Prevention of covid-19

Bibliography

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September 2021

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Technical Services Department (TSD)

Content

Introduction

"Most people infected with the virus will experience mild to moderate respiratory illness and recover without requiring special treatment. However, some will become seriously ill and require medical attention. Older people and those with underlying medical conditions like cardiovascular disease, diabetes, chronic respiratory disease, or cancer are more likely to develop serious illness. Anyone can get sick with COVID-19 and become seriously ill or die at any age.

The best way to prevent and slow down transmission is to be well informed about the disease and how the virus spreads. Protect yourself and others from infection by staying at least 1 meter apart from others, wearing a properly fitted mask, and washing your hands or using an alcohol-based rub frequently. Get vaccinated when it's your turn and follow local guidance". (WHO, 2020)

"If COVID-19 is spreading in your community, stay safe by taking some simple precautions, such as physical distancing, wearing a mask, keeping rooms well ventilated, avoiding crowds, cleaning your hands, and coughing into a bent elbow or tissue. Check local advice where you live and work. Do it all!" (WHO.2020)

The National Scientific & Technical Information Center (NSTIC) produces this bibliography for Quality, Health, Safety and Environment Department (QHSWEB).

This bibliography highlights some of the latest publications, Journal articles for period 2020-2021 using SinceDirect, Scopes, Elsevier.

Title: Mathematical model of COVID-19 in Nigeria with optimal control

Authors: Abioye, A. I., Peter, O. J., Ogunseye, H. A., Oguntolu, F. A., Oshinubi, K., Ibrahim, A. A., & Khan, I.

The novel Coronavirus Disease 2019 (COVID-19) is a highly infectious disease caused by a new strain of severe acute respiratory syndrome of coronavirus 2 (SARS-CoV-2). In this work, we proposed a mathematical model of COVID-19. We carried out the qualitative analysis along with an epidemic indicator which is the basic reproduction number () of this model, stability analysis of COVID-19 free equilibrium (CFE) and Endemic equilibrium (EE) using Lyaponuv function are considered. We extended the basic model into optimal control system by incorporating three control strategies. These are; use of face-mask and hand sanitizer along with social distancing; treatment of COVID-19 patients and active screening with testing and the third control is prevention against recurrence and reinfection of humans who have recovered from COVID-19. Daily data given by Nigeria Center for Disease Control (NCDC) in Nigeria is used for simulation of the proposed COVID-19 model to see the effects of the control measures. The biological interpretation of this findings is that, COVID-19 can be effectively managed or eliminated in Nigeria if the control measures implemented are capable of taking or sustaining the basic reproductive number to a value below unity. If the three control strategies are well managed by the government namely; NCDC, Presidential Task Force (PTF) and Federal Ministry of Health (FMOH) or policymakers, then COVID-19 in Nigeria will be eradicated.

Title: COVID-19 convalescent plasma composition and immunological effects in severe patients

Authors: Acosta-Ampudia, Y., Monsalve, D. M., Rojas, M., Rodríguez, Y., Gallo, J. E., Salazar-Uribe, J. C., . . . Anaya, J.

Convalescent plasma (CP) has emerged as a treatment for COVID-19. However, the composition and mechanism of action are not fully known. Therefore, we undertook a two-phase controlled study in which, first the immunological and metabolomic status of recovered and severe patients were evaluated. Secondly, the 28-day effect of CP on the immune response in severe patients was assessed. Nineteen recovered COVID-19 patients, 18 hospitalized patients with severe disease, and 16 pre-pandemic controls were included. Patients with severe disease were treated with CP transfusion and standard therapy (i.e., plasma recipients, n = 9) or standard therapy alone (n = 9). Clinical and biological assessments were done on day 0 and during follow-up on days 4, 7, 14, and

28. Clinical parameters, viral load, total immunoglobulin (Ig) G and IgA anti-S1-SARS-CoV-2 antibodies, neutralizing antibodies (NAbs), autoantibodies, cytokines, T and B cells, and metabolomic and lipidomic profiles were examined. Total IgG and IgA anti-S1-SARS-CoV-2 antibodies were key factors for CP selection and correlated with NAbs. In severe COVID-19 patients, mostly interleukin (IL)-6 ($P = <0.0001$), IL-10 ($P = <0.0001$), IP-10 ($P = <0.0001$), fatty acyls and glycerophospholipids were higher than in recovered patients. Latent autoimmunity and anti–IFN–α antibodies were observed in both recovered and severe patients. COVID-19 CP induced an early but transient cytokine profile modification and increases IgG anti-S1-SARS-CoV-2 antibodies. At day 28 post-transfusion, a decrease in activated, effector and effector memory $CD4^+$ ($P < 0.05$) and activated and effector $CD8^+$ ($P < 0.01$) T cells and naïve B cells ($P = 0.001$), and an increase in non-classical memory B cells ($P=<0.0001$) and central memory $CD4^+$ T cells ($P = 0.0252$) were observed. Moreover, IL-6/IFN-γ ($P = 0.0089$) and IL-6/IL-10 ($P = 0.0180$) ratios decreased in plasma recipients compared to those who received standard therapy alone. These results may have therapeutic implications and justify further post-COVID-19 studies.

