



Technology as a Psychological Healer: A Digital War against Covid-19

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ABSTRACT

Globally the year 2020 recognized as the “Year of COVID-19” gets a popularity as a virus without break in the history of medical science because its spreadability is very high as shown by its latest figures till 03rd August 2020, approximately 18,233,977 of confirmed cases with 6,92,785 of deaths as per World Health Organization. Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2), the universal gift of China is a genetically strong virus with extraordinary proteinous makeup. The severity of coronavirus increase continuously due to numerous climatological and sociobiological factors results in symptomatic to asymptomatic spread of infection. Till date, there is no any vaccine except the supportive and preventive strategies as given by the regulatory authorities. This current outbreak not only become the physical threat to the global population but also affects the psychological ability of every human being with the fear, the unseen psychological weapon of coronavirus. Therefore, learning from previous virulent pandemics such as the Middle East Respiratory Syndrome and Severe Acute Respiratory Syndrome, presently the countries take a new advanced innovative step via digital infrastructure to control the spread of this deadly virus. However, from the beginning of COVID-19 outbreak and during this lockdown time, the techno world psychological supporting media and apps getting popularity continuously and becoming a psychological healer to a great extent. This review enlightened the global impact of SARS-CoV-2, the supportive efforts of Allopathy or Ayurveda to stop the progression of this virus and most prominently the fruitful outcomes of techno-medical collaborations on human psychology.

Keywords: Techno-medical, Asymptomatic, COVID-19, Psychological healer, SARS-Cov-2, WHO.

INTRODUCTION

In the universal history of medical science, the year 2020 retained in the human memories as the “Year of Coronavirus” or Coronavirus disease-2019 (COVID-19) as the name recommended by the World Health Organization (WHO).¹ COVID-19 has been gifted from the Wuhan city of China in late December 2019 with the title of 2019-noble coronavirus (2019-nCoV).² But, unfortunately in the drastic phase of COVID-19, the world had been welcoming the strain of human coronavirus namely Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) as per International Committee on Taxonomy of Virus.³ Previously, the world had been already gone through with the two such kind of aggressive attacks of a novel coronavirus such as Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV, 2003)⁴ in China and Hong Kong which accounts for approximately 8422 of confirmed cases with 916 deaths⁵ and Middle East Respiratory Syndrome Coronavirus (MERS CoV, 2012) in Saudi Arabia with round about 2494 confirmed cases and 858 deaths.^{6,7} In 1968 invented term coronavirus (CoV) belongs from the largest family of positive-sense, single-stranded RNA viruses classified under order Nidovirales, family Coronaviridae and subfamily Coronavirinae and subdivided into four sister branches mainly alpha, beta, gamma and delta COVs.⁸ Meanwhile, the virions of coronavirus are spherical and covered through glycoproteins with the spikes or finger-like projections^{2,9}

from its base to the upward direction which gives the virus crown-like appearance with the viral genomic limits ranges from 6-32 kilobases in length.² Due to its high spreadability and pathogenicity this virus ruled over six continents and more than 213⁺ countries. Earlier this virus was reported in bats⁹ but now it is heavily spread in human being through numerous ways, most probably airborne droplets or direct contact with the infected person may be the straightforward process of human-to-human transmission of infection^{10,11} with an average incubation period ranges in between 7-14 days.^{3,10} SARS-CoV-2 must be showed very unique asymptomatic to symptomatic journey with mild (dry cough, mild fever, nasal congestion, sore throat, headache, muscle pain, and malaise)³ to moderate symptoms (cough, shortness of breath, and tachypnea)³ along with fatal symptoms (Acute Respiratory Distress Syndrome (ARDS), multi-organ death).¹² Latest clinical studies reveal that the elderly people who suffered from chronic ailments like diabetes, hypertension, heart problems¹³ are more prone to show a higher level of infection symptoms with higher fatality rate as compared to the normal population. The eugenic pillars of SARS-CoV-2 has been very strong due to its high mutation rate and extraordinary stronger proteinous and genetic makeup², therefore, the combination of serological studies and Real Time-Polymerase Chain Reaction (RT-PCR) assay has been used for its confirmatory testing.¹⁴ There are several contributing factors^{15,16} such



as age, atmospheric conditions, host defence system, population density and underlying health conditions may be responsible for the global spread of COVID-19.¹⁷ WHO and Ministry of AYUSH creates a line of actual control of preventive and remedial measures^{18,19} which affects all aspects of human health such as physiological, psychological and socioeconomic. The remedial measures include hand washing, proper sanitization²⁰, using face masks, avoiding mass gathering, avoiding close contact with infected ones, coughing or sneezing etiquettes²¹ with special focus on immunity.^{22,23} Learning from the previous pandemics such as MERS and SARS, the psychological area of human health needs more attention therefore in case of COVID-19 the universal digital infrastructure act as a psychological healer to a great extent.²⁴ This review emphasized on the overall impact of SARS-CoV-2 in India and overseas, collaborative approaches of Allopathy or Ayurveda to stop the progression of a deadly virus and most prominently the fruitful outcomes of techno world on our human psychology.

MITIGATING ASPECTS OF CORONA VIRUS

Fear: Fear is the root cause of the psychological impact of coronavirus on the mental health status of a human being because this disease has been caused by the new strain of coronavirus and currently there is no any vaccine or treatment for it.²⁵ Ultimately, we don't have enough knowledge about the deadly nature of this virus and that enhances the anxiety level of world population to an intangible level.²⁶ Different national studies parameters indicated that due to the COVID-19 outbreak there has been a sharp increases in fear and worries related reported cases of the virus worldwide.^{27,28} As per the Canadian and United States human sampling data⁶, a recently developed the COVID STRESS SCALES (CSS)²⁹ identified some factors of stress and anxiety symptoms relating to the coronavirus and i.e. danger and contamination, compulsive checking and reassurance-seeking, traumatic stress symptoms, coronavirus-related xenophobia, fears about economic consequences. Furthermore, many different psychological, sociological and genetic factors have been linked to fear.^{15,29}

Age: Age is one of the most important contributing factor towards the universal fatality rate.³⁰ Statistical reports of China and Italy clearly states that the fatality rate has been almost similar in the age groups of 0-69 years and 70-80 years people respectively.¹⁶ Prolonged health conditions like renal, heart and lungs problems³¹ which contributes towards their low immunity status and social isolation during this pandemic making them more prone to this infection.³²

