrease in leisure and friend. Uncertainty of the upcoming situation causes cognitive dissonance and insecurity; this produces a feeling of mental discomfort, leading to Weibo's activity oriented toward dissonance reduction and keeping security on health and family relationship. According to the theory of BIS, people behave in a more reticent and conservative way when they feel threatened by disease. Therefore, staying at home with family and reducing recreational activities seems to be a safer way to prevent illness. It also indicated that people begin to care more about their health and were more likely to seek social support from their families rather than getting together with friends, which suggested that people' interests and attention were influenced by the restricted travel policy and self-isolation regulations from the health authorities and central government.

Affected by COVID-19, messages related to death and religion became salient after 20 January. Reports showed severity and potential mortality of COVID-19. Research confirmed that people tended to respond to emergencies such as stress or death in the way of religion, which can comfort tense moods and bring more positive emotions That is why people prayed for the county through religion or other beliefs, leading to the phrase that appeared most frequently on the Internet at that time: God bless China.

People showed more negative emotions (anxiety, depression, and indignation) and less positive emotions (Oxford happiness) after the declaration of COVID-19, which was supported by the theory of BIS, i.e., people did generate more negative emotions for self-protection These results are consistent to previous studies as well, which found that public health emergencies (e.g., SARS) triggered a series of stress emotional response containing a higher level of anxiety and other negative emotions]. Meanwhile, the confirmation that COVID-19 could be passed from person to person on 20 January, which was inconsistent with previous reports, lead to quite a number of people being unsatisfied with misinformation published from provincial governments (e.g., Hubei) and ineffective regulatory actions, causing an increase in indignation. However, it's worth noting that the word frequency of positive emotions increased after 20 January, which seemed to be inconsistent with the theory of BIS. In fact, positive emotion includes words such as faith and blessing, which are more inclined to reflect group cohesiveness rather than pure personal emotions (e.g., happiness). Researchers found that group threats (e.g., natural disasters and epidemic diseases) made groups a community of interests, resulting in more beneficial behaviors and social solidarity, which indicated higher group cohesiveness. For example, lots of provinces (e.g., Sichuan Province, Shandong Province, etc.) formed medical teams to help the Hubei province, which was the worst affected area. Many people donated money and supplies to Hubei Red Cross to support the control of COVID-19.

Furthermore, social risk judgement was higher and life satisfaction was lower after the declaration of COVID-19. It is consistent with the theory of BIS, which found that when social uncertainty increased, such as unknown etiology and ambiguous route of transmission, people developed the negative cognitive assessment (e.g., higher sensitivity of risk judgment or risk perception) so that they could discover potential infection sources in time and avoid infection Not only that, people's fear of potential risk and lack of controllability caused by COVID-19 brought about higher risk judgement as perceived risk theory claimed Moreover, some preventive policies and regulations in terms of travel restriction and self-isolation made the quality of life worse, reflecting in lower life satisfaction.

The following briefly foregrounds some of the study's implications for policy makers and clinical practitioners (e.g., social workers, psychiatrists, and psychologists) plan and fight against COVID-19. For policy makers: (1) develop a consistent policy and procedure for reporting the latest confirmed cases, recent death toll, and other data about the epidemic situation. For example, the surge of cases on February 12th did not mean that the situation has been out of control, but because of the new diagnostic criteria introduced. It is important to let people understand the data properly to reduce excessive stress responses (e.g., anxiety, depression, etc.) brought on by inappropriate perception. (2) Expand public awareness of continuous progress in decision-making measures. Since indignation may come mainly from mistakes and deficiencies in preventing and controlling the epidemic, it can effectively decrease indignation if public awareness and involvement are provided. (3) Ensure the supply of medical treatment service. It is critical to set up medical service to treat the disease, and let people know how to access it conveniently. People can get help in time if they are infected. It can improve people's sense of control over risks, thereby avoiding excessive social risk perception. (4) Provide more in-door entertainment services to address good quality of life. People may be more willing to cooperate when their living

and entertainment requirements are met, such as online shopping, entertainments, etc. For clinical practitioners: (1) adjust consultant configuration rationally and cooperate with each other. Psychological consultants should grasp the epidemic information correctly and conduct science popularization during counseling. Social workers can help solve practical problems in life. These actions can improve the sense of stability and relieve anxiety and depression. (2) Deliver necessary psychosocial therapy in various ways. Considering the particularity of self-isolation, relevant hotline counseling and online consulting should be applied in practice.

Several other points should be considered when generalizing this study's findings. First, as Weibo users are mainly young people, the results may be biased to some extent. In addition, the current analysis is based on a weekly basis, with a relatively large granularity, which has certain influences on reflecting the changing trend of social mentality in a timely manner. In further studies, we will try to expand the range of sex and age and predict psychological traits in a finer granularity. Previous studies indicated that people tended to exaggerate attitudes and prejudices, especially when they felt more vulnerable to disease transmission It inspires us to try to build a prediction model which can predict people's attitudes and beliefs against the virus through online Weibo data for further understanding of psychological impacts of public health emergencies [11].

5. Conclusions

In this study, we compared the difference before and after 20 January on both linguistic categories and psychological profile. We found an increase in negative emotions (anxiety, depression, and indignation) and sensitivity to social risks, as well as a decrease in positive emotions (Oxford happiness) and life satisfaction after declaration of COVID-19 in China. What's more, people show more concern for health and family, and less concern for leisure and friends. Using social media data may provide timely understanding of the impact of public health emergencies on the public's mental health during the epidemic period.

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