FIMEK

Journal of Agronomy, Technology and Engineering Management

Review

The Pandemic of SARS-CoV-2 as a Worldwide Health Safety Risk

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Received: 26 December 2020; Accepted: 05 February 2021

Abstract: The novel SARS virus, known as SARS-CoV-2, and the disease it causes, are acknowledged as a worldwide pandemic, thus breaking confusion on natural life and economies over the globe. The magnitude of the outbreak of COVID-19, which has been discovered relatively recently, and its massive impact on lives, societies, and the affected countries' economies is unparalleled. Cases of COVID-19 infection have been reported in 212 countries, with more than 71.2 million people have been affected till December 2020, resulting in more than 1.6 million deaths. All around the world, COVID-19 was transmitted through human-to-human, which has resulted in a worldwide outbreak. To decrease new infections and transmissions, measures such as lockdown has been applied in affected countries. However, all the daily activities were moved to a virtual reality, which adds more impact to investigate the virtual reality's future and its significant impact during this challenging time. This paper presents a short insight on the outbreak of coronavirus, COVID-19, by providing an analysis of the confirmed cases and discussing the disease's impact on social lives, gender influences, gyms as a safe and healthy places, economies, and health safety risks worldwide between humans and pet animals.

Keywords: coronavirus; COVID-19; pandemic; epidemiology; health; safety.

1. Introduction

An outbreak of a novel coronavirus disease, COVID-19, which was uncovered lately in 2019, happens to be one of the biggest catastrophes that have alarmed the globe [1,2]. The virus, characterized as the severe acute respiratory syndrome named SARS-CoV-2, has been liable for instigating the COVID-19 disease [3]. Coronavirus belongs to the virus family of *Coronaviridae*, order *Nidovirales*, subfamily *Orthocoronavirinae* [4]. The *Coronaviridae* family of viruses includes SARS, which impacted Hongkong in 2002 as an outbreak, causing 8 000 reported cases and 774 deaths. Other variants of SARS related coronavirus have been known to infect humans, certain mammals, and bats and have been involved in a few earlier outbreaks and the middle east respiratory syndrome, MERS [5]. Even though the COVID-19 is associated with the common virus caused by cold, its disease pathway is more complicated, with acute pneumonia reports. It has been speculated that the virus was firstly found in 2019 in the city of Wuhan, Republic of China.

While it is officially known as SARS-CoV-2, it is not the same virus that caused the outbreak in 2002 [6]. However, these viruses are associated. SARS-CoV-2 has a susceptibility that was instantly available and shared by most respiratory viruses and all other coronaviruses [7]. They are remarkably fragile even though they can survive for weeks or even months. From the beginning of May 2020, 3 724 517 COVID-19 cases have been verified worldwide, with total recorded death cases of 258 027. The COVID-19 has shaken more than 212 countries around the world. The unparalleled influence of the COVID-19 has given the worldwide economy to cessation and created a health crisis [8]. The virus, which has long existed, was known only to exist in animals, mostly poultry and birds [9,10]. However, it has mutated, broke the barrier of species and is now able to cross from species to species and exist in humans. The origin of the virus is believed to have emerged from Wuhan's wild animal markets, but this has yet to be confirmed with proof [11]. The mutated virus, now capable of transmitting between humans, can spread through human contact, which is why officials believe physical distancing (often confused with social distancing) is an effective way to limit virus spread [12]. As stated, the virus is not airborne, yet it remains to be analyzed further when enough experiments are conducted. Surfaces that humans touch frequently remain one of the fastest ways of its transmission.

2. Development of COVID-19

Coronavirus outbreak came to the attention in late 2019, when several local hospitals in Wuhan registered an atypical number of cases of patients with acute pneumonia with not an exact cause [13]. Unlike the seasonal flu and previous pneumonia outbreaks, there was no improvement in patients' clinical outcomes when administered with existing medicines [14]. The cases were linked to a food market involved in large-scale retail of several kinds of fish, chickens, bats, snakes, rabbits, and various other wild animals. However, a recent study demonstrated that most of the patients or their family members had not been directly exposed to the food market, which was linked initially [15]. Nevertheless, a too high human-to-human transmission rate was observed, which rapidly progressed within a short time [16]. By early January 2020, around 59 suspected cases were identified from local hospitals in Wuhan [17]. These cases were isolated immediately at a local hospital. Out of these 59 suspected cases, 41 cases were confirmed to be infected with the novel COVID-19 virus. However, the isolation of these cases proved late, as before the isolation took place, the human-to-human transmission of COVID-19 had already taken place among thousands of peoples [17]. The localized epidemic in central China quickly spread to all other Chinese provinces in just a few weeks [18]. Within some weeks, cases in other countries were also reported. This spread in the virus was attributed to international travelers transmitting this virus. The first reported cases outside China were in countries such as Italy, Germany, Iran, Australia, USA, Russia, and plenty of other countries [19]. The worldwide alarm state, with the first death occurring at the beginning of January 2020 [20]. Quickly, the deaths started to increase rapidly with an increase in the total confirmed number of cases, leading to the declaration of a pandemic by the World Health Organization (WHO) on March 11, 2020 [21]. There has been a massive increase in the percentage of cases and deaths recorded. Due to the trend in new cases and a number of deaths, the WHO declared the epidemic as a global health emergency initially, but on March 11, 2020, the WHO officially declared the coronavirus outbreak as a worldwide pandemic [21].