Underlying Health Conditions: Older patients with underlying comorbidities such as heart and kidney problems, high blood pressure, stroke, diabetes with debilitated immune system has been more vulnerable for COVID-19 infections.^{33,34} This is all because of extremely lower level of immunity fighters and high level of cytokines storm, especially mediated through Interleukin-6 in our

body fluids.³⁵ This cytokine storm or Cytokine Release Syndrome (CRS) in COVID-19 has been responsible for extreme level tissue damage and ultimately results in organ failure³⁶, therefore the elderly people with underlying health conditions have been requested to stay safe or protective inside their homes because their body may have the stamina to fight with cytokines bombardment and eventually leads to CRS and finally death.³⁷

Host Defence Potential: As we know every human being has their immune powers to fight against the deadly virus^{38,39} but the immunologically compromised persons have become more susceptible targets for virus action as their defending power must be very low.⁴⁰ Previous studies reveal that, during the earlier stages of coronavirus infection, the upper respiratory tract went to be infected, and the disease progression depends upon the host immunity backup.³⁷ If the immunity fighter may fail to compete with the viral attack then the disease moves towards lower respiratory tract results in lung fibrosis, shortness of breath and finally death. COVID-19 becomes a highly pathogenic virus due to its extreme complicated proteinous makeup, hence a protein called nsp3 in the novel coronavirus meant for blocking host innate immune response and promoting cytokine expression.^{41,42}

Host Behaviour and Number of Contacts: SARS-CoV-2 easily spread by human-to-human transmission as a mean of droplets or direct contact with the average incubation period of 7 days.⁴³ So, keeping on mind the severity and spreadability of this current outbreak, we all have to focus on the frontline preventive measures of this virus as recommended by the WHO and Ministry of AYUSH.⁴⁴ Home and institutional quarantine, social distancing, maintain personal hygiene and use of immunity enhancers, they all are meant to be strictly followed to reduce numbers and the usual risk of transmission of infection.¹⁶

Personal Hygiene Practices: Most importantly WHO approved and accepted healthcare preventive measures are used for maintaining personal hygiene in our daily life and it should be well documented in our health care systems.⁴⁵ Hand sanitization with isopropyl alcohol sanitizers and avoiding mass gathering, these are the two mandatory actions to minimize the community spread of SARS-CoV-2.^{45,46}

Airflow and Ventilation: Previous clinical studies show that just like another respiratory pathogen like rhinovirus or flu, the coronavirus is believed to be spread through coughing, sneezing or most prominently through droplet nuclei.⁴⁷ Hence, closed areas with low airflow and ventilation can increase the risk of COVID-19 infection. Analysis of Chinese data related to the SARS-CoV-2 spreadability indicates that the human-to-human close contact is necessary for the transmission of the virus.^{48,49} This criterion becomes worsen when the group people present in a mass gathering such as a meeting in a small room, aeroplane, centralized A/C etc expose the person already having the infection.^{50,51}



Atmospheric Temperature and Humidity: The COVID-19 shows its better stability at low temperature and high humidity and that may facilitate its transmission in air-conditioned and temperate climatic environments.^{52, 53} The COVID-19 outbreak initially reported in the countries in the coldest months of the year. However, there is a somewhat reduction in the cases during warmer weather that would provide valuable time to our health care systems to plan and make strategies to develop potential medicines.⁵⁴ Globally, scientific coronavirus literature suggests that there is any type of connectivity between atmospheric temperature and spreading ability of virus.^{53,55}

Virulence of Novel Coronavirus: The severity outcomes of this virus are so much high and it depends upon multiple factors like its replication ability, spreading tendency and also modifying the host cell environment by making its immune system weaker and extent of tissue damage in host body.⁵⁶ Background history of CoV family shows its different area of interest e.g. alpha and beta coronaviruses shows their interest in mammals, similarly birds and fish become the area of interest of gamma and delta coronavirus, but some of them also interested in the area of mammals also.⁵⁷ SARS-CoV-2 has been belonging from the family of beta coronavirus.⁵⁸ Currently, this new virus seems to be moving with full-on speed without break because of its much-complicated genetic coding and replicating ability and extraordinary proteinous support.³

Social Distancing and Community Consciousness: Social distancing comes under the non-pharmacological approaches of COVID-19 based upon the preventive measure criteria recommended by WHO.⁴⁴ Social distancing technique has been measured used to avoid the spread of the virus on a large scale specifically by avoiding the mass gathering, restricting the visitor movement at home for safety and health issues, maintain a distance of about 2 to 6 feet as much as possible.⁵⁹ During this outbreak, all governments and health sectors as per WHO¹⁶ instruction kept the social distancing on the top priority on the preventive list of COVID-19 spread.⁶⁰

GLOBAL TALK OF COVID-19

Universal Perspective

Among all continents, North America is extremely affected by the COVID-19 followed by Europe, Asia, South America, Africa and Australia. Australia account the least number of COVID-19 confirmed cases as of now i.e. 18564 only with least number of deaths and recovery rate is excellent in Australia **Fig. 1.**⁶¹

Indian Perspective

In COVID-19 pandemic records, India stands at 3rd position with total confirmed cases 18,04,702 with 38,161 of deaths. Maharashtra being the most affected state followed by Telangana, Uttar Pradesh, Tamil Nadu, Delhi and Andhra Pradesh and recovery rate is exemplary with 61.53% **Fig. 2,3,4.**^{61,62}