Title: closer look at U.S COVID-19 vaccination rates and the emergence of new SARS-CoV-2 variants: It's never late to do the right thing.

Authors: Alfaro, S., Sen-Crowe, B., McKenny, M., & Elkbuli, A.

Journal: Annals of Medicine and Surgery

Doi: https://doi.org/10.1016/j.amsu.2021.102709

According to the Center for Disease Control (CDC), 49.7% of the United States (U.S.) population has been fully vaccinated (165, 081, 416 million people) and 57.9% has received at least 1 dose (192, 120, 576 million people) as of August 3rd, 2021 [1], which is below the national goal of at least 80% [2]. The recent emergence of new SARS-CoV-2 variants emphasizes the importance of vaccinations and increasing vaccination efforts to provide sufficient protection against COVID-19 and a possible upcoming wave [3,4]

Within the plethora of SARS-CoV-2 variants identified, the most commonly referenced in the literature include B.1.1.7 (Alpha), B.1.351 (Beta), P.1, and B.1.617.2 (Delta) [5]. These variants have led to increased viral transmission, hospitalizations, and severity of disease [6], with the Delta variant being declared the most transmissible [4]. Recent data published by the CDC shows the number of variant cases, per state, for variants Alpha, Beta, and P.1 (Fig. 1) [7]. The states with the highest number of variant cases (401+) were clustered around the East, with the Alpha variant being

mostly responsible. There is no available data regarding the number of variant Delta cases distributed by state as of today, but it is known to be present in the largest proportion [8].

Title: Could natural products modulate early inflammatory responses, preventing acute respiratory distress syndrome in COVID-19-confirmed patients?

Authors: Amaral-Machado, L., Oliveira, W. N., Rodrigues, V. M., Albuquerque, N. A., Alencar, É N., & Egito, E. S. T.

Journal: Biomedicine & Pharmacotherapy

Doi: https://doi.org/10.1016/j.biopha.2020.111143

Background

The ARDS (Acute Respiratory Distress Syndrome) is a severe respiratory syndrome that was recently associated as the main death cause in the COVID-19 pandemic outbreak. Hence, in order to prevent ARDS, the pulmonary function maintenance has been the target of several pharmacological approaches. However, there is a lack of reports regarding the use of effective pharmaceutical active natural products (PANPs) for early treatment and prevention of COVID-19-related ARDS. Therefore, the aim of this work was to conduct a systematic review regarding the PANPs that could be further studied as alternatives to prevent ARDS. Consequently, this work can pave the way to spread the use of PANPs on the prevention of ARDS in COVID-19-confirmed or -suspected patients.

Title: Innovative human resource management strategies during the COVID-19 pandemic: A systematic narrative review approach

Authors: Azizi, M. R., Atlasi, R., Ziapour, A., Abbas, J., & Naemi, R.

Journal: Heliyon

Doi: https://doi.org/10.1016/j.heliyon.2021.e07233

The spread of COVID-19 creates disruption, uncertainty, complexity, and ambiguity in all organizations. People are the primary asset of any organization and help achieve their goals. Accordingly, to manage human resources sustainably, the organizational strategy review is an appropriate retort.

Title: Prevention and treatment of COVID-19: Focus on interferons, chloroquine/hydroxychloroquine, azithromycin, and vaccine.

Authors: Bakadia, B. M., He, F., Souho, T., Lamboni, L., Ullah, M. W., Boni, B. O., . . . Yang, G.

Journal: Biomedicine & Pharmacotherapy

Doi: https://doi.org/10.1016/j.biopha.2020.111008

The ongoing pandemic caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has drawn the attention of researchers and clinicians from several disciplines and sectors who are trying to find durable solutions both at preventive and treatment levels. To date, there is no approved effective treatment or vaccine available to control the coronavirus disease-2019 (COVID-19). The preliminary in vitro studies on viral infection models showed potential antiviral activities of type I and III interferons (IFNs), chloroquine (CQ)/hydroxychloroquine (HCQ), and azithromycin (AZM); however, the clinical studies on COVID-19 patients treated with CQ/HCQ and AZM led to controversies in different regions due to their adverse side effects, as well as their combined treatment could prolong the QT interval. Interestingly, the treatment with type I IFNs showed encouraging results. Moreover, the different preliminary reports of COVID-19 candidate vaccines showcase promising results by inducing the production of a high level of neutralizing antibodies (NAbs) and specific T cell-mediated immune response in almost all participants. The present review aims to summarize and analyze the recent progress evidence concerning the use of IFNs, CQ/HCQ, and AZM for the treatment of COVID-19. The available data on immunization options to prevent the COVID-19 are also analyzed with the aim to present the promising options which could be investigated in future for sustainable control of the pandemic.

