

**NEW PROPHYLACTIC MEASURES IN PREVENTING COMPLICATIONS OF VIRUS
INFECTION COVID-19****Dr. Ivan Minić***

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ABSTRACT

Background: Coronavirus Disease 2019 (COVID-19) is a respiratory disease caused by a new virus that first emerged in December 2019 and has since spread to many countries. In the current situation where COVID-19 is rapidly spreading worldwide and the number of cases in Europe is rising with increasing pace in several affected areas, there is a need for immediate targeted action. There were strong evidences of human-to-human transmission of 2019-nCoV among the close contacts of infected patients. The most common symptoms at onset of COVID-19 illness are fever, cough, and fatigue, while other symptoms include sputum production, headache, haemoptysis, diarrhoea, dyspnoea, and lymphopenia. The virus lingers on the mucous membranes of the nose and in the oral cavity before being transmitted to the lungs. Method: The aim of this paper is to consider additional measures for the prevention of viral infection. Steam inhalation is one of the most widely used home remedies to soothe and open the nasal passages and get relief from the symptoms of a cold or sinus infection. Also called steam therapy, it involves the inhalation of water vapor. The introduction of water vapor into the nasal spaces and sinuses can also affect viruses and in this situation the virus COVID -19. Sodium hypochlorite (NaOCl), commonly known as "bleach," is widely accepted as being a safe and effective antiseptic against bacteria, fungi, and viruses. The author's recommendation is that each person uses NaOCl at a concentration of 0.05% or 0.1% 2 times a day after contact with another person and after spending time outside the home. It is thought that mouthwashing alone will contribute to the reduced concentration of viruses in the oral cavity and NaOCl will also exert its antiviral effect. Result: The result of this research could be to prevent the spread of the virus into the deeper parts of the airways, which is an important prevention of the complication of viral infection. Conclusion: Based on available data on the virus COVID-19, its transmission, retention in the nasal mucosa and oral cavity the application of water vapor to the nasal cavities and the application of a solution of NaOCl could contribute to the reduction of virus activity in the indicated regions of the body and thus reduce the possibility of virus transmission in deeper parts of the airways. These preventive measures have been used in medicine for many years, have no negative effects on health and can be applied in the situation of a pandemic virus COVID-19.

KEYWORDS: Coronavirus, Water vapor, Sodium hypochlorite.**INTRODUCTION**

Coronavirus Disease 2019 (COVID-19) is a respiratory disease caused by a new virus that first emerged in December 2019 and has since spread to many countries. In December 2019, a cluster of pneumonia cases, caused by a newly identified β -coronavirus, occurred in Wuhan, China. This coronavirus, was initially named as the 2019-novel coronavirus (2019-nCoV) on 12 January 2020 by World Health Organization (WHO). WHO officially named the disease as coronavirus disease 2019 (COVID-19).^[1]

As of 26 March 2020, a total of 416,686 cases of COVID-19 have been confirmed worldwide, confirmed deaths in 18,589 cases, the virus has spread to 197 countries.^[2]

In the current situation where COVID-19 is rapidly spreading worldwide and the number of cases in Europe is rising with increasing pace in several affected areas, there is a need for immediate targeted action. The speed with which COVID-19 can cause nationally incapacitating epidemics once transmission within the community is established, indicates that in a few weeks or even days, it is likely that similar situations to those seen in China and Italy may be seen in other EU/EEA countries or the UK.

The recently identified SARS-CoV causes a life-threatening pneumonia, and is the most pathogenic human coronavirus identified thus far. The risk of transmission of COVID-19 in health and social institutions with large vulnerable populations is

considered high. The impact of transmission in health and social institutions can be mediated by the application of effective infection prevention and control and surge capacity.

The epidemic of unknown acute respiratory tract infection broke out first in Wuhan, China, since 12 December 2019, possibly related to a seafood market. Several studies suggested that bat may be the potential reservoir of SARS-CoV-2^[3] Based on virus genome sequencing results and evolutionary analysis, bat has been suspected as natural host of virus origin, and SARSCoV 2 might be transmitted from bats via unknown intermediate hosts to infect humans. It is clear now that SARS-CoV-2 could use angiotensin converting enzyme 2 (ACE2), the same receptor as SARS-CoV, to infect humans.^[4]

The SARS-CoV-2 is a β -coronavirus, which is enveloped non-segmented positive-sense RNA virus (subgenus sarbecovirus, Orthocoronavirinae subfamily).^[5]