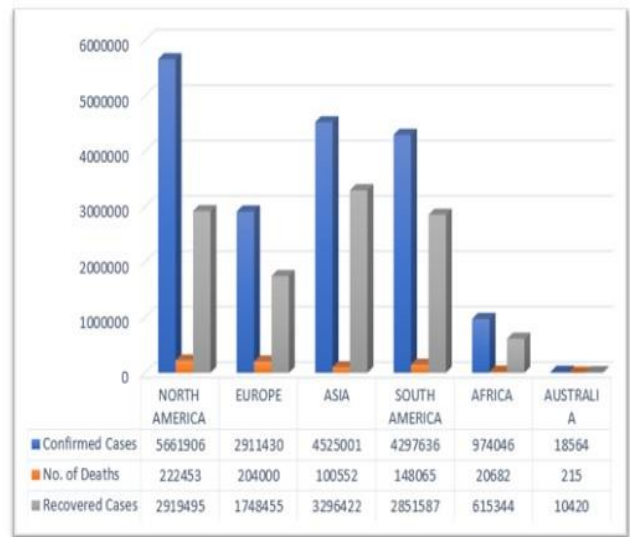


Figure 1: Worldwide Cases

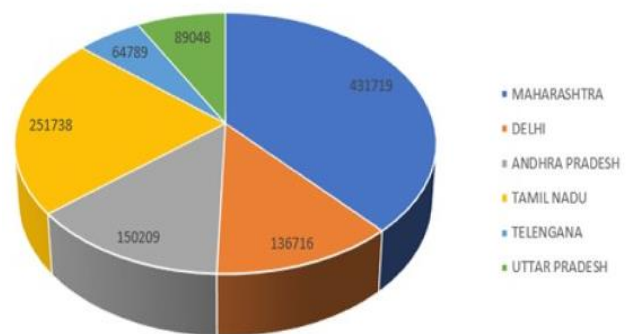


Figure 2: Confirmed Cases in India

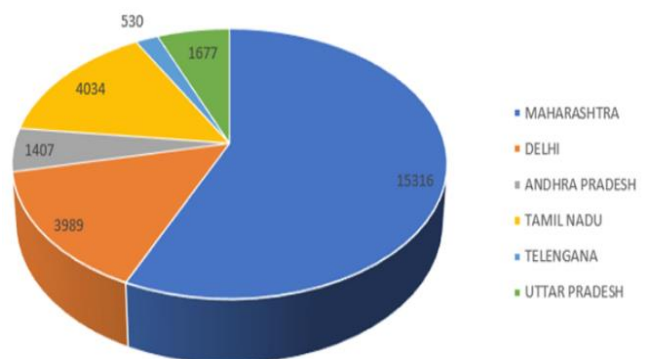


Figure 3: Death Cases in India

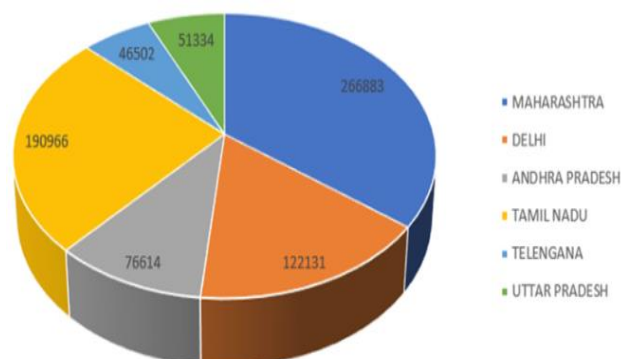


Figure 3: Recovered Cases of India

REMEDIAL STRATEGIES

Till date, all researchers and medical personnel from each country has been searching for the treatment of SARS-CoV-2, even some of them reach to the final stages of the clinical trial with some antiviral drugs or vaccines. But in this time, we have only hope not medicine.

Preventive Strategies: Social Distancing, Quarantine, Maintain Personal Hygiene, Sanitization, Use of Immunity Enhancers.

Curative Strategies: Drugs and Vaccines

Symptomatic Treatment

PREVENTIVE STRATEGIES

As Per WHO Guidelines:

Preventive measure particularly focuses on the transmission of infection. WHO sets universal guidelines for controlling the spreadability of infection.³ The infection controlling measures are self-isolation that maybe home quarantine or institutional quarantine⁶³, social distancing (at least 2 to 6 feet), maintain health hygiene includes periodic handwashing with soap, hand sanitization, proper coughing and sneezing etiquettes and avoid bulk gathering on a preventive bases.^{20,21} Even though, in health care settings the health care professional must wear Personal Protective Equipment (PPE) kits along with N95 masks on safety measures and strictly apply the sanitization procedure in the contaminated areas or emergency area of hospitals.

As Per Ministry of AYUSH:

As discussed earlier that elder population with lower immunity level has been more prone to develop the COVID-19 symptoms. So, it's time to pay attention to the fighting ability of our body system i.e. the use of immunity enhancers. Therefore, Ministry of AYUSH gives direction towards the Indian herbal ancestry which includes Turmeric (*Curcuma longa*, Family *Zingiberaceae*), Tulsi (*Ocimum sanctum*, Family *Labiata*), Mint (*Mentha piperita*, Family *Labiata*), Garlic (*Allium sativum*, Family *Amaryllidaceae*), Ginseng (*Panax ginseng*, Family *Araliaceae*), Ginger (*Zingiber officinale*, Family *Zingiberaceae*), Clove (*Syzygium aromaticum*, Family *Myrtaceae*) etc.²² Daily practice of exercise and yoga is also helpful for immunity maintenance and body relaxation.²³

CURATIVE STRATEGIES

Drugs: As we know that, yet know the world has been fighting with this SARS-CoV-2 without any therapeutic approach, but hopefully maximum of scientific organization has been in the final phases of clinical trials with some antiviral drugs like Remdesivir, Favipiravir, Lopinavir, and Ritonavir.⁶⁴ Even though, plasma therapy may also become a potential lifesaver for COVID-19 patients after getting multiple time successful clinical results.⁶⁵

Vaccine: Currently more than 100 vaccines at various stages of developmental trials including in India, Britain, China, the US, Russia and Israel etc. The mRNA-1273 vaccine candidate, developed by US-based biotechnology company Moderna, has started Phase-2 clinical trials.⁶⁶ Ad5-nCoV vaccine prepared by CanSino Biologicals and the Beijing Institute of Biotechnology shows promising results in the Phase-2 clinical trials, though they are yet to be published.⁶⁷ Vaccine INO-4800 is also one of the promising candidate developed by Inovio Pharmaceuticals facing the phase-1 clinical trials.⁶⁸

Symptomatic Treatment: As per Ministry of Health and Family Welfare, India's COVID-19 recovery rate⁶⁶ crosses 60% and improve to 62% as on July 19, 2020. Hence, in the absence of any confirmed treatment³, the symptomatic care becomes a ray of hope for a global health care system. The basic principle behind the symptomatic treatment is to cure the underlying disease condition and provides functional support to body organs timely. This target must be achieved by the use of life supporting measures as per patient health condition includes antipyretics, anti-bacterial drugs, nutritional supplements, oxygen therapy⁶⁹, non-invasive mechanical ventilation, invasive mechanical ventilation, renal failure and renal replacement therapy, convalescent plasma treatment, immunotherapy⁷⁰, blood purification technique etc⁹ Moreover, unnecessary administration of antibiotics should also be avoided.