Title: Changes in drug use in european cities during early COVID-19 lockdowns – A snapshot from wastewater analysis.

Authors: Been, F., Emke, E., Matias, J., Baz-Lomba, J. A., Boogaerts, T., Castiglioni, S., . . . Bijlsma, L.

Journal: Environment International

Doi: https://doi.org/10.1016/j.envint.2021.106540

The COVID-19 outbreak has forced countries to introduce severe restrictive measures to contain its spread. In particular, physical distancing and restriction of movement have had important consequences on human behaviour and potentially also on illicit drug use and supply. These changes can be associated with additional risks for users, in particular due to reduced access to prevention and harm reduction activities. Furthermore, there have been limitations in the amount of data about drug use which can be collected due to restrictions. To goal of this study was to obtain information about potential changes in illicit drug use impacted by COVID-19 restrictions. Wastewater samples were collected in seven cities in the Netherlands, Belgium, Spain and Italy at the beginning of lockdowns (March-May 2020). Using previously established and validated methods, levels of amphetamine (AMP), methamphetamine (METH), MDMA, benzoylecgonine

(BE, the main metabolite of cocaine) and 11-nor-9-carboxy-Δ9-tetrahydrocannabinol (THC-COOH, main metabolite of tetrahydrocannabinol (THC)) were measured and compared with findings from previous years. Important differences in levels of consumed drugs were observed across the considered countries. Whilst for some substances and locations, marked decreases in consumption could be observed (e.g., 50% decrease in MDMA levels compared to previous years). In some cases, similar or even higher levels compared to previous years could be found. Changes in weekly patterns were also observed, however these were not clearly defined for all locations and/or substances. Findings confirm that the current situation is highly heterogeneous and that it remains very difficult to explain and/or predict the effect that the present pandemic has on illicit drug use and availability. However, given the current difficulty in obtaining data due to restrictions, wastewater analysis can provide relevant information about the situation at the local level, which would be hard to obtain otherwise.

Title: When COVID-19 will decline in india? prediction by combination of recovery and case load rate.

Authors: Bhattacharjee, A., Kumar, M., & Patel, K. K.

Journal: Clinical Epidemiology and Global Health

Doi: https://doi.org/10.1016/j.cegh.2020.06.004

The World Health Organization (WHO) declared COVID-19 as a pandemic on March 11, 2020. There is sudden need of statistical modeling due to onset of COVID-19 pandemic across the world. But health planning and policy requirements need the estimates of disease problem from clinical data.

Title: Air travel and COVID-19 prevention in the pandemic and peri-pandemic period: A narrative review

Authors: Bielecki, M., Patel, D., Hinkelbein, J., Komorowski, M., Kester, J., Ebrahim, S., . . . Schlagenhauf, P.

Air travel during the COVID-19 pandemic is challenging for travellers, airlines, airports, health authorities, and governments. We reviewed multiple aspects of COVID peri-pandemic air travel, including data on traveller numbers, peri-flight prevention, and testing recommendations and in-flight SARS-CoV-2 transmission, photo-epidemiology of mask use, the pausing of air travel to mass gathering events, and quarantine measures and their effectiveness.

Flights are reduced by 43% compared to 2019. Hygiene measures, mask use, and distancing are effective, while temperature screening has been shown to be unreliable. Although the risk of in-flight transmission is considered to be very low, estimated at one case per 27 million travellers, confirmed in-flight cases have been published. Some models exist and predict minimal risk but fail to consider human behavior and airline procedures variations. Despite aircraft high-efficiency filtering, there is some evidence that passengers within two rows of an index case are at higher risk. Air travel to mass gatherings should be avoided. Antigen testing is useful but impaired by time lag to results. Widespread application of solutions such as saliva-based, rapid testing or even detection with the help of "sniffer dogs" might be the way forward. The "traffic light system" for traveling, recently introduced by the Council of the European Union is a first step towards normalization of air travel. Quarantine of travellers may delay introduction or re-introduction of the virus, or may delay the peak of transmission, but the effect is small and there is limited evidence. New protocols detailing on-arrival, rapid testing and tracing are indicated to ensure that restricted movement is pragmatically implemented. Guidelines from airlines are non-transparent. Most airlines disinfect their flights and enforce wearing masks and social distancing to a certain degree. A layered approach of non-pharmaceutical interventions, screening and testing procedures, implementation and adherence to distancing, hygiene measures and mask use at airports, in-flight and throughout the entire journey together with pragmatic post-flight testing and tracing are all effective measures that can be implemented.

