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REVIEW: A Review on Prevention, Transmission and Symptoms of the COVID-19

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ABSTRACT

Introduction: Coronavirus belongs to a family of viruses that can cause symptoms such as pneumonia, fever, shortness of breath and lung infection. On December 29, 2019, the World Health Organization (WHO) coined the term New Coronavirus 2019 to refer to a coronavirus that affects the lower respiratory tract of patients with pneumonia in Wuhan, China. The new coronavirus was first identified in Wuhan, among a number of patients with an unknown form of viral pneumonia who also had a history of Huanan seafood market.

Material and Methods: In this study, the websites of PubMed, Google Scholar, SID, and Magiran were searched and related articles were reviewed.

Results: Symptoms of COVID-19 occur after a period of 2 to 10 days and the period of symptoms resulting in death of patients varied between 6 to 41 days. Common symptoms at the onset of the disease are fever, cough, and fatigue. Each carrier is reported to infect an average of 3.77 others.

Conclusion: Regarding the way of transmission of viral diseases of the upper respiratory tract, such as COVID-19, i.e., the transmission by respiratory droplets as well as close communication between individuals, solutions have been recommended by experts. Researchers are suggesting not touching the T-zone on the face, using a mask and following the principles of social distancing are the most effective ways to control the disease. Due to the lack of definitive treatment or effective vaccine for COVID-19 so far, following these principles has a significant role in combating this pandemic.

Introduction

Viruses have always been a potential threat to human life and can cause serious detriments to human societies (1). The advent of the twentieth century has been accompanied by the emergence of novel viruses that have endangered global health (2). The latest of these emerging viruses was the SARS-CoV-2 virus in Wuhan, China (Hubei Province) and its rapid spread worldwide (3). Coronavirus belongs to a family of viruses that can cause symptoms such as pneumonia, fever, shortness of breath, and lung infection. These viruses are common among animals around the world, yet very few of them have been identified to infect humans. On December 29, 2019, the World Health Organization (WHO) used the term new coronavirus 2019 to refer to a coronavirus that affects the lower respiratory tract of patients with pneumonia

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in Wuhan, China (4).

A number of animal viruses that have the potential of person-to-person transmission, such as HIV, Ebola, and some coronaviruses, can cause deadly diseases. When human communities are initially infected with these viruses, there is usually no effective or specific treatment or vaccine available, which can result in significant losses in the early outbreak (5, 6). By extracting the genetic material of the new coronavirus 2019 and conducting research on it, researchers have found that the coronavirus has a similar origin to SARS and some animals such as bats and snakes maybe its intermediate hosts (5, 7).

On February 11, 2020, the virus was named severe acute respiratory coronavirus 2 or SARS-CoV-2. The virus is the seventh member of the coronavirus family to infect humans. On January 30, 2020, the World Health Organization classified the epidemic caused by the virus as a public health emergency. The disease caused by SARS-CoV-2 was named COVID-19 (8). In addition to the previous outbreak of coronaviruses, including Acute Respiratory Syndrome (SARS-CoV) and Middle East Respiratory Syndrome (MERS-CoV), SARS-CoV-2 implicate in severe lower respiratory tract infections in humans and is recognized as a major threat to general human health (9).

SARS-CoV-2, a coated virus, contains positive single-stranded RNA and belongs to the *Coronaviridae* family (1, 2). The *Coronaviridae* family has four genera: alpha, beta, delta and gamma. SARS-CoV, SARS-CoV-2 and MERS-CoV viruses are categorized in the beta-coronavirus category (10).

The new coronavirus disease 2019 (COVID-19) was first identified in Wuhan, China, in December 2019, among several patients with an unknown form of viral pneumonia who also had a history of presence in Huanan seafood market. Compared to SARS and MERS, the new coronavirus disease (COVID-19) has spread more rapidly (11).

Methods

In the present study, which was conducted by unsystematic review method, the data were collected using keywords and phrases of Coronavirus, COVID-19, Coronavirus disease and a combination of those and searched in Pubmed, Google Scholar, Embase and SID (Scientific Information Database) were collected and the results of the studied articles were summarized.