EPIDEMIOLOGY

There were strong evidences of human-to-human transmission of 2019-nCoV among the close contacts of infected patients. Researches has shown that a number of infected people do not show symptoms of infection. These asymptomatic infected people may pose a serious risk for the transmission of infection to healthy population.^[6]

The symptoms of COVID-19 infection appear after an incubation period of approximately 5.2 days⁽⁷⁾. The period from the onset of COVID-19 symptoms to death ranged from 6 to 41 days with a median of 14 days⁽⁸⁾. The most common symptoms at onset of COVID-19 illness are fever, cough, and fatigue, while other symptoms include sputum production, headache, haemoptysis, diarrhoea, dyspnoea, and lymphopenia.^[9,10,11]

Similar to SARS-CoV, the transmission of 2019-nCoV may occur predominantly through direct mucous membrane (nose, mouth or eye) contact with infectious respiratory droplets within close vicinity of an infected person, and/or through exposure to fomites, such as hand-to-mouth (or hand-to-nose and hand-to-eye) contact with fomites, and inhalation of virus-containing aerosols generated from the evaporation of respiratory droplets produced by patients during coughing, sneezing or even talking^[12] Research on SARS-CoV indicates that the aerosol should not be distributed evenly in an enclosed space, that is, the aerosol concentration decays as one moves away from the source.^[13] Thus, close or long-term contact with an infected patient is considered to be a major risk factor for infection.

For some infected people, their protective immunity in upper respiratory tract system is weaker (especially those older or frail people) and the 2019-nCoV has more

opportunities to invade the lower respiratory tract. After the entry of virus in the lower respiratory tract, the S-proteins on the surface of the 2019-nCoV can bind to the surface receptors (ACE2) of sensitive cells (AT2), then leading to the development of pneumonia.^[14]

Based on the current information, most patients had a good prognosis, while a few patients were in critical condition, especially the elderly and those with chronic underlying diseases.

There are many doubts as to how temperature affects the COVID-19 virus. Rough observations of outbreaks of COVID-19 outside China show a noteworthy phenomenon. In the early dates of the outbreak, countries with relatively lower air temperature and lower humidity (e.g. Korea, Japan and Iran) see severe outbreaks than warmer and more humid countries (e.g. Singapore, Malaysia and Thailand) do.^[15]

Scientific research on related viruses has shown that an increase in temperature has the effect of reducing viral activity. The study conducted between 11 March and 22 May 2003 in Hong Kong 19 showed that SARS-CoV incidences sharply decreased as temperature increased from 15°C to 29°C, after which it practically disappeared. In this study, incidences under the cooler end of the gradient were 18-fold higher than under the opposite warmer end of the gradient.^[16] The mechanism underlying these patterns climate determination is likely linked with the ability of the virus to survive external environmental conditions prior to reaching a host. For example, a study examined survival of dried SARSCoV Coronavirus on smooth surfaces and found that it would be viable for over 5 days at temperatures ranging between 11-25°C and relative humidity of 40-50%, drastically losing viability as temperatures and humidity increased.^[17]

Work hypothesis

This paper proceeded from the following assumptions:

1. As an emerging acute respiratory infectious disease, COVID-19 primarily spreads through the respiratory tract, by droplets, respiratory secretions, and direct contact.^[16]
2. These pathogens can be picked up by our hands and get into the body through mucous membranes on the face — eyes, nose, and mouth — that act as pathways to the throat and lungs.
3. That the virus lingers on the mucous membranes of the nose and in the oral cavity before being transmitted to the lungs
4. That with increasing temperature there is a decrease in virus virulence, from related groups of viruses tested so far

The aim of this paper is to consider additional measures for the prevention of viral infection. The recommended preventive measures so far in preventing the spread of COVID-19 virus have shown some degree of success.

Currently, the use of personal protective equipments, such as N95 respirators, surgical masks, gloves and goggles can offer a level of protection against the transmission of the coronavirus.^[18,19]

The main risk factors for 2019-nCoV infection may be the inappropriate use of respirators or masks, or the use of masks with lower filtration efficiency when people are in direct contact or close proximity to infected patients.⁽²⁰⁾ The development of the protective drugs or vaccines for 2019-nCoV is in the process. A potential problem is that if the production of drugs can meet the needs of a large number of people in a short period.

