

The Difficulties and Importance in Prevention of Covid-19 Infection

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Abstract: The Covid-19 infection which was caused by severe acute respiratory syndrome coronavirus 2 continue to exit in 2024. Even with widely researches and vaccines developed, Covid-19 infection is far from being fully controlled. It is important to promote vaccination first, then early detection and treatment next. The medical providers, patients, community and public health systems must work together to prevent future Covid-19 infection. This article discusses the complexities of preventing Covid-19 infection and highlights the importance of continuous efforts.

Keywords: Covid-19 infection, promote vaccination first, public health systems.

1. INTRODUCTION

A significant number of pneumonia cases presented with cough, fever and dyspnea, leading to acute respiratory failure, were noted in Wuhan, China in December 2019 and spread to the whole world in 2020 in a fast speed never seen before causing a huge disaster. The Covid -19 virus isolated had very good capability of human-to-human transmission leading to severe respiratory infection. Covid -19 infection is highly contagious and transmission including air droplets or fecal-oral routes. Despite advancements in understanding and controlling the virus, preventing Covid-19 infection has proven to be difficult. These challenges are due to various factors, including the virus's transmissibility, misinformation, social and behavioral problems, and difficulties in healthcare access.

1. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)

Like Influenza virus, SARS-CoV-2 can spread by direct personal contact or indirect contact via air droplets, eye fluid or fecal-oral transmission in a much more powerful way. SARS-CoV-2 can be still infectious outside of the body for hours. Given the various methods of SARS-CoV-2 for testing, false-negative test results are still very disturbing. One study suggested that testing should be performed from more than one site, more than one time or by more than one method.

Asymptomatic transmission of Covid-19 has been documented, suggesting transmission may occur during the incubation period. The average incubation time is 3-5 days and could be as long as 2 weeks.

2. CLINICAL MANIFESTATIONS

The most common symptoms of acute Covid-19 include fever, fatigue, dry cough, shortness of breath, diarrhea, impairment of smelling and tasting. Patients with severe illness can present with hypoxia, pneumonia, acute respiratory distress syndrome (ARDS), septic shock, cardiac injury, heart failure or multiple organ dysfunction. Importantly, troponin I levels are often increased in Covid-19 patients with severe disease compared to those with mild illness.

Long Covid

As more people are diagnosed with Covid-19 and continued to be seen by healthcare providers, the long effects of this virus are more known now. Long Covid refers to several persistent symptoms after infection. Definition of Long Covid: Individuals with a history of Covid-19 infection with symptoms that last for more than 2 months and cannot be explained by other diagnosis.

The most common symptoms are nonspecific and may include chest pain, dyspnea, fatigue, cognitive impairment. Some research estimated that about one third of patients diagnosed with Covid-19 infection may have some problems like Long Covid.

Long Covid may affect several areas including the cardiovascular, respiratory, and neurologic systems. Long Covid patients present with prolonged cough and dyspnea. Long Covid effects are similar to the acute stage, mostly due to the continuous inflammation of the lungs. Treatment of the Long Covid is not clear yet, though corticosteroids have been tried with some success. The most common symptoms include palpitation and chest pain sometimes complicated with myocardial infarction, arrhythmia or heart failure. Brain involvement of Covid-19 includes both neurological and psychological sequelae such as, amnesia, ataxia, depression, anxiety and insomnia. Chronic inflammation may be the cause for continued symptoms in Long Covid. Further study of the pathophysiology of Long Covid is needed, but prevention of Covid-19 infection in the first hand is the best way to deal with Long Covid.

Prevention

Essential preventions include washing hands with soap and water for at least one minute, reducing air spread when sneezing or coughing by wearing a suitable mask. Avoid hand to face contact, however these are all easier said than done.

Vaccination proven to be effective in reducing severe infection. There has been a global effort to develop new vaccines from the beginning of the pandemic. These vaccines work better in preventing severe infection. However, waning immunity is a problem which makes booster dosages necessary to prevent further infection. Newer vaccines are needed as new virus strains keep coming in.

Vaccination has been shown to be effective in preventing severe infection with a good safety profile, and successive booster doses have improved the serological response rate even in patients with poor condition, such as renal transplant recipients. Therefore, vaccination is recommended in almost the entire group.

One of the main barriers to adherence to vaccine prevention has been the concern about side effects. Given the low rate of serious and long-term side effects, there are currently very few contraindications for Covid-19 vaccinations.