Results

Symptoms

Symptoms of new coronavirus disease (COVID-19) appear after a period of 2 to 10 days, and the period from onset of symptoms to death of the patients varies between 6 to 41 days and averages around 14 days. This period depends on the immune system strength as well as the patient's age so that it was shorter among patients over 70 years old compared to patients under 70 years old (12). In another study, the incubation period of COVID-19 was shown to average 3 to 7 days, with a maximum of 14 days (7, 13). Common symptoms at the onset of the disease are fever, cough, and fatigue, and other symptoms include headache, sputum production, bleeding, diarrhea, indigestion, and decreased lymphocyte count (9, 13). Most people with coronavirus have mild symptoms, such as a dry cough, sore throat, and fever, which in most cases resolve spontaneously (9). Chest sonography in patients has shown symptoms such as pneumonia, but other symptoms have also been reported such as acute respiratory syndrome, acute heart failure, and fibrotic pulmonary lesions that have resulted in death (14).

Huang et al. found that 98% of COVID-19 patients in the study had a fever; Of these, 78% had a body temperature above 38 °C. Also, 76% of patients had cough, 44% had muscle fatigue and pain, and 55% had shortness of breath. 28% of patients had expectoration of sputum, 8% of headache, 5% of bleeding and 3% of diarrhea. Abnormalities in CT scan images of the chest were observed in 100% of patients and in 98% of the lungs on both sides of infected patients, grinding glass-like and consolidation areas were found (15, 16).

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In a study by Lin et al., On 95 patients with SARS-CoV-2, 58 (11.6%) of patients had gastrointestinal symptoms, of which 11 (49.5%) on admission and 47 on hospitalization had shown symptoms. Diarrhea, anorexia, and nausea were the main gastrointestinal symptoms in patients in this study respectively. Stool samples were taken from 65 hospitalized patients to evaluate for the presence of new coronavirus, of which 42 had gastrointestinal symptoms but 23 did not. Among 42 patients with gastrointestinal symptoms, 22 had a fecal test, and 23 patients without gastrointestinal symptoms, 9 had a positive fecal test, indicating that the gastrointestinal tract could also be a potential route of transmission and target organ for SARS-CoV-2 (17).

Guan et al. reported 1,099 cases of COVID-19. They considered the symptoms of fever with 87.9% and cough with 67.7% as the most common symptoms of this disease. Symptoms of vomiting with 5% and diarrhea with 3.7% were also rare. CT scan images showed abnormalities in 96% of patients and lymphopenia in 82.1% (18, 15).

One of the challenges in identifying patients with new coronavirus (SARS-CoV-2) is the variety and extent of the symptoms. Some patients may show only one of the symptoms but because it is ignored by the patient and normal social communication is kept thus lead to the infection of other people.

Disease Transmission

During the latent period of the disease, carriers can infect many other people. It is reported that each carrier is able to infect an average of 3.77 individuals (13, 19).

According to researches, person-to-person transmission of COVID-19 is done by micro-respiratory droplets as well as close communication (21, 20), but further studies is required to affirm the transmission through airborne droplets as well as fecal-oral transmission (13).

A study by Bai et al. in 2020 confirmed the person-to-person transmission of COVID-19, however, stating that transmission from asymptomatic carriers by normal CT scan of the chest is not reported (22).

Ghinai et al. reported the first known case of SARS-CoV-2 person-to-person transmission in the United States. On January 23, 2020, the COVID test was positive for a 19-year-old woman who traveled to Wuhan, China, in mid-January, in the state of Illinois. Despite not traveling to Wuhan, her husband tested positive 8 days after her. Individual transmission in this case, between a patient and a healthy person, followed a long-term relationship and in a situation where the patient had symptoms (23).

Prevention

The basic principles in the prevention and control of infectious diseases are the destruction of the source of infection, the cessation of the transmission of the disease, as well as the protection of suspected populations (8). The patients with COVID-19 are the main source of infection; however asymptomatic patients can also play a role as a source of infection (8, 24, 25).

With the increase in the number of patients with COVID-19, prevention also becomes important and, of course, urgent (13, 26). One of the most important ways to reduce the number of patients is to diagnose the patients on time, as well as to observe the principles of social distancing and in acute conditions, general quarantine.

One of the most important and effective behaviors in personal protection to prevent infection with SARS-CoV-2 is not to touch the T-zone in the face, which is considered to have a great effect on preventing the infection. Importantly, this behavior should be put into serious consideration due to the lack of need for special equipment, (27).

In 2020, Feng et al. examined the need to use a mask in the COVID-19 pandemic. This study, while comparing the recommend-dations of various health authorities in this regard, considers the use of the mask if it is available, especially for those who are in contact with people with symptoms, the elderly or those who leave the house for any reason (28).