Ongoing research and systematic review are indicated to provide evidence on the utility of preventive measures and to help answer the question "is it safe to fly?".

Title: Impacts of COVID-19 on agricultural production and food systems in late transforming Southeast Asia: The case of Myanmar

Authors: Boughton, D., Goeb, J., Lambrecht, I., Headey, D., Takeshima, H., Mahrt, K., . . . Diao, X.

Journal: Agricultural Systems

Doi: https://doi.org/10.1016/j.agsy.2020.103026

The objective of this contribution is to report the initial impacts of measures taken to contain the COVID-19 pandemic on Myanmar's agri-food system. Myanmar is one of several late-transforming low-income countries in Southeast Asia where agriculture still plays a large role in rural livelihoods, and where food prices are a key factor affecting nutrition security for poor urban and rural households. Whereas the economic impacts of COVID-19 disruptions on tourism and manufacturing were obvious to policymakers, the impacts on the agri-food system were less evident and often more indirect. This resulted in the rural sector being allocated only a very small share of the government's initial fiscal response to mitigate the economic impacts of COVID-19.

To correct this information gap, a suite of phone surveys covering a wide spectrum of actors in the agri-food system were deployed, including farm input suppliers, mechanization service providers, farmers, commodity traders, millers, food retailers and consumers. The surveys were repeated at regular intervals prior to and during the main crop production season which began shortly after nationwide COVID-19 prevention measures were implemented in April. While the results indicate considerable resilience in the agri-food system in response to the initial disruptions, persistent financial stress for a high proportion of households and agri-food system businesses indicate that the road to a full recovery will take time. The experience provides important lessons for strengthening the resilience of the agri-food system, and the livelihoods of households that depend on it.

Title: Current diagnostic and therapeutic strategies for COVID-19

Authors: Cao, M., Su, X., & Jiang, S.

Journal: **Journal** of Pharmaceutical Analysis

Doi: https://doi.org/10.1016/j.jpha.2020.12.001

The outbreak and spread of novel coronavirus disease 2019 (COVID-19) with pandemic features, which is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), have greatly threatened global public health. Given the perniciousness of COVID-19 pandemic, acquiring a deeper understanding of this viral illness is critical for the development of new vaccines and therapeutic options. In this review, we introduce the systematic evolution of coronaviruses and the structural characteristics of SARS-CoV-2. We also summarize the current diagnostic tools and therapeutic strategies for COVID-19.

Title: The COVID-19 shocks on the stock markets of oil exploration and production enterprises.

Authors: Chen, D., Hu, H., & Chang, C.

Journal: Energy Strategy Reviews

Doi: https://doi.org/10.1016/j.esr.2021.100696

Using daily data from January 1, 2020 to March 31, 2021, this research explores COVID-19 shocks on the stock market of 15 representative oil exploration and production enterprises from 7 countries. We measure the COVID-19 epidemic from two levels, government response stringency index and number of confirmed cases, and employ stock prices and stock market returns to reflect the stock market. Our research results confirm that both the government response stringency index and the number of confirmed cases have a significantly negative influence on stock prices. We further find that the negative reaction of the stock market to the government response stringency index is greater than that from confirmed cases. Finally, we conclude that the government response stringency index have a significantly positive effect on stock market returns of oil exploration and production enterprises. Similar findings arise from analyzing specific enterprises. Overall, our conclusions provide some useful information for the decision-making of oil exploration and production enterprises' investors and policy makers.

Title: A secondary approach with conventional medicines and supplements to recuperate current COVID-19 status

Authors: Chowdhury, A., Sajid, M., Jahan, N., Adelusi, T. I., Maitra, P., Yin, G., . . . Wang, S.

Journal: Biomedicine & Pharmacotherapy

Doi: https://doi.org/10.1016/j.biopha.2021.111956

Novel coronavirus 2019 (COVID-19) is a zoonosis that revised the global economic and societal progress since early 2020. The SARS-CoV-2 has been recognized as the responsible pathogen for COVID-19 with high infection and mortality rate potential. It has spread in 192 countries and infected about 1.5% of the world population, and still, a proper therapeutic approach is not unveiled. COVID-19 indication starts with fever to shortness of breathing, leading to ICU admission with the ventilation support in severe conditions. Besides the symptomatic mainstay clinical therapeutic approach, only Remdesivir has been approved by the FDA. Several pharmaceutical companies claimed different vaccines with exceptionally high efficacy (90–95%) against COVID-19; how long these vaccines can protect and long-term safety with the new variants are unpredictable. After the worldwide spread of the COVID-19 pandemic, numerous clinical trials with different phases are being performed to find the most appropriate solution to this condition. Some of these trials with old FDA-approved drugs showed promising results. In this review, we have precisely compiled the efforts to curb the disease and discussed the clinical findings of Ivermectin, Doxycycline, Vitamin-D, Vitamin-C, Zinc, and cannabidiol and their combinations. Additionally, the correlation of these molecules on the prophylactic and diseased ministration against COVID-19 has been explored.