TECHNOLOGY: AS A PSYCHOLOGICAL HEALER

The current COVID-19 outbreak not only becomes a threat to the physical health of the population but also produce psychological consequences for the mental health of an individual. Meanwhile, social distancing plays a key role to slow down the severity of this pandemic followed by physical isolation, decreased human efforts and increased rumours which ultimately hit the psychology of every normal individual to some extent and also to those with pre-existing mental illness.²⁴ Today's world is a techno-world linked with digital mental health revolution, creating a platform for the delivery of confidential mental health services or psychological support to worldwide population with the help of technological tools known as tele mental health delivery system^{72,73,74} using apps, text messaging, social media etc.

Telemental Health APPS

There is a crucial role for the use of teleconferencing software for therapy sessions during the COVID-19 pandemic. The implementation of mobile software applications to monitor people and carry out contact tracing has been a trend adopted on a global scale.

Categories of Covid-19 APPS

Informational app, Self-assessment/Medical reporting app, Contact tracing app, Multi-purpose app.⁷⁵

Information App: During this pandemic time this app provides exact information regarding the disease condition



includes latest news, fact sheets and guidelines etc. as per government organizations like WHO. The apps are: Cambodia – Khmer Education COVID-19 app ⁷⁶, India (Mizoram) – McoVID-19 and India (Kerala) – GoK Direct ⁶⁶, Guatemala – COVID-19 en Guatemala, Brazil – Coronavirus – SUS etc.

Self-Assessment/Medical Reporting App: The purpose of this app to reduce the work pressure of health care professionals by doing the self-assessment testing of COVID-19 associated symptoms. e.g. Australia – Australian Government, Belgium – moveUP App, France – Maladie Coronavirus, India – Arogya Setu App ⁶⁶, India (Punjab) – COVA ^{66,76}, USA – COVID-19 screening tool, South Africa – Corona Fighter, Pakistan – Corona-Check etc.

Contact Tracing App: This app is used to monitor the infected persons or the home quarantine people by tracking their locations. e.g. Austria – Stopp Corona ⁷⁷, China: Hong Kong – StayHomeSafe, India – Corona Kavach, India (Maharashtra) – MahaKavach, United Arab Emirates – Stay Home etc.

Some Multipurpose Apps: This category deals with at least a combination of two previously mentioned apps – informational apps, self-assessment/medical reporting apps and contract tracing. e.g. Nepal - Kathmandu Metropolitan City (KMC), USA – How we feel, Saudi Arabia – Tawakkalna.

SOCIAL MEDIA

Social media plays a duplex role for coping with the mental health status of the general public during this corona time.²⁴ On the side, it can provide a positive vibes and motivational support to the physically isolated or under quarantine people by encouraging them to share their difficult time experiences ⁷⁴ and on another side, due to the fake news and rumours about the COVID-19, it may also become a source of negative vibes turns into anxiety leads to depression.⁷⁸ However, for avoiding this misinformation and fake news regarding COVID-19 pandemic, a social media organization on large scale using Artificial Intelligence Techniques (AI) as developed by WHO ⁷⁹ for distributing reliable and accurate information. Mostly the governing authorities of developed nations like USA, China along with their National Health Services (NHS) using their social media platforms such as Google, Twitter, Instagram, and Facebook ⁸⁰, WeChat, Tik-Tok ⁸¹ for providing online mental health education or counselling.

Texting Applications

Text-messaging platforms supports the psychologically challenged COVID-19 people in a very tactful way by promoting their awareness about this deadly virus.⁷³ Text-messaging is an appropriate method or tool for handling low digital literacy population.⁸² The healthy SMS or text messaging techniques have been developed specifically for low-income populations without smartphones or no internet access facilities.⁸³ Therefore, the texting applications become a backbone of our digital world

providing psychological care or awareness regarding the COVID-19 up to the ground level of the global population where the high-speed internet and android approaches can't reach.

CONCLUSION

Worldwide, the negative vibrations related to coronavirus spread with such a great intensity without break and yet now approximately knock the doorbells of every country with a virulent health alarm. COVID-19 stands with more infection and fatality rate as compared to its ancestral pillars such as SARS or MERS. Based upon the multifactorial approaches mainly the elderly population with immunocompromised health status more prone to develop such kind of infection. Anyhow, in the absence of any therapeutic approaches all nations should actively fight with this situation with the supportive and preventive measures as directed by the regulatory authorities. This current outbreak not only becomes the physical threat to the global population but also affects the psychological ability of every human being with the fear of uncertainty or incomplete knowledge about this harmful virus. So, this calls for an active and updated counselling sessions with the medical professionals via using digitalization techniques. During this pandemic time, the technological collaboration proves a novel strategy to become a psychological healer. Therefore, this review strongly highlighted this fact that this is a high time to extensively invest in the technology-based measures to cope up with such a present COVID-19 pandemic or possibly the future pandemics.

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REFERENCES

1. Zhou Peng, Yang Xing-Lou, Wang Xian-Guang, Hu Ben, Zhang Lei, Zhang Wei, Si Hao-Rui, Zhu Yan, Li Bei, Huang Chao-Lin, Chen Hui-Dong, Chen Jing, Luo Yun, Guo Hua, Jiang Ren Di, Liu Mei-Qin, Chen Ying, Shen Xu-Rui, Wang Xi, Zheng Xiao-Shuang, Zhao Kai, Chen Quan-Jiao, Deng Fei, Liu Lin-Lin, Yan Bing, Zhan Fa-Xian, Wang Yan-Yi, Xiao Geng-Fu, Shi Zheng-Li, A pneumonia outbreak associated with a new coronavirus of probable bat origin, *Nature*, 579, 2020; 270-273. <https://doi.org/10.1038/nature.2020.s41586-020-2012>.
2. Wang Chen, Horby W Peter, Hayden G Frederick, Gao F George, A novel coronavirus outbreak of global health concern, *The Lancet*, 395(10223), 2020, 470-473. [https://doi.org/10.1016/lancet.2020.S0140-6736\(20\)30185-9](https://doi.org/10.1016/lancet.2020.S0140-6736(20)30185-9).
3. Cascella Marco, Rajnik Michael, Cuomo Arturo, Dulebohn C Scott, Napoli Di Raffaella, Features, Evaluation and Treatment Coronavirus (COVID-19). FL: Stat Pearls Publishing, 2020.
4. Zhong N S, Zheng B J, Li Y M, Poon, Xie Z H, Chan K H, Li P H, Tan S Y, Chang Q, Xie J P, Liu X Q, Xu J, Li D X, Yuen K Y, Peiris, Guan Y, Epidemiology and cause of severe acute respiratory syndrome(SARS) in Guangdong, People's Republic of China in February 2003, *The Lancet*, 362 (9393), 2003, 1353-1358.
5. Chan-Yeung Maira, Xu Rui-Heng, SARS: epidemiology, *Respirology*, 8(1), 2003, S9–14.