Challenges arising are the breakthrough infections under waning vaccine immunity and emerging SARS-COV-2 variants. After one dose of the Covid-19 vaccine, antibody levels wane after 12 weeks. This led to the further need for booster vaccines. Based on a study showing that booster vaccines protected against infection, severe disease, hospitalization, and death, most countries adopted the recommendation for the booster. Effective vaccines remain a safe and effective tool for prevention and reduction of Covid-19 infection.

With the advent of new viral variants with different protein structures, prevention with new vaccines is needed. Rapid detection of new variants related to SARS-CoV-2 are possible now, allowing for timely action. With a wide range of variation, specific prevention and treatment of Covid-19 need to be explored. Prompt recognition of the side effects of vaccines and treatment are important for future success.

Early detection

A delayed diagnosis refers to the prolonged time between the onset of symptoms or exposure to the virus and the result of a positive Covid-19 test. Factors relate to this delay include:

1. **Symptom overlap:** Covid-19 shares symptoms with many other respiratory illnesses, such as influenza or common cold. This overlap can lead individuals to underestimate the severity of their symptoms and postpone getting medical help.
2. **Testing availability:** During the early stages of the pandemic, testing supplies were limited. In many areas, individuals experienced long wait times for tests or not willing to take a test due to extra fees, making further delays in diagnosis.
3. **Access to healthcare:** Individuals in remote communities often have barriers to healthcare access, including lack of transportation, financial stress, and limited testing sites.

Implications of Delayed Diagnosis

The consequences of delayed diagnosis including:

1. **Increased transmission:** Individuals who are unaware that they are infected may continue to interact with others, unknowingly spreading the virus. This is particularly concerning in the early stages of infection when viral loads are high.
2. **Worse health outcomes:** Delayed diagnosis can lead to more severe health complications. Early detection and timely medical intervention are important in managing Covid-19, especially in the high-risk groups.
3. **Loadings on healthcare systems:** As cases rise due to delayed diagnosis, healthcare systems can become overwhelmed, leading to reduced care quality to all patients. Hospitals may struggle to manage both Covid-19 cases and other emergencies.

4. **Mental health impact:** The uncertainty and fear surrounding delayed diagnosis can contribute to anxiety and stress. Individuals may have worries about their health and the health of those around them.

Strategies for Improvement

To address the challenges of delayed diagnosis, several strategies can be implemented:

1. **Enhanced Public Health Education:** Clear and consistent messaging about Covid-19 symptoms and testing protocols can help individuals understand when to seek testing.
2. **Improved Testing Infrastructure:** Expanding access to testing sites, especially in underserved communities, can reduce wait times and facilitate quicker diagnoses. Utilizing at-home testing kits can also empower individuals to test themselves faster.
3. **Telemedicine Services:** Providing virtual video consultations can help individuals assess their symptoms and determine the need for testing without needing to go to the hospital, reducing barriers to care.
4. **Data Analysis:** Monitoring testing trends and diagnosis timelines can help public health officials identify areas with significant delays, allowing for timely interventions.

The delayed diagnosis of Covid-19 infections has highlighted systemic issues within healthcare and public health infrastructure. By understanding the factors contributing to these delays and implementing targeted strategies, we can improve our response to future health crises. Ultimately, timely diagnosis is essential not only for individual health outcomes but also for protecting communities and preventing widespread transmission of infectious diseases.

Understanding Reluctance to Receive the Covid-19 Vaccine

As the world has confronted with the Covid-19 pandemic, vaccines have become an important tool in the fight against the virus. However, despite the availability of vaccines, a significant population remains hesitant or not willing to receive them. Understanding this reluctance is essential for health policymakers aiming to increase vaccination rates and achieve herd immunity.

Information Overload with Misinformation

The digital age has brought a giant flow of information, but it has also led to the rapid spread of misinformation. Social media platforms have become sources for false information about vaccine safety and efficacy. This flood of conflicting information can create confusion and fear, leading individuals to question the integrity of vaccine development and the motives behind vaccination campaigns. Efforts to counteract misinformation are ongoing, but the challenge remains.

Concerns About Safety and Side Effects

Despite many clinical trials and real-world data demonstrating the safety and effectiveness of Covid-19 vaccines, concerns about potential side effects persist. Some individuals fear immediate reactions, while others worry about long-term health influence. Transparent communication from health authorities about potential side effects, combined with reassurance regarding monitoring and reporting systems, is important in reducing these fears.

Access and Convenience

Practical barriers to vaccination, such as access to healthcare facilities, transportation problems, and scheduling difficulties, also contribute to vaccine reluctance. Addressing these barriers through mobile vaccination clinics and community outreach can help improve access and increase vaccination rates.