Title: Running behavior and symptoms of respiratory tract infection during the COVID-19 pandemic: A large prospective dutch cohort study

Authors: Cloosterman, K. L. A., van Middelkoop, M., Krastman, P., & de Vos, R.

Journal: **Journal** of Science and Medicine in Sport

Objectives to explore changes in running behavior due to the Coronavirus Disease 2019 (COVID-19) pandemic, assess presence of symptoms suggestive for COVID-19 and identify whether there is an association between running behavior and COVID-19.

Design prospective cohort study.

Methods for this study we used a cohort of runners participating in an ongoing randomized controlled trial on running injury prevention among recreational runners. At baseline, demographic and training variables were collected. Seven weeks after starting the lockdown, information on running behavior (interval training, training with partner and physical distancing during training) and running habits (training frequency, duration, distance and speed) were obtained. Furthermore, healthcare utilization and symptoms suggestive for COVID-19 were assessed. To determine the association between running and symptoms suggestive for COVID-19, univariate and multivariate logistic regression analyses were performed.

Results of the 2586 included participants, 2427 (93.9%) participants continued running during lockdown with no significant changes in mean weekly training variables. A total of 253 participants (9.8%) experienced symptoms suggestive for COVID-19 and 10 participants tested positive for COVID-19. Two participants were admitted to hospital due to COVID-19 with both one day of admission. Running behavior and running habits were not associated with the onset of symptoms suggestive for COVID-19.

Conclusions the large majority of runners in the Netherlands did not change their running habits during lockdown. No association between running behavior or running habits and onset of symptoms suggestive for COVID-19 was identified. This implicates that running outdoor during lockdown does not negatively affect health of runners.

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Journal: Saudi **Journal** of Biological Sciences

Doi: https://doi.org/10.1016/j.jsams.2020.10.009

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Title: Biochemical role of serum ferratin and d-dimer parameters in COVID 19 diagnosis

Authors: Farasani, A.

Journal: Saudi **Journal** of Biological Sciences

Doi: https://doi.org/10.1016/j.sjbs.2021.08.040

One and one only most unforgettable pandemic is coronavirus 2019 (COVID 19) which is the most memorable pandemic of the twenty-first century. The diagnosis of COVID19 is based on purely clinical symptoms and real time reverse transcription polymerase chain reaction (RT-PCR) test. The role of COVID19 during this pandemic was horrible in diagnosing the disease with RT-PCR as this disease was documented to be a symptomatic disease. Serum ferratin and D-dimer tests plays

a major role in identifying the infections in the human body specifically, patients diagnosed with COVID19. Serum ferritin levels are important for an immune response mediator that rises in severe COVID-19 instances, and elevated ferritin levels may trigger a cytokine storm by exerting direct immunosuppressive and pro-inflammatory effects. d-dimer is used to identify the clots in the blood. COVID-19 patients were found to be clotting of blood and d-dimer is recommended. The blood of the COVID-19 patients were found to clotted than the patients were prescribed the anticoagulant Injections are prescribed. d-dimer can be used as a biomarker in the COVID-19 patients by measuring the d-dimer levels and analyse the mortality and severity. Pulmonary complication risk can also be identified. d-dimer is a mandatory and an essential test in the COVID-19. Numerous COVID-19 vaccines have been shown to have great efficacy levels through clinical trials. COVID-19 vaccines are not 100% effective, although the condition is mild or moderate and can be controlled if COVID-19 is affected. In this review, I have only included serum ferritin and d-dimer; however, C-reactive protein, vitamin D levels, and prolactin were also attributed to COVID-19. This review concludes the importance of RT-PCR, serum ferratin, and d-dimer testing in identifying COVID-19 infection in humans.

Title: Epidemiology and pathobiology of SARS-CoV-2 (COVID-19) in comparison with SARS, MERS: An updated overview of current knowledge and future perspectives.

Authors: Ganesh, B., Rajakumar, T., Malathi, M., Manikandan, N., Nagaraj, J., Santhakumar, A., . . . Malik, Y. S.

Journal: Clinical Epidemiology and Global Health

Doi: https://doi.org/10.1016/j.cegh.2020.100694

Severe Acute Respiratory Syndrome-Coronavirus-2 (SARS-CoV-2) is the causative etiology of 'Corona Virus Disease-2019' (COVID-19); formerly referred as 'novel-Coronavirus-2019'. It was originated in Wuhan city, Hubei province, China in early December 2019. The World Health Organization (WHO) declared it as 'Public Health Emergency of International Concern' due to their rapid transmission and causing public and health-care-related casualties worldwide. This review provides an updated overview of COVID-19 (SARS-CoV-2), in comparison with the etiologies of the same group viz. SARS and MERS and also its future perspectives for planning appropriate strategies for prevention, control and treatment modalities to avert similar catastrophe in near future.