Considering the known characteristics of the virus, the author came up with the following ideas in order to protect each individual additionally and act preventively, to prevent the virus from moving to the lungs and to prevent further complications. Based on the known facts that the virus first settles in the oral cavity and nasal mucosa, the author proposes the following preventive measures:

1. Inhalation of water vapor, whose temperature is above 50 degrees into the nasal corridors and sinuses, can be inactivated by the virus.
2. Rinse the mouth with a solution of sodium hypochlorite against bacteria, fungi, and viruses.

Water vapor, water vapour or aqueous vapor is the gaseous phase of water. It is one state of water within the hydrosphere. Water vapor can be produced from the evaporation or boiling. Water vapor is transparent, like most constituents of the atmosphere.⁽²¹⁾

Steam inhalation is one of the most widely used home remedies to soothe and open the nasal passages and get relief from the symptoms of a cold or sinus infection. Also called steam therapy, it involves the inhalation of water vapor. The warm, moist air is thought to work by loosening the mucus in the nasal passages, throat, and lungs. This may relieve symptoms of inflamed, swollen blood vessels in your nasal passages.

The water vapor temperature is over 50 degrees. The introduction of water vapor into the nasal spaces and sinuses can also affect viruses and in this situation the virus COVID -19. The use of water vapor by inhalation can prevent the spread of viral infection. This method can be applied by all individuals worldwide. Easy to use, there are no side effects and no cost. The author believes that the temperature and humidity of water vapor will certainly influence the reduced virulence of the virus in the nasal cavities and sinuses.

Inhalation process, recommendation

Need the following materials: a large bowl, water, a pot or kettle and a stove or microwave for heating up water, towel.

Process

Heat up the water to boiling. Carefully pour the hot water into the bowl. Drape the towel over the back of your head. Turn on a timer.

Shut eyes and slowly lower head toward the hot water until you're about 8 to 12 inches away from the water. Be extremely careful to avoid making direct contact with the water. Inhale slowly and deeply through your nose for at least two to five minutes. Don't steam longer than 10 to 15 minutes for each session. However, you can repeat steam inhalation two or three times per day. The recommendation of the author is that any person who was out of the house or in contact with people should be inhaled after coming home, thus preventing the spread of COVID-19 to the lungs.

Sodium hypochlorite (NaOCl), commonly known as "bleach," is widely accepted as being a safe and effective antiseptic against bacteria, fungi, and viruses. Sodium hypochlorite at 0.5% (Dakin's solution) was used with great success to control infections of combat wounded soldiers during World War I, before antibiotics.^[22]

Sodium hypochlorite (NaOCl) is one example of a potent, safe, and inexpensive antiseptic used for decades in dentistry, particularly as an efficient irrigating solution in endodontic treatment.^[23] In several studies, different concentrations of NaOCl have been used in oral rinse formulations (0.05%, 0.1%, 0.25%, 0.5%, and 1%).^[24] In dentistry, the most commonly used solution is concentration 0.05% and 0.1%.

The active species is undissociated hypochlorous acid which is lethal to most bacteria, fungi and viruses. Interference of cytoplasmic membrane integrity by an irreversible enzymatic inhibition, biosynthetic alterations in cellular metabolism and phospholipid degradation. Sodium hypochlorite presents with high surface tension and minimum inhibitory concentration lower than 1% for resistant microorganisms. The concentration rise is in proportionate to the antimicrobial effect and tissue dissolution capacity.^[25]

The author recommendation is that each person uses NaOCl at a concentration of 0.05% or 0.1% 2 times a day after contact with another person and after spending time outside the home. It is thought that mouthwashing alone will contribute to the reduced concentration of viruses in the oral cavity and NaOCl will also exert its antiviral effect. NaOCl is marketed worldwide and is cheap.

CONCLUSION

Based on available data on the virus COVID-19, its transmission, retention in the nasal mucosa and oral cavity the application of water vapor to the nasal cavities and the application of a solution of NaOCl could contribute to the reduction of virus activity in the indicated regions of the body and thus reduce the

possibility of virus transmission in deeper parts of the airways. These preventive measures have been used in medicine for many years, have no negative effects on health and can be applied in the situation of a pandemic virus COVID-19. Certainly, the described measures must be scientifically confirmed by research in the future, however, in the current situation of mass spread of the virus in the world, the author believes that they can be added to the already prescribed preventive measures.

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