Journal of Namibian Studies, 27 S2 (2020) : 16-20 ISSN: 2197-5523

The Developments In COVID-19 Diagnosis, Treatment, AndControl Strategies To End The Pandemic

Salman Musharraf Abdullah Alamri[1] , Abdullah Hoede Z Alrawis[2] , Naif Dhaifallah Naif Alotaibi[3], Aljazi Tariq Alsalloum[4]

[1]Technician-Public Health
[2]Emergency Medicl Services
[3]Emergency Medicl Services
[4]Laboratory Specialist

Abstract:

Rapid diagnostic tools, easily accessible repurposable medications, and timely containment measures to control the SARS-CoV-2 infectionare crucial given the ongoing global spread of COVID-19. Recent developments in diagnostic testing include the use of artificial intelligence, IgG assay, spike protein detection, and CRISPR technology. Point-of-care rapid tests have also improved the gold standard reverse transcription polymerase chain (RT-PCR). In addition to antivirals, antiparasitics, anti-inflammatories, interferon, convalescent plasma, monoclonal antibodies, hyperimmunoglobulin, RNA interference, and mesenchymal stem cell therapy, supportive care, mechanical ventilation, and extracorporeal membrane oxygenation (ECMO) continue to be the preferred treatment options.

Clinical trials are underway for a variety of vaccines, including lentiviral, inactivated, viral, and RNA/DNA vaccines. Additionally, novel vaccine delivery systems that are portable and quickly deployable arealso being developed. The possibility of a second wave of infection necessitates stringent and sensible control measures to keep fatalitiesto a minimum as nations have begun to relax the lockdown measures.Better containment tactics and references for additional research canbe obtained from a better understanding of the developments in COVID-19 diagnostic tools, treatments, vaccines, and control measures.

Keywords: Health, COVID-19 Diagnosis, Pandemic, Treatment.

Introduction:

The WHO recommends reverse transcription polymerase chain

reaction (RT-PCR) basedon thenucleicacid amplificationtest(NAAT) as the primary testing method. As a result, RT-PCR continues to be the gold standard for COVID-19 detection. To perform the test precisely, the method necessitates laboratory environments and knowledgeable staff. It is crucial to develop an accurate point-of-caretest in order to increase the number of tests conducted daily. Accordingto some recent antibody-based serological research, the number of COVID-19 infections may be significantly higher than previously believed (Pan, 2020 ; De Wit, 2016).

The development of an efficient vaccine is still the best option given the overburdened healthcare system and the rising number of infections among medical staff. However, the process of finding and creating a vaccine or medication is time-consuming, and it typically takes ten years to complete.(Sanche, 2020). Therefore, using already-approved medications to treat COVID-19 seems like a sensible scientific strategy. There are currently few specific medications available for treating COVID-19, which limits the options. Repurposing the right drug from a range of currently available antiviral medications is still a challenge. A few medications were found to be effective in small-scale studies, but these studies later showed no discernible difference in clinical outcomes. In vitro research and high throughput virtual screening are being conducted to find opportunitiesfor antiviral medication development and repurposing (Van, 2020).

Various control measures have been considered by different regions due to the virus's pandemic-like speed. The problems with disease containment can be further resolved by revising the decisions and their respective results. In order to create a compilation of knowledge regarding the range of COVID-19 diagnostic tools, treatments, vaccines, and control measures.

Differential Diagnosis:

Differential diagnosis is the process of distinguishing one illness or condition from others with comparable clinical characteristics. Coinfection, or simultaneous infection by other viruses or bacteria, is possible in patients with COVID-19. In order to distinguish SARS-CoV- 2-induced infection from other viral, bacterial, and mycoplasmal pneumonias, differential diagnosis is crucial. There is a greater likelihood of an incorrect diagnosis because COVID-19 exhibits a wide range of clinical manifestations. For example, a COVID-19 patient in Thailand was initially misdiagnosed as having dengue because of their fever and rash. Differential diagnosis based on current symptoms, medical and epidemiological history, and a series of physicalexaminations will assist in determining the correct etiology in areas with a high burden of disease. A high fever and coughing up thick, blood- tinged mucus or yellowish-greenish sputum with pus are typical symptoms of bacterial pneumonia. Additionally, mycoplasmal pneumonia can

happen at any time of year, so serum antibody testing or blood culture are useful for differential diagnosis (Watson, 2020).

Treatments:

- **Antiviral Medicines:**

According to the WHO, one of the most promising options for treatingCOVID-19 is remdesivir, a prodrug that was initially meant to be used against the Ebola virus. Remdesivir was recently approved by the FDAfor use in treating patients under the EUA because it has been demonstrated to reduce recovery time. Remdesivir is an analogue of adenosine that inhibits the production of viral RNA by targeting the viral RdRp. Additionally, it has been demonstrated that the drug circumvents ExoN's proofreading ability, resulting in irreversible chain termination. Remdesivir's phase-III trial demonstrated that patients who received a ten-day course of the medication at an early stage of the illness—that is, before mechanical ventilation was necessary saw definite improvement. Remdesivir is only available as an intravenous fluid (IVF), though, and its effectiveness in treating critically ill intensivecare unit patients has not yet been determined (Corman, 2020).