Title: The impact of COVID-19 outbreak on hotels' value compared to previous diseases: the role of ALFO strategy

Authors: García-Gómez, C. D., Demir, E., Díez-Esteban, J. M., & Bilan, Y.

Journal: Heliyon

By using the Event Study Method (ESM), this paper aims to examine the effect of new coronavirus (SARS-CoV-2) disease (COVID-19) outbreak on the market performance of the hotel industry in the U.S. We also compare the impact of COVID-19 outbreak with three previous diseases outbreaks. The results show that there is a negative influence of the diseases outbreaks on stock returns of hotels in the U.S. However, the impact of COVID-19 is incomparably higher in magnitude compared to previous diseases. Furthermore, given the importance of following flexible corporate strategies to adapt to new and unpredicted situations, it is found that the ALFO (assets-light, fee-orientated) strategy acts as a mitigator for the predicted market value drop due to the pandemic.

Title: The impact of social distancing, contact tracing, and case isolation interventions to suppress the COVID-19 epidemic: A modeling study

Authors: Ge, Y., Chen, Z., Handel, A., Martinez, L., Xiao, Q., Li, C., . . . Shen, Y.

Journal: Epidemics

Most countries are dependent on nonpharmaceutical public health interventions such as social distancing, contact tracing, and case isolation to mitigate COVID-19 spread until medicines or vaccines widely available. Minimal research has been performed on the independent and combined impact of each of these interventions based on empirical case data.

We obtained data from all confirmed COVID-19 cases from January 7th to February 22nd 2020 in Zhejiang Province, China, to fit an age-stratified compartmental model using human contact information before and during the outbreak. The effectiveness of social distancing, contact tracing, and case isolation was studied and compared in simulation. We also simulated a two-phase reopening scenario to assess whether various strategies combining nonpharmaceutical interventions are likely to achieve population-level control of a second-wave epidemic.

Our study sample included 1,218 symptomatic cases with COVID-19, of which 664 had no inter-province travel history. Results suggest that 36.5 % (95 % CI, 12.8–57.1) of contacts were quarantined, and approximately five days (95 % CI, 2.2–11.0) were needed to detect and isolate a case. As contact networks would increase after societal and economic reopening, avoiding a second wave without strengthening nonpharmaceutical interventions compared to the first wave it would be exceedingly difficult.

Continuous attention and further improvement of nonpharmaceutical interventions are needed in second-wave prevention. Specifically, contact tracing merits further attention.

Title: Application of non-parametric models for analyzing survival data of COVID-19 patients

Authors: Ghosh, S., Samanta, G. P., & Nieto, J. J.

Journal: **Journal** of Infection and Public Health

COVID-19 Coronavirus variants are emerging across the globe causing ongoing pandemics. It is important to estimate the case fatality ratio (CFR) during such an epidemic of a potentially fatal disease.

Firstly, we have performed a non-parametric approach for odds ratios with corresponding confidence intervals (CIs) and illustrated relative risks and cumulative mortality rates of COVID-19 data of Spain. We have demonstrated the modified non-parametric approach based on Kaplan–Meier (KM) technique using COVID-19 data of Italy. We have also performed the significance of characteristics of patients regarding outcome by age for both genders. Furthermore, we have applied a non-parametric cure model using Nadaraya–Watson weight to estimate cure-rate using Israel data. Simulations are based on R-software.

The analytical illustrations of these approaches predict the effects of patients based on covariates in different scenarios. Sex differences are increased from ages less than 60 years to 60–69 years but decreased thereafter with the smallest sex difference at ages 80 years in a case for estimating both purposes RR (relative risk) and OR (odds ratio). The non-parametric approach investigates the range of cure-rate ranges from 5.3% to 9% and from 4% to 7% approximately for male and female respectively. The modified KM estimator performs for such censored data and detects the changes in CFR more rapidly for both genders and age-wise.

Older-age, male-sex, number of comorbidities and access to timely health care are identified as some of the risk factors associated with COVID-19 mortality in Spain. The non-parametric approach has investigated the influence of covariates on models and it provides the effect in both genders and age. The health impact of public for inaccurate estimates, inconsistent intelligence, conflicting messages, or resulting in misinformation can increase awareness among people and also induce panic situations that accompany major outbreaks of COVID-19.

Title: Mathematical assessment of the role of denial on COVID-19 transmission with non-linear incidence and treatment functions

Authors: Gweryina, R. I., Madubueze, C. E., & Kaduna, F. S.