6. World Health Organization, Middle East Respiratory Syndrome Coronavirus (MERS-CoV), government told, 2019. Available from: <<https://www.who.int/emergencies/mers-cov/en/>, 2019>. [Accessed on: 5 June 2020].
7. Fehr R. Anthony, Perlman Stanley, Coronaviruses: an overview of their replication and pathogenesis, *Methods in Molecular Biology*, 1282, 2015, 1–23. https://doi.org/10.1007/m.m.b.2015.978-1-4939-2438-7_1.
8. Lu Roujian, Zhao Xiang, Li Juan, Niu Peihua, Yang Bo, Wu Honglong, Wang Wenling, Song Hao, Huang Baoying, Zhu Na, Bi Yuhai, Ma Xuejun, Zhan Faxian, Wang Liang Wang, Hu Tao, Zhou Hong, Hu Zhenhong, Zhou Weimin, Zhao Li, Chen Jing, Meng Yao, Wang Ji, Lin Yang, Yuan Jianying, Xie Zhihao, Ma Jinmin, Liu J William, Wang Dayan, Xu Wenbo, Holmes C Edward, Gao F George, Wu Guizhen, Chen Weijun, Shi Weifeng, Tan Wenjie, Genomic characterization and epidemiology of 2019 novel coronavirus: implications for virus origins and receptor binding, *The Lancet*, 395, 2020, 565-574. [https://doi.org/10.1016/lancet.2020.S0140-6736\(20\)30251-8](https://doi.org/10.1016/lancet.2020.S0140-6736(20)30251-8).
9. Geng Li, Yaohua Fan, Yanni Lai, Tiantian Han, Zonghui Li, Peiwen Zhou, Pan Pan, Wenbiao Wang, Dingwen Hu, Xiaohong Liu, Qiwei Zhang, Jianguo Wu, Coronavirus infections and immune responses, *Journal of Medical Virology*, 92(4), 2020, 424-432. <https://doi.org/10.1002/j.m.v.2020.25685>.
10. National Health Commission of People's Republic of China, prevent guideline of 2019 nCoV, government told, 2019. Available from: <http://www.nhc.gov.cn/xcs/yqfkdt/gzbd_index.shtml/, 2020>. [Accessed on: 21 June 2020].
11. National Health Commission of People's Republic of China, Pneumonia diagnosis and treatment of 2019 n-CoV infection from Chinese NHC and CDC, government told, 2019. Available from: <<https://www.nhc.gov.cn/xcs/zhengcwj/202001429563ed35b43209b31739bd0785e67/fies/7a9309111267475a99d44306962c8bf78.pdf/>, 2020>. [Accessed on: 17 June 2020].
12. Wang Yixuan, Wang Yuyi, Chen Yan, 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/j.m.v.2020.25748>.
13. Chen Nanshan, Zhou Min, Dong Xuan, Qu Jieming, Gong Fengyun, Han Yang, Qiu Yang, Wang Jingli, Liu Ying, Wei Yuan, Xia Jiaan, Yu Ting, Zhang Xinxin, Zhang Li, Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: A descriptive study, *The Lancet*, 395, 2020, 507-513. [https://doi.org/10.1016/lancet.2020.S0140-6736\(20\)30211-7](https://doi.org/10.1016/lancet.2020.S0140-6736(20)30211-7).
14. Kanne P. Jeffrey, Chest CT findings in 2019 novel coronavirus (2019-nCoV) infections from Wuhan, China: Key points for the radiologist, *Radiology*, 295, 2020, 16-17. <https://doi.org/10.1148/radiol.2020.200241>.
15. Zunyou Wu, McGoogan M, Jennifer M, Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention, *Journal of American Medical Association*, 323(13), 2020, 1239-1242. <https://doi.org/10.1001/j.a.m.a.2020.2648>.
16. World Health Organization, Coronavirus disease (COVID-19) outbreak, government told, 2020. Available from: <<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/>, 2020>. [Accessed on: 28 June 2020].
17. Priyadarsini Lakshmi S and Suresh M, Factors influencing the epidemiological characteristics of pandemic COVID 19: A TISM approach, *International Journal of Healthcare Management*, 13(2), 2020, 8998. <https://doi.org/10.1080/i.j.h.m.2020.20479700.1755804>.
18. World Health Organization, Novel coronavirus (2019-nCoV) Situation report- 18, government told, 2020. Available from: <<https://www.who.int/docs/default-source/coronaviruse/situationreports/20200207-ncov.pdf/>, 2020>. [Accessed on: 9 July 2020].
19. Ministry of AYUSH, Ayurveda's immunity boosting measures for self-care during COVID 19 crisis, government told, 2020. Available from: <<https://www.ayush.gov.in/>, 2020>. [Accessed on 29 June 2020].
20. Q Wei, Z Ren, Disinfection measures for pneumonia foci infected by novel corona virus in 2019, *Chinese Journal of Disinfection*, 37, 2020, 59–62.
21. C Bin, X Fang, H Chen, Application effect of disaster vulnerability analysis in coping with the transmission of new coronavirus in non-closed hematology ward, government told, 2020. Available from: <<http://kns.cnki.net/kcms/detail/14.1272.R.20200131.1909.002.html>>. [Accessed on: 22 June 2020].
22. Simpson J Richard, Kunz Hawley, Agha Nadia, Graff Rachel, Exercise and the Regulation of Immune Functions, *Progress in Molecular Biology and Translational Science*, 135, 2015, 355-380.
23. High KP, Nutritional strategies to boost immunity and prevent infection in elderly individuals, *Clinical Infectious Diseases*, 33, 2001, 1892-1900.
24. Figueroa A. Caroline, Aguilera Adrian, The Need for a Mental Health Technology Revolution in the COVID-19 Pandemic, *Frontiers in Psychiatry*, 11, 2020, 523. <https://doi.org/10.3389/f.psyt.2020.00523>.
25. Wheaton, Abramowitz G. Michael, Berman S. Jonathan, Fabricant C. Noah, Olatunji E. Laura, O Bunni, Psychological predictors of anxiety in response to the H1N1 (swine flu) pandemic, *Cognitive Therapy and Research*, 36(3), 2012, 210–218. <https://doi.org/10.1007/c.t.r.2012.s10608-011-9353-3>.
26. Stussi, Brosch Yoann, Sander Tobias, David, Learning to fear depends on emotion and gaze interaction: The role of self-relevance in fear learning, *Biological Psychology*, 109, 2015, 232–238. <https://doi.org/10.1016/j.biopsycho.2015.06.008>.
27. Asmundson JG Gordon, Taylor Steven, Coronaphobia: Fear and the 2019-nCoV outbreak, *Journal of Anxiety Disorders*, 70, 2020(a), 102196. <https://doi.org/10.1016/j.janxdis.2020.102196>.
28. Mccarthy Justin, U.S. coronavirus concerns surge, government trust slides, government told, 2020. Available from: <<https://news.gallup.com/poll/295505/coronavirus-worries-surge.aspx/>, 2020>. [Accessed on: 15 July 2020].
29. Taylor Steven, Landry A Caeleigh, Paluszek M Michelle, Fergus A Thomas, Mckay, Gordon J.G., Asmundsone, Development and initial validation of the COVID stress scales, *Journal of Anxiety Disorders*, 72, 2020, 102232. <https://doi.org/10.1016/j.janxdis.2020.102232>.
30. Coelho Magalhaes Carlos, Purkis Helena, The origins of specific phobias: Influential theories and current perspectives, *Review of General Psychology*, 13(4), 2009, 335–348. <https://doi.org/10.1037/r.g.p.2009.a0017759>.
31. Onder Graziano, Rezza Giovanni, Brusaferro Silvio, Case-fatality rate and characteristics of patients dying in relation to COVID-19 in Italy, *Journal of American Medical Association*, 323(18), 2020, 1775-1776. <https://doi.org/10.1001/j.a.m.a.2020.4683>.
32. Kane RL, Kane RA, Long-term care: can our society meet the needs of its elderly, *Annual Review of Public Health*, 1(1), 1980, 227–253. <https://doi.org/10.1146/annurev.pu.1980.01.050180.001303>.
33. Zhou Fei, Yu Ting, Du Ronghui, Fan Guohui, Liu Ying, Liu Zhibo, Xiang Jie, Wang Yeming, Song Bin, Gu Xiaoying, Guan Lulu, Wei Yuan, Li Hui, Wu Xudong, Xu Jiuyang, Tu Shengjin, Zhang Yi, Chen Hua, Cao Bin, Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study, *The Lancet*, 395, 2020, 1054-1062. [https://doi.org/10.1016/lancet.2020.S0140-6736\(20\)30566-3](https://doi.org/10.1016/lancet.2020.S0140-6736(20)30566-3).
34. Raghupathi Viju, An empirical investigation of chronic diseases: a visualization approach to Medicare in the United States,