- **Medication to Reduce Inflammation:**

Additionally, some anti-inflammatory medications are used to lessen the severity of the illness. Sargramostim, for example, is a recombinant GM-CSF that enhances the innate host defenses againstinfections and acts as an immunostimulatory agent. Among other things, tocilizumab is a new monoclonal antibody that lowers immunological hyperactivity by competitively blocking the binding of interleukin-6 (IL-6) to its receptor (IL-6R). For critically ill patients, tocilizumab's initial clinical trial demonstrated an effective neutralizingcapacity. Sarilumab is another possible IL-6 inhibitor that is presentlyrecruiting patients for clinical trials in Russia, Italy, Spain, Germany, and France (Molina, 2020).

- **Treatment with Plasma:**

Critically ill patients may benefit from convalescent plasma (CP) therapy, which uses blood from recovered COVID-19 patients to promote recovery. Preliminary findings were encouraging, and a significant number of clinical trials are being conducted to determine the treatment's safety and effectiveness. One dose (200 mL) of CP could significantly increase or maintain the concentration of neutralizing antibodies at a high level, helping to eradicate viremia in seven days, according to a study conducted on ten seriously ill adult patients. The European Commission's latest

guidelines state that the neutralizing antibody is advised. Despite showing promise, a lack of supply may prevent some people from accessing CP treatment. Additionally, in order to donate blood, recovered patients need to generate enough neutralizing antibodies (Magagnoli, 2020).

Citizens' Protection Measures:

Citizens are urged to adhere to fundamental rules like frequent hand washing, the use of disinfectants, cough etiquette, and the use of facemasks in order to stop the crisis. According to recent research, masks may reduce the spread of disease. In areas where community-based transmission is significant, the CDC now advises the use of facemasks or at the very least, do-it-yourself cloth covers. According to a study, DIY masks composed of one-layer cloth and four-layer kitchen paper could block 95.15% of the virus in aerosols, compared to up to 97.14% and 99.98% for surgical and N95 masks, respectively. Although surgical masks and N95s are useful tools for front-linehealthcare workers, they are not advised unless one is ill (Rothe, 2020).

Recommendations:

AI-powered urban intelligence models could be created to implementa mass surveillance approach with data encryption for privacy concerns. Serological tests based on antibodies should be carried out since they indicate the proportion of individuals who appear to bevirus-immune. The application of "immune passport" and its scientificvalidation may reduce infections to an exponential increase.

- Governments, the media, and concerned citizens must all play a crucial role in spreading accurate information and increasing public awareness of the dangers of disregarding their respective regulations.

Conclusion:

The COVID-19 pandemic has put our current understanding, laws, and regulations to the test and compelled us to take drastic measures, including total lockdowns, in several regions of the world. The high number of COVID-19 fatalities has highlighted the urgency of conducting new research and disseminating current knowledge. The scope and advancements of COVID-19 diagnostic tools and treatmentoptions were outlined in this review, along with prevention and control strategies in light of an apparent impending second wave of infection.

It is advised that nations use the scientific tools currently available

to create models that forecast community-based outcomes before makingdecisions, even as the world looks for a cure. Healthcare professionalsneed to be provided with supplies and kept up to date on the latest information, and citizens have a responsibility to uphold fundamental standards. Facilitating more testing and contact tracing, publishing epidemic information promptly, enabling early diagnosis, and providingpatients with supportive treatments are all of the utmost importance at the governmental level.

References:

1. De Wit E., Van Doremalen N., Falzarano D., Munster V. J. SARS and MERS: recentinsights into emerging coronaviruses. Nature Reviews Microbiology. 2016;14(8):523–534.
2. Rothe C., Schunk M., Sothmann P., et al. Transmission of 2019-NCOV infection from an asymptomatic contact in Germany. New England Journal of Medicine. 2020;382(10):970–971.
3. WHO. Laboratory Testing for Coronavirus Disease 2019 (COVID-19) in Suspected Human Cases. Interim Guidance. Geneva, Switzerland: WHO; 2020.
4. Molina J. M., Delaugerre C., Le Goff J., et al. No evidence of rapid antiviral clearance or clinical benefit with the combination of hydroxychloroquine and azithromycin in patients with severe COVID-19 infection. Médecine et Maladies Infectieuses. 2020;50(4):p. 384.
5. Corman V. M., Landt O., Kaiser M., et al. Detection of 2019 novel coronavirus (2019-nCoV) by real-time RT-PCR. Eurosurveillance. 2020;25(3).
6. Watson J., Whiting P. F., Brush J. E. Interpreting a COVID-19 test result. BMJ. 2020;369:1–7.
7. Van Kasteren P. B., Van der Veer B., Van den Brink S., et al. Comparison of seven commercial RT-PCR diagnostic kits for COVID-19. Journal of Clinical Virology. 2020;128.
8. Pan Y., Long L., Zhang D., et al. Potential false-negative nucleic acid testing results for severe Acute respiratory syndrome coronavirus 2 from thermal inactivation of samples with low viral loads. Clinical Chemistry. 2020;66(6):794–801.