Journal: Scientific African

Doi: https://doi.org/10.1016/j.sciaf.2021.e00811

A mathematical model describing the dynamics of <u>Corona</u> virus disease 2019 (COVID-19) is constructed and studied. The model assessed the role of denial on the spread of the pandemic in the world. Dynamic stability analyzes show that the equilibria, disease-free equilibrium (DFE) and endemic equilibrium point (EEP) of the model are globally asymptotically stable for R0<1 and R0>1, respectively. Again, the model is shown via numerical simulations to possess the backward bifurcation, where a stable DFE co-exists with one or more stable <u>endemic equilibria</u> when the control reproduction number, R0 is less than unity and the rate of denial of COVID-19 is above its upper bound. We then apply the optimal control strategy for controlling the spread of the disease using the <u>controllable variables</u> such as COVID-19 prevention, hospitalization and maximum treatment efforts. Using the Pontryagin maximum principle, we derive analytically the optimal controls of the model. The aforementioned control strategies are performed numerically in the presence of denial and without denial rate. Among such experiments, results without denial have shown to be more productive in ending the pandemic than others where the denial of the disease invalidates the effectiveness of the controls causing the disease to continue ravaging the globe.

Title: Non-linear spatial linkage between COVID-19 pandemic and mobility in ten countries: A lesson for future wave

Authors: Habib, Y., Xia, E., Hashmi, S. H., & Fareed, Z.

Journal: **Journal** of Infection and Public Health

Doi: https://doi.org/10.1016/j.jiph.2021.08.008

Restrictive measures enacted in response to the COVID-19 pandemic have resulted in dramatic and substantial variations in people's travel habits and behaviors worldwide. This paper empirically examines the asymmetric inter-linkages between transportation mobility and COVID-19.

Using daily data from 1st March 2020 to 15th July 2020, this study draws the dynamic and causal relationships between transportation mobility and COVID-19 in ten selected countries (i.e., USA, Brazil, Mexico, UK, Spain, Italy, France, Germany, Canada, and Belgium). To systematically analyze how the quantiles of COVID-19 (transportation mobility) affect the quantiles of transportation mobility (COVID-19), a complete set of non-linear modeling including the quantile-on-quantile (QQ) regression and quantile Granger causality in mean is applied.

Our preliminary findings strictly reject the preposition of data normality and highlight that the observed relationship is highly correlated and quantile-dependent. The empirical results

demonstrate the heterogeneous dependence between COVID-19 and transportation mobility across quantiles. The findings acclaim the presence of a significant positive association between COVID-19 and transportation mobility in the USA, UK, Spain, Italy, Canada, France, Germany and Belgium, predominantly at upper quantiles, but results are contrasting in the case of Brazil and Mexico. In addition, either lower or upper quantiles of both variables indicate a declining negative effect of transportation mobility on COVID-19. Furthermore, the outcomes of quantile Granger causality in mean conclude a bidirectional causal link between COVID-19 and transportation mobility for almost all sample countries. Unlike them, France has found unidirectional causality that extends from COVID-19 to transportation mobility.

We may conclude that COVID-19 leads to a reduction in transportation mobility. On the other hand, the empirical results quantify that excessive transportation mobility levels stimulate pandemic cases, and social distancing is one of the primary measures to encounter infection transmission. Imperative country-specific policy implications pertaining to public health, potential virus spread, transportation, and the environment may be drawn from these findings.

Title: Anti-inflammatory treatment of COVID-19 pneumonia with to facitinib alone or in combination with dexamethasone is safe and possibly superior to dexamethasone as a single agent in a predominantly African American cohort

Authors: Hayek, M. E., Mansour, M., Ndetan, H., Burkes, Q., Corkern, R., Dulli, A., . . . Singh, S.

Journal: Mayo Clinic Proceedings: Innovations, Quality & Outcomes

Doi: https://doi.org/10.1016/j.mayocpiqo.2021.03.007

To explore the survival benefit of tofacitinib in addition to dexamethasone in hospitalized patients treated for coronavirus disease 2019 (COVID-19)–related pneumonia.

This is a single-center retrospective observational study. All patients who were hospitalized at Delta Regional Medical Center (a regional hospital in the Mississippi Delta) with a COVID-19 diagnosis and discharged between March 1 and September 30, 2020, are included. The primary outcome was in-hospital mortality in relation to receipt of tofacitinib alone or in addition to dexamethasone (designated as the tofacitinib group), versus dexamethasone alone (designated as the dexamethasone group).

Of 269 eligible patients, 138 (51.3%) received tofacitinib uniformly and 131 (48.7%) patients received dexamethasone without tofacitinib. A total of 44 patients expired: 14 (31.8%) in the tofacitinib group and 30 (68.2%) in the dexamethasone group. The proportions of death among the tofacitinib and dexamethasone groups were, respectively, 10.1% and 22.9%. This represents a 70% reduction in odds of dying among the tofacitinib group compared to the dexamethasone group after adjusting for age and clinical parameters captured at hospitalization (adjusted odds ratio: 0.30; 95% CI: 0.12 to 0.76; P=.01).