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Discussion

In late 2019, a pathogen caused acute respiratory disease in Wuhan, China, emerged which was renamed later to acute respiratory coronavirus 2 on February 11, 2020 (8). Researchers around the world then began researching and studying this new virus. According to the studies, children under 10 years and women are less likely to be infected with SARS-CoV-2 (29). Also, the average age of patients was reported 59 years and 56% of patients were men (30).

According to information from patients with SARS-CoV-2, the most common symptoms are fever, cough, and fatigue, and other symptoms include headache, sputum, bleeding, diarrhea, indigestion, and decreased lymphocyte count (9,13).

Many patients in the early pandemic of the new coronavirus used shared medical and laboratory facilities. This is a factor in transmitting the disease and accelerating the spread of the virus (31, 32). Another factor accelerating the outbreak of the disease is the movement of patients in medical centers and the use of facilities such as shared W.C. , so that hospitals around the world became one of the main centers of disease outbreak after a while (31, 33).

During a pandemic, the social behavior of individuals in society has a very effective role in controlling or exacerbating the disease. Researchers and experts have recommended solutions for the transmission of viral diseases of the upper respiratory tract, including COVID-19, which involves the transmission of micro-respiratory droplets as well as close communication between individuals. Researchers consider not touching the T-zone in the face (27), the use of masks, especially for those who are in contact with people with symptoms (28), and following the principles of social distancing as effective ways to control the disease. Due to the lack of definitive treatment or effective vaccine for COVID-19 so far, compliance with these cases has a significant role in combating this pandemic.

By recognizing the symptoms and informing the community correctly and increasing people's awareness of the symptoms, it is possible to identify more patients at the beginning of their infection or by quarantining them, to prevent the further spread of the disease.

Conclusion

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References

1. ul Qamar MT, Shahid F, Ashfaq UA, Aslam S, Fatima I, Fareed MM, et al. Structural modeling and conserved epitopes prediction against SARS-COV-2 structural proteins for vaccine development. 2020.
2. Rasheed MA, Raza S, Zohaib A, Yaqub T, Rabbani M, Riaz MI, et al. In Silico Identification of Novel B Cell and T Cell Epitopes of Wuhan Coronavirus (2019-nCoV) for Effective Multi Epitope-Based Peptide Vaccine Production. 2020.
3. Ahmed SF, Quadeer AA, McKay MR. Preliminary identification of potential vaccine targets for the COVID-19 coronavirus (SARS-CoV-2) based on SARS-CoV immunological studies. Viruses. 2020;12(3):254.
4. Adhikari SP, Meng S, Wu Y-J, Mao Y-P, Ye R-X, Wang Q-Z, et al. Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus disease (COVID-19) during the early outbreak period: a scoping review. Infectious diseases of poverty. 2020;9(1):1-12.

[DOI: 10.18502/tbsrj.v2i4.5468]