- International Journal of Healthcare Management, 12(4), 2019, 327–339.
35. Mehta Puja, McAuley F Daniel, Brown Michael, Sanchez Emilie, Tattersall S Rachel, Manson J Jessica, [HLH Across Speciality Collaboration, UK](#): COVID-19: consider cytokine storm syndromes and immunosuppression, *The Lancet*, 395(10229), 2020, 1033-1034. [https://doi.org/10.1016/lancet.2020.S0140-6736\(20\)30628-0](https://doi.org/10.1016/lancet.2020.S0140-6736(20)30628-0).
 36. Channappanavar Rudragouda, Perlman Stanley, Pathogenic human coronavirus infections: causes and consequences of cytokine storm and immunopathology, *Seminars in Immunopathology*, 39(5), 2017, 529-539. <https://doi.org/10.1007/s.i.p.2017.s00281-017-0629-x>.
 37. World Health Organization, Clinical management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected: Interim guidance, government told, 2020. Available from: <<https://who/2019-nCoV/clinical/2020/>, 2020>. [Accessed on: 30 June 2020].
 38. Skountzou Ioanna, Koutsonanos G Dimitrios, Kim Hyang Jin, Powers Ryan, Satyabhama LakshmiPriyadarshini, Maseoud Fedaa, Weldon C William martin Del Pilar Maria, Mittler S Robert, Compans Richard, Jacob Joshy, Immunity to pre-1950 H1N1 influenza viruses confer cross-protection against the pandemic swine-origin 2009 A (H1N1) influenza virus, *Journal of Immunology*, 185(3), 2010,1642–1649.
 39. Skountzou Ioanna, Satyabhama LakshmiPriyadarshini, Stavropoulou Anastasia, Ashraf Zuhha, Esser Stein E, Vassilieva Elena, Koutsonanos Dimitrios, Compans Richard, Jacoba Joshy, Influenza virus-specific neutralizing IgM antibodies persist for a lifetime, *Clinical and Vaccine Immunology*, 21(11), 2014, 1481–1489.
 40. Owen A Judith, Punt Jenni, Stranford A Sharon, Jones P Patricia, Kuby Janis, *Kuby immunology*, 7th ed. WH Freeman, New York, 2013.
 41. Lei [Jian](#), Kusov [Yuri](#), Hilgenfeld Rolf, Nsp3 of coronaviruses: structures and functions of a large multi-domain protein, *Antiviral Research*, 149, 2018, 58–74.
 42. Jie Cui, Fang Li, Shi Zheng-Li, Origin and evolution of pathogenic coronaviruses, *Nature Reviews Microbiology*, 17, 2019, 181–192. <https://doi.org/10.1038/n.r.m.2019.s41579-018-0118-9>.
 43. Riou Julien, Althaus L Christain, Pattern of early human-to-human transmission of Wuhan 2019 novel coronavirus (2019-nCoV), December 2019 to January 2020, *Eurosurveillance*, 25(4), 2020. <https://doi.org/10.2807/ES.2020.1560-7917.25.4.2000058>.
 44. European Centre for Disease Prevention and Control, Coronavirus Disease (COVID- 19), government told, 2020. Available from: <<https://www.ecdc.europa.eu/en/novel-coronavirus-china/>, 2020>. [Accessed on: 10 July 2020].
 45. [E Mathai](#), [B Allegranzi](#), [C Kilpatrick](#), [D Pittet](#), Prevention and control of health care-associated infections through improved hand hygiene, *Indian Journal of Medical Microbiology*, 28(2), 2010, 100–106. <https://doi.org/10.4103/i.j.m.m.2010.0255-0857.62483>
 46. Centers for Disease Control and Prevention China, the epidemiological characteristics of an outbreak of 2019 Novel Coronavirus Disease (COVID-19) – China, government told, 2019. Available from: <<http://www.ourphn.org.au/wp-content/uploads/20200225-Article-COVID-19.pdf/>, 2020>. [Accessed on: 10 July 2020].
 47. Boldog Péter, Tekeli Tamás, Vizi Zsolt, Denes Attila, Bartha A Ferenc, Rost Gergely, Risk assessment of novel coronavirus COVID-19 outbreaks outside China, *Journal of Clinical Medicine*, 9(2), 2020, 571. <http://doi.org/10.3390/j.c.m.2020.9020571>.
 48. Donnelly A Christl, Ghani C Azra, Leung M Gabriel, Hedley J Anthony J, Fraser Christophe, Riley Steven, Abu-Raddad J Laith, Ho Lai-Ming, Thach Thuan-Quoc, Chau Patsy, Chan King-Pan, Lam Tai-Hing, Tse Lai-Yin, Tsang Thomas, Liu Shao-Haei, Kong H B James, Lau M C Edith, Ferguson M Neil, Anderson M Roy M, Epidemiological determinants of spread of causal agent of severe acute respiratory syndrome in Hong Kong, *The Lancet*, 361(9371), 2003, 1761–1766. [http://doi.org/10.1016/lancet.2003.S0140-6736\(03\)13410-1](http://doi.org/10.1016/lancet.2003.S0140-6736(03)13410-1).