The in-patient treatment of COVID-19 pneumonia has rapidly evolved. The addition of dexamethasone has made a relevant improvement on survival. Other immunomodulators have yet

to show an impact. Here we present the potential survival benefit of the Janus kinase–signal transducer and activator of transcription inhibitor tofacitinib on COVID-19 pneumonia. We found that adding tofacitinib-based anti-inflammatory therapy to a treatment regimen including dexamethasone in COVID-19 pneumonia seems to have potential benefit of improving survival when compared to dexamethasone alone.

Title: Sensitivity analysis and optimal control of COVID-19 dynamics based on SEIQR model.

Authors: Hayek, M. E., Mansour, M., Ndetan, H., Burkes, Q., Corkern, R., Dulli, A., . . . Singh, S.

Journal: Results in Physics

Doi: https://doi.org/10.1016/j.rinp.2021.103956

It is of great curiosity to observe the effects of prevention methods and the magnitudes of the outbreak including epidemic prediction, at the onset of an epidemic. To deal with COVID-19 Pandemic, an SEIQR model has been designed. Analytical study of the model consists of the calculation of the basic reproduction number and the constant level of disease absent and disease present equilibrium. The model also explores number of cases and the predicted outcomes are in line with the cases registered. By parameters calibration, new cases in Pakistan are also predicted. The number of patients at the current level and the permanent level of COVID-19 cases are also calculated analytically and through simulations. The future situation has also been discussed, which could happen if precautionary restrictions are adopted.

Title: Data analytics to evaluate the impact of infectious disease on economy: Case study of COVID-19 pandemic.

Authors: Hyman, M., Mark, C., Imteaj, A., Ghiaie, H., Rezapour, S., Sadri, A. M., & Amini, M. H.

Journal: Patterns

Doi: https://doi.org/10.1016/j.patter.2021.100315

SARS-CoV-2 (COVID-19) is a new strain of coronavirus that is regarded as a respiratory disease and is transmittable among humans. At present, the disease has caused a pandemic, and COVID-19 cases are ballooning out of control. The impact of such turbulent situations can be controlled by tracking the patterns of infected and death cases through accurate prediction and by taking precautions accordingly. We collected worldwide COVID-19 case information and successfully predicted infected victims and possible death cases around the world and in the United States. In addition, we analyzed some leading stock market shares and successfully forecast their trends. We also scrutinized the share market price by proper reasoning and considered the state of affairs of COVID-19, including geographical dispersity. We publicly release our developed dashboard that presents statistical data of COVID-19 cases, shows predicted results, and reveals the impact of COVID-19 on leading companies and different countries' job market

Title: Exploring existing drugs: proposing potential compounds in the treatment of COVID-19

Authors: Kabir, E. R., Mustafa, N., Nausheen, N., Sharif Siam, M. K., & Syed, E.U.

Journal: Heliyon

The COVID-19 situation had escalated into an unprecedented global crisis in just a few weeks. On the 30th of January 2020, World Health Organization officially declared the COVID-19 epidemic as a public health emergency of international concern. The confirmed cases were reported to exceed 105,856,046 globally, with the death toll of above 2,311,048, according to the dashboard from Johns Hopkins University on the 7th of February, 2021, though the actual figures may be much higher. Conserved regions of the South Asian strains were used to construct a phylogenetic tree to find evolutionary relationships among the novel virus. Off target similarities were searched with other microorganisms that have been previously reported using Basic Local Alignment Search Tool (BLAST). The conserved regions did not match with any previously reported microorganisms or viruses, which confirmed the novelty of SARS-CoV-2. Currently there is no approved drug for the prevention and treatment of COVID-19, but researchers globally are attempting to come up with one or more soon. Therapeutic strategies need to be addressed urgently to combat COVID-19. Successful drug repurposing is a tool that uses old and safe drugs, is time effective and requires lower development costs, and was thus considered for the study. Molecular docking was used for repurposing drugs from our own comprehensive database of approximately 300 highly characterized, existing drugs with known safety profile, to identify compounds that will inhibit the chosen molecular targets - SARS-CoV-2, ACE2, and TMPRSS2. The study has identified and proposed twenty seven candidates for further in vitro and in vivo studies for the treatment of SARS-CoV-2 infection.

Title: Genetic emergence of B.1.617.2 in COVID-19

Authors: Kirola, L.

Journal: H New Microbes and New Infections

Many proactive steps have been taken worldwide to fight against the SARS-CoV-2 pandemic and to prevent COVID-19 spread with realistic approaches. Recently, a novel variant B.1.617.2 has been identified in India, which is rapidly transmitting to other countries, challenging current therapeutics, wide vaccination and future research in COIVD-19.

Reference

Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. WHO https://www.who.int/health-topics/coronavirus#tab=tab_1

Protect yourself and others from COVID-19. WHO. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public