5. Taheri S. A Review on Coronavirus Disease (COVID-19) and What is Known about it. Depiction of Health. 2020; 11(1): 87-93. (Persian)
6. Wilson ME, Chen LH. Travellers give wings to novel coronavirus (2019-nCoV). Journal of Travel Medicine. 2020;27(2).
7. Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, et al. A Novel Coronavirus from Patients with Pneumonia in China, 2019. New England Journal of Medicine. 2020;382(8):727-33.
8. Yang P, Wang X. COVID-19: a new challenge for human beings. Cellular & Molecular Immunology. 2020;17(5):555-7.
9. Irani M. Review on the Symptoms, Transmission, Therapeutics Options and Control the Spread of the Disease of COVID-19. Alborz University Medical Journal. 2020;9(2):171-80. (Persian)
10. Xia S, Liu M, Wang C, Xu W, Lan Q, Feng S, et al. Inhibition of SARS-CoV-2 (previously 2019-nCoV) infection by a highly potent pan-coronavirus fusion inhibitor targeting its spike protein that harbors a high capacity to mediate membrane fusion. Cell research. 2020;30(4):343-55.
11. Peeri NC, Shrestha N, Rahman MS, Zaki R, Tan Z, Bibi S, et al. The SARS, MERS and novel coronavirus (COVID-19) epidemics, the newest and biggest global health threats: what lessons have we learned? International journal of epidemiology. 2020.
12. Wang W, Tang J, Wei F. Updated understanding of the outbreak of 2019 novel coronavirus (2019-nCoV) in Wuhan, China. Journal of Medical Virology. 2020;92(4): 441-7.
13. Xu J, Zhao S, Teng T, Abdalla AE, Zhu W, Xie L, et al. Systematic comparison of two animal-to-human transmitted human coronaviruses: SARS-CoV-2 and SARS-CoV. Viruses. 2020;12(2):244.
14. Rothan HA, Byrareddy SN. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. Journal of autoimmunity. 2020:102433.
15. Farnoosh G, Alishiri G, Hosseini Zijoud SR, Dorostkar R, Jalali Farahani A. Understanding the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) and Coronavirus Disease (COVID-19) Based on Available Evidence - A Narrative Review. Journal of Military Medicine. 2020;22(1):1-11. (Persian)
16. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. The Lancet. 2020;395(10223): 497-506.
17. Lin L, Jiang X, Zhang Z, Huang S, Zhang Z, Fang Z, et al. Gastrointestinal symptoms of 95 cases with SARS-CoV-2 infection. Gut. 2020;69(6):997-1001.
18. Guan W-j, Ni Z-y, Hu Y, Liang W-h, Ou C-q, He J-x, et al. Clinical characteristics of 2019 novel coronavirus infection in China. MedRxiv. 2020.
19. Yang Y, Lu Q, Liu M, Wang Y, Zhang A, Jalali N, et al. Epidemiological and clinical features of the 2019 novel coronavirus outbreak in China. MedRxiv. 2020.
20. Carlos WG, Dela Cruz CS, Cao B, Pasnick S, Jamil S. COVID-19 Disease due to SARS-CoV-2 (Novel Coronavirus). American Journal of Respiratory and Critical Care Medicine. 2020;201(4):P7-P8.
21. Li X, Zai J, Wang X, Li Y. Potential of large “first generation” human-to-human transmission of 2019-nCoV. Journal of Medical Virology. 2020;92(4):448-54.
22. Bai Y, Yao L, Wei T, Tian F, Jin D-Y, Chen L, et al. Presumed asymptomatic carrier transmission of COVID-19. JAMA. 2020;323(14):1406-7.
23. Ghinai I, McPherson TD, Hunter JC, Kirking HL, Christiansen D, Joshi K, et al. First known person-to-person transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in the USA. The Lancet. 2020.
24. Chang D, Lin M, Wei L, Xie L, Zhu G, Cruz CSD, et al. Epidemiologic and clinical characteristics of novel coronavirus infections involving 13 patients outside Wuhan, China. JAMA. 2020;323(11):1092-3.
25. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, et al. Epidemiological and clinical characteristics of 99 cases of 2019

[DOI: 10.18502/tbsrj.v2i4.5468]

novel coronavirus pneumonia in Wuhan, China: a descriptive study. The Lancet. 2020;395(10223):507-13.
26. Nishiura H, Jung S-m, Linton NM, Kinoshita R, Yang Y, Hayashi K, et al. The extent of transmission of novel coronavirus in Wuhan, China, 2020. Multidisciplinary Digital Publishing Institute; 2020.
27. West R, Michie S, Rubin GJ, Amlôt R. Applying principles of behaviour change to reduce SARS-CoV-2 transmission. Nature Human Behaviour. 2020:1-9.
28. Feng S, Shen C, Xia N, Song W, Fan M, Cowling BJ. Rational use of face masks in the COVID-19 pandemic. The Lancet Respiratory Medicine. 2020;8(5):434-6.
29. Gudbjartsson DF, Helgason A, Jonsson H, Magnusson OT, Melsted P, Norddahl GL, et al. Spread of SARS-CoV-2 in the Icelandic Population .New England Journal of Medicine. 2020;382(24):2302-15.
30. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus–Infected Pneumonia. New England Journal of Medicine. 2020;382(13): 1199-207.
31. Behzadnia MJ, Saboori F. COVID-19 Outbreak Management in Hospitals of Iran; Strengths and Weaknesses. Journal of Military Medicine. 2020;22(2):203-4. (Persian)
32. Peters A, Vetter P, Guitart C, Lotfinejad N, Pittet D. Understanding the emerging coronavirus: what it means for health security and infection prevention. Journal of Hospital Infection. 2020;104(4): 440-8.
33. Zhou P, Huang Z, Xiao Y, Huang X, Fan X-G. Protecting Chinese healthcare workers while combating the 2019 novel coronavirus. Infection Control & Hospital Epidemiology. 2020;41(6):745-6.

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