 49. Booth F Timothy, Kournikakis Bill, Bastien Nathalie, Ho Jim, Kobasa Darwyn, Stadnyk Laurie, Li Yan, Spence Mel, Paton Shirley, Henry Bonnie, Mederski Barbara, White Diane, Low E Donald, McGeer Allison, Simor Andrew, Vearncombe Mary, Downey James, Jamieson B Frances, Tang Patrick, Plummer Frank, Detection of airborne severe acute respiratory syndrome (SARS) coronavirus and environmental contamination in SARS outbreak units, *Journal of Infectious Diseases*, 191(9), 2005,1472–1477.
 50. Ijaz M.K., Brunner A. H., Sattar S.A., Nair C Rama, Lussenburg Johnson C.M., Survival characteristics of airborne human coronavirus 229E, *Journal of General Virology*, 66(12), 1985, 2743–2748.
 51. Woodward Aylin: High temperatures and muggy weather might make the new coronavirus less-contagious, a group of experts says, *Business Insider India*, 2020. Available from: <<https://www.businessinsider.in/science/news/high-temperatures-and-muggy-weather-might-make-the-new-coronavirus-less-contagious-a-group-of-experts-says/articleshow/74697538.cms/>, 2020>. [Accessed on: 15 July 2020].
 52. Chan KH, Peiris Malik JS, Lam SY, Poon LLM, Yuen KY, Seto WH, The effects of temperature and relative humidity on the viability of the SARS coronavirus, *Advances in Virology*, 2011, 2011. <https://doi.org/10.1155/a.v.2011/734690>.
 53. Harvard Health Letter, out in the cold, government told, 2020. Available from: <<https://www.health.harvard.edu/staying-healthy/out-in-the-cold/>, 2020>. [Accessed on: 9 July 2020].
 54. Bannister-Tyrrell Melanie, Meyer Anne, Faverjon Celine, Cameron Angus, Preliminary evidence that higher temperatures are associated with lower incidence of COVID-19, for cases reported globally up to 29th February 2020, *medRxiv*, 2020. <https://doi.org/10.1101/m.rxiv.2020.03.18.20036731>.
 55. Christopher Burrell Colin Howard Frederick Murphy: *Bunyaviruses*, edn 5. Fenner White Medical Virology, 2017, 407–424.
 56. Chen Yu, Liu Qianyun, Guo Deyin, [Qianyun Liu](#), Emerging coronaviruses: genome structure, replication, and pathogenesis, *Journal of Medical Virology*, 92(4), 2020, 418-423. <http://doi.org/10.1002/j.m.v.2020.25681>.
 57. Velavan P. Thirumalaisamy, Meyer G Christian, The COVID-19 epidemic, *Tropical Medicine and International Health*, 25(3), 2020, 278–280. <http://doi.org/10.1111/t.m.i.2020.13383>.
 58. Wilder- Smith A, Freedman DO, Isolation, quarantine, social distancing and community containment: pivotal role for old-style public health measures in the novel coronavirus (2019-nCoV) outbreak, *Journal of Travel Medicine*, 27(2), 2020. <http://doi.org/10.1093/j.t.m.2020/taaa020>.
 59. Kuper-Smith Benjamin, Doppelhofer Lisa, Oganian Yulia, Rosenblau Gabriela, Korn Christoph, Optimistic beliefs about the personal impact of COVID-19, 2020. <http://doi.org/10.31234/osf.io/epcyb>.
 60. Taderera Hope Bernard, Community health volunteers and their role in health system strengthening in peri-urban areas: a qualitative study of Epworth, Zimbabwe, *International Journal of Healthcare Management*, 2019, 1–9. <http://doi.org/10.1080/i.j.h.m.2019.20479700.1647379>.
 61. World Health Organization, Coronavirus disease (COVID-2019) situation reports 175, government told, 2020. Available from: <https://www.who.int/docs/defaultsource/coronaviruse/situation-reports/20200713-covid-19-sitrep-175.pdf?sfvrsn=d6acef25_2/, 2020>. [Accessed on: 16 July 2020].
 62. Ministry of Health and Family Welfare, COVID-19 India, government told, 2020. Available from: <<https://www.mohfw.gov.in/>, 2020>. [Accessed on: 14 July 2020].