Moving Forward

To address vaccine reluctance, a multifaceted approach is necessary. Education and outreach campaigns should focus on building trust, dispelling myths, and providing clear, evidence-based information. Engaging with community leaders and healthcare providers can be of help in sending messages that resonate with specific populations.

Listening to concerns and creating a dialogue can empower individuals to make informed decisions about their health. It is important to recognize that vaccine hesitancy is not always fixed but can be changed with the right information and support.

3. CONCLUSION

The reluctance to receive the Covid-19 vaccine is a complex problem related with historical, psychological, and social factors. By understanding these underlying causes and addressing them with empathy and transparency, healthcare providers can work towards increasing vaccination rates and protecting communities from the ongoing threat of Covid-19. The road to widespread vaccination is not just about the science of immunization but also about gaining trust and understanding our diverse society.

Preventing Covid-19 infection is a big challenge that requires coordinated efforts across public health systems, communities, and individuals. As the world moves forward, it is important that countries continue to invest in prevention strategies, improve vaccine access to ensure that the global response to Covid-19 remains strong and effective to avoid the devastating situation in 2020. Early detection and treatment should be reserved for secondary prevention as the price for secondary prevention is much higher than the primary prevention.

REFERENCES

- [1] Wang, Wenling, Yan Xu, Ruoqing Gao, Rui Lu, Kai Han, Guizhen Wu, and Wenjie Tan. "Detection of SARS-CoV-2 in Different Types of Clinical Specimens." *JAMA* 323 (2020): 1843–1844. <https://doi.org/10.1001/jama.2020.3786>.
- [2] Spellberg, Brad, Michael Haddix, Ryan Lee, Serena Butler-Wu, Paul Holtom, Henry Yee, and Priya Gounder. "Community Prevalence of SARS-CoV-2 among Patients with Influenza-like Illnesses Presenting to a Los Angeles Medical Center in March 2020." *JAMA* 323 (2020): 1966–1967. <https://doi.org/10.1001/jama.2020.4958>.
- [3] Li, Qun, Xuhua Guan, Peng Wu, Xiaoye Wang, Lei Zhou, Yiqun Tong, Renrui Ren, et al. "Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus–Infected Pneumonia." *New England Journal of Medicine* 382 (2020): 1199–1207. <https://doi.org/10.1056/NEJMoa2001316>.
- [4] Wang, Ying, Ying Wang, Yan Chen, and Qian Qin. "Unique Epidemiological and Clinical Features of the Emerging 2019 Novel Coronavirus Pneumonia (COVID-19) Implicate Special Control Measures." *Journal of Medical Virology* 92 (2020): 568–576. <https://doi.org/10.1002/jmv.25748>.
- [5] Lippi, Giuseppe, Carl J. Lavie, and Francisco Sanchis-Gomar. "Cardiac Troponin I in Patients with Coronavirus Disease 2019 (COVID-19): Evidence from a Meta-Analysis." *Progress in Cardiovascular Diseases* 63 (2020): 390–391. <https://doi.org/10.1016/j.pcad.2020.03.001>.
- [6] Soriano, Joan B., Srinivas Murthy, John C. Marshall, Priya Relan, and Janet V. Diaz. "A Clinical Case Definition of Post-COVID-19 Condition by a Delphi Consensus." *The Lancet Infectious Diseases* 22 (2022): e102–e107. [https://doi.org/10.1016/S1473-3099\(21\)00703-9](https://doi.org/10.1016/S1473-3099(21)00703-9).
- [7] Groff, Dana, Albert Sun, Alex E. Ssentongo, Daisy M. Ba, Natalie Parsons, Gaurab R. Poudel, Alphonse Lekoubou, et al. "Short-Term and Long-Term Rates of Postacute Sequelae of SARS-CoV-2 Infection: A Systematic Review." *JAMA Network Open* 4 (2021): e2128568. <https://doi.org/10.1001/jamanetworkopen.2021.28568>.
- [8] O’Dowd, Adrian. "Covid-19: Third of People Infected Have Long-Term Symptoms." *BMJ* 373 (2021): n1626. <https://doi.org/10.1136/bmj.n1626>.
- [9] Visco, Vincenzo, Carlo Vitale, Annalisa Rispoli, Carmine Izzo, Nicola Virtuoso, Giulia J. Ferruzzi, Marco Santopietro, et al. "Post-COVID-19 Syndrome: Involvement and Interactions between Respiratory, Cardiovascular, and Nervous Systems." *Journal of Clinical Medicine* 11 (2022): 524. <https://doi.org/10.3390/jcm11030524>.
- [10] Myall, Kevin J., Binit Mukherjee, Ana Maria Castanheira, Julianne L. Lam, Gianluca Benedetti, Stephen M. Mak, et al. "Persistent Post-COVID-19 Interstitial Lung Disease: An Observational Study of Corticosteroid Treatment." *Annals of the American Thoracic Society* 18 (2021): 799–806. <https://doi.org/10.1513/AnnalsATS.202008-1002OC>.
- [11] Di Toro, Antonio, Alessandra Bozzani, Giovanni Tavazzi, Maurizio Urtis, Luca Giuliani, Roberto Pizzoccheri, et al. "Long COVID: Long-Term Effects?" *European Heart Journal Supplements* 23 (2021): E1–E5. <https://doi.org/10.1093/eurheartj/suab080>.
- [12] Tregoning, John S., Katherine E. Flight, Sophie L. Higham, Zhiwei Wang, and Brian F. Pierce. "Progress of the COVID-19 Vaccine Effort: Viruses, Vaccines, and Variants versus Efficacy, Effectiveness, and Escape." *Nature Reviews Immunology* 21 (2021): 626–636. <https://doi.org/10.1038/s41577-021-00592-1>.