63. World Health Organization, Global Surveillance for human infection with coronavirus disease (COVID-19): Interim guidance, government told, 2019. Available from: <<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/2020>>. [Accessed on: 30 June 2020].
64. Jin Ying-Hui, Cai Lin, Cheng Zhen-Shun, Cheng Hong, Deng Tong, Fan Yi-Pin, Fang Cheng, Huang Di, Huang Lu-Qi, Huang Qiao, Han Yong, Hu Bo, Hu Fen, Li Bing-Hui, Li Yi-Rong, Liang Ke, Lin Li-Kai, Luo Li-Sha, Ma Jing, Ma Lin-Lu, Peng Zhi-Yong, Pan Yun-Bao, Pan Zhen-Yu, Ren Xue-Qun, Sun Hui-Min, Wang Ying, Wang Yun-Yun, Weng Hong, Wei Chao-Jie, Wu Dong-Fang, Xia Jian, Xiong Yong, Xu Hai-Bo, Yao Xiao-Mei, Yuan Yu-Feng, Ye Tai-Sheng, Zhang Xiao-Chun, Zhang Ying-Wen, Zhang Yin-Gao, Zhang Hua-Min, Zhao Yan, Zhao Ming-Juan, Zi Hao, Zeng Xian-Tao, Wang Yong-Yan, Wang Xing-Huan, A rapid advice guideline for the diagnosis and treatment of 2019 novel coronavirus [2019-nCoV] infected pneumonia, *Military Medical Research*, 7, 2020, 4.
65. Derebail K Vimal, Falk J Ronald, ANCA-Associated Vasculitis—Refining Therapy with Plasma Exchange and Glucocorticoids, *Mass Medical Society*, 2020.
66. National Institute of Allergy and Infectious Diseases (NIAID), Clinical Trials, government told, 2020. Available from: <<https://clinicaltrials.gov/ct2/show/NCT04283461/2020>>. [Accessed on: 1 July 2020].
67. Times Now News, Can Sino Biologics COVID-19 vaccine 'Ad5-nCoV' gets nod for military use in China. Available from: <<https://www.timesnownews.com/health/article/cansino-biologics-covid-19-vaccine-ad5-ncov-gets-nod-for-military-use-in-china/613504/2020>>. [Accessed on: 15 July 2020].
68. R Carlson, INO4800coronavirusvaccine, government told, 2020. Available from: <<https://www.precisionvaccinations.com/vaccnes/ino-4800coronavirus-vaccine/2020>>. [Accessed on: 13 June 2020].
69. Shen Kunling, Yang Yonghong, Wang Tianyou, Zhao Dongchi, Jiang Yi, Jin Runming, Zheng Yuejie, Xu Baoping, Xie Zhengde, Lin Likai, Shang Yunxiao, Lu Xiaoxia, Shu Sainan, Bai Yan, Deng Jikui, Lu Min, Ye Leping, Wang Xuefeng, Wang Yongyan, Gao Liwei, Diagnosis, treatment, and prevention of 2019 novel coronavirus infection in children: experts, *World Journal of Pediatrics*, 16, 2020, 223-231. <https://doi.org/10.1007/w.j.p.2020.s12519-020-00343-7>.
70. Capritto Amanda, How to protect yourself from the coronavirus. Available from: <<https://www.cnet.com/how-to/how-toprotect-yourself-from-coronavirus/2020>>. [Accessed on: 13 July 2020].
71. Ralston, Allura L. Andrews III, Arthur R. Hope, Debra A., Fulfilling the promise of mental health technology to reduce public health disparities: Review and research agenda, *Clinical Psychology Science and Practice*, 26(1), 2019, e12277. <http://doi.org/10.1111/cpsp.2019.12277>.
72. Berrouguet Sofian, Baca- Garcia Enrique, Brandt Sara, Walter Michel, Courtet Philippe, Fundamentals for future mobile-health (mHealth): a systematic review of mobile phone and web-based text messaging in mental health, *Journal of Medical Internet Research*, 18(6), 2016, e135. <http://doi.org/10.2196/j.m.i.r.2016.5066>.
73. Naslund A John, Aschbrenner A Kelly, McHugo J Gregory, Unutzer Jurgen, Marsch A Lisa, Bartels J Stephen, exploring opportunities to support mental health care using social media: A survey of social media users with mental illness, *Early Intervention in Psychiatry*, 13(3), 2019, 405–413. <http://doi.org/10.1111/e.i.p.2019.12496>.
74. Silva Azevedo Marta, COVID-19 Apps, *European Emergency Number Association*, 2020.
75. Dara Voun, Covid-19 app contest launched, *The Phnom Penh Post*. Available from: <<https://bit.ly/2XlzwIT/>, 2020>. [Accessed on: 4 July 2020].
76. Kumar Vinod, Ensure Cova app download on all phones: Punjab to service providers, *The Times of India*. Available from: <<https://bit.ly/34JRIgh/>, 2020>. [Accessed on: 9 July 2020].
77. Grull Philipp, VIENNA – Survey shows Austrians against making Corona-tracing-apps mandatory, *Euractiv*, government told, 2020. Available from: <<https://bit.ly/2Xlt5Wd/>, 2020>. [Accessed on 16 July 2020].
78. Primack BA, Shensa A, Escobar-Viera CG, Barrett EL, Sidani JE, Colditz JB, James A. Everette, Use of multiple social media platforms and symptoms of depression and anxiety: A nationally-representative study among US young adults, *Computers in Human Behavior*, 69, 2017, 69, 1–9. <http://doi.org/10.1016/j.chb.2016.11.013>.
79. Douek Evelyn, COVID-19 and Social Media Content Moderation, *Lawfare*. Available from: <<https://www.lawfareblog.com/covid-19-and-social-media-content-moderation/2020>>. [Accessed on: 25 April 2020].
80. Lovell Tammy, Healthcare IT News. Available from: <<https://www.healthcareitnews.com/news/europe/nhs-joins-forces-tech-firms-stop-spread-covid-19-misinformation/>, 2020>. [Accessed on May 25 2020].
81. Liu Shuai, Yang Lulu, Zhang Chenxi, Xiang Yu-Tao, Liu Shuai, Liu Zhongchun, Hu Shaohua, Zhang Bin, Online mental health services in China during the COVID-19 outbreak, *Lancet Psychiatry*, 7(4), 2020. [http://doi.org/10.1016/lancet.pysc.2020.S2215-0366\(20\)30077-8](http://doi.org/10.1016/lancet.pysc.2020.S2215-0366(20)30077-8)
82. Silver Laura, Smartphone Ownership Is Growing Rapidly Around the World, but Not Always Equally, *Pew Research Center's Global Attitudes Project* 2019.
83. Aguilera Adrian, Berridge Clara, Qualitative Feedback from a Text Messaging Intervention for Depression: Benefits, Drawbacks, and Cultural Differences, *JMIR mHealth uHealth*, 2(4), 2014, e46. <http://doi.org/10.2196/mhealth.2014.3660>.

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