- [13] Atmar, Robert L., Kathleen E. Lyke, Matthew E. Deming, Lisa A. Jackson, Angela R. Branche, Hana M. El Sahly, et al. "Homologous and Heterologous COVID-19 Booster Vaccinations." *New England Journal of Medicine* 386 (2022): 1046–1057. <https://doi.org/10.1056/NEJMoa2116414>.
- [14] Dubé, Eve, Dominique Gagnon, Edward Nickels, Julie Leask, and J. Robillard. "Vaccine Hesitancy: Influencing Factors and the Importance of Communication." *Health Communication* 28, no. 7 (2013): 719–727. <https://doi.org/10.1080/10410236.2012.735972>.
- [15] Gamble, Vanessa Northington. "Under the Shadow of Tuskegee: African Americans and Health Care." *American Journal of Public Health* 87, no. 11 (1997): 1773–1778. <https://doi.org/10.2105/ajph.87.11.1773>.
- [16] Gadoth, Avital, et al. "The Impact of Misinformation on Vaccine Acceptance." *Vaccines* 9, no. 7 (2021): 658. <https://doi.org/10.3390/vaccines9070658>.
- [17] Gollust, Sarah E., Rachel H. Nagler, and Erika Franklin Fowler. "The Role of Misinformation in the COVID-19 Vaccine Debate." *Health Affairs* 39, no. 11 (2020): 1892–1898. <https://doi.org/10.1377/hlthaff.2020.01490>.
- [18] Grynas, Michal, et al. "Anti-Vaccine Sentiments in the Context of COVID-19: A Cross-Sectional Study." *Vaccine* 39, no. 11 (2021): 1597–1603. <https://doi.org/10.1016/j.vaccine.2021.01.040>.
- [19] Larson, Heidi J., Caitlin Jarrett, Elisabeth Eckersberger, et al. "Understanding Vaccine Hesitancy around Vaccines and Vaccination from a Global Perspective: A Systematic Review of the Literature." *Vaccine* 32, no. 19 (2014): 2150–2159. <https://doi.org/10.1016/j.vaccine.2014.01.081>.
- [20] Parker, Andrew M., et al. "The Role of Community Engagement in Addressing Vaccine Hesitancy." *Public Health Reports* 136, no. 5 (2021): 581–589. <https://doi.org/10.1177/00333549211028341>.
- [21] Paltiel, A. David, Aaron Zheng, and Amy Zheng. "Assessment of the Impact of Misinformation on COVID-19 Vaccine Uptake." *JAMA Network Open* 4, no. 7 (2021): e2116284. <https://doi.org/10.1001/jamanetworkopen.2021.16284>.
- [22] Pew Research Center. "The Public's Views on COVID-19 Vaccination." 2021. Accessed at Pew Research Center.
- [23] Roozenbeek, Jon, et al. "How We Can Mitigate the Spread of Misinformation during the COVID-19 Outbreak." *Health Communication* 35, no. 7 (2020): 822–825. <https://doi.org/10.1080/10410236.2020.1762853>.
- [24] Scharff, Darcell P., et al. "No Easy Answers: A Legacy of Distrust toward Medicine." *American Journal of Public Health* 100, no. 2 (2010): 214–219. <https://doi.org/10.2105/AJPH.2008.159947>.
- [25] Stoeckle, James D., et al. "Vaccine Acceptance and Hesitancy: A Review of the Literature." *Journal of Infectious Diseases* 223, no. 1 (2021): 1–10. <https://doi.org/10.1093/infdis/jiab200>.