3. COVID-19 Gender Dispersal

Earlier epidemic outbreaks were unsuccessful in obtaining significant gender essential statistics [22]. It is critical to show results in a broken down into the form of infections rate by gender. This information can help in notifying which of the gender is vulnerable to infection by COVID-19. Besides, this would help study each gender's socio-economic realities and better address the specific needs of each gender. Additional assessment on the COVID-19 cases reveals that males may be at a higher risk than women, even though both males and females have been infected in almost equal numbers [23]. The mortality rate among men was 2.8% and 1.7% among women, as of early March 2020.

Moreover, it has been indicated that a significant number of deaths have been of old males [24]. Besides, if the virus impacts males more than females, then the health care systems will be quantifying more males than females for obvious reasons [25]. Likewise, some researchers also suggested that females may have stronger immunity to viruses due to biological aspects compared to males.

4. Challenges for the Female Scientist During the COVID-19 Pandemic

Variety is something from which science and innovation benefits [26]. Nevertheless, as the global community fights COVID-19, female scientist's productivity and scientific output are unduly influenced, prominent to loss of women's scientific expertise from the public realm [27]. Women comprise 70% of the worldwide health workforce and more than 50% of medical graduates in many countries [28]. Notwithstanding this, women and gender minorities remain diminished in medical leadership. Only 23% of full professors in European medical schools and 22% in America are women [29].

Scholarly publishing is crucial to professional development. Women's first authorship in major medical journals has increased from 27% to 37% (1994–2014) [30]. However, COVID-19 is threatening progress by amplifying existing gender inequalities. Early data show that COVID-19 significantly affects women's publishing. By comparing authorship of 1179 medical COVID-19 papers with 37 531 papers from the same journals in 2019, at 30%, 28%, and 22%, women's shares of overall, first, and last authorship in COVID-19 papers decreased by 16%, 23%, and 16%, respectively [31].

Improving the notoriety of women in academia is vital to the fight against COVID-19. Furthermore, ensuring that women's academic output is not excessively affected by COVID-19 might safeguard women's career paths [32]. Challenges women in academia face are well documented in non-pandemic times. These challenges include male-dominated institutional cultures, lack of female mentors, competing family responsibilities due to gendered domestic labor, and implicit and subconscious biases in recruitment, research allocation, the outcome of peer review, and several citations [33]. COVID-19 has led to exceptional daycare, school, and workplace closures, exacerbating challenges [34].

The academic community, funders, and health professionals should support women in academia during this pandemic [35]. First, recognize that women are probably taking on more responsibilities than men are. Help families access safe childcare and provide options for academics caring for family members by considering the lockdown period as care leave, so productivity decreases do not hinder later career advancement. Second, recognize how gender bias influences the selection and evaluation of scientific experts and leaders during crisis times. Women make up just 24% of COVID-19 experts quoted in the media and 24.3% of national task forces analyzed. However, countries with female leaders have some of the best COVID-19 outcomes. Third, collect and report institutional data on gender representation, including academic output and senior positions. Fourth, identify and address structural implicit and unconscious biases in research institutions and publication processes.

Scientific expertise and knowledge from all genders are essential to build diverse, inclusive research organizations and improve medical research rigor to tackle COVID-19 [36].

5. Gyms as a Safe Place for People During Pandemic of COVID-19

After analyzing millions of member check-in data across 2 873 gyms, sports clubs, and boutique fitness centers over three months, The International Health, Racquet & Sports club Association (IHRSA) and MXM, a technology and knowledge transfer company specializing in member tracking within the fitness industry, conclusively found that fitness facilities are safe and are not contributing to the spread of COVID-19 [37]. From May 1 through August 6, 2020, IHRSA and MXM closely examined and compared member check-in data (number of gym visits) from several fitness facilities across the countries with self-reported infection rates. After nearly 50 million check-ins over those three months, the study found a nominal 0.0023 percent tested positive for COVID-19. Gyms nationwide have robust

COVID-19 safety measures in place, and there is zero evidence that the positive cases originated in gyms themselves [38].

A few months ago, the data correlating fitness facility visits, and the mitigating risk was practically non-existent. All that is changed – and for the better. It has become abundantly clear that the safety measures gyms, sports clubs, and boutique fitness centers have in place are incredibly effective at keeping their members safe and curbing any potential spread of COVID-19 during a time when we all need access to exercise facilities to stay healthy [39].

The fitness industry's only trade association included as much as possible health and fitness clubs in the USA to participate in the long-form study. Throughout the study, fitness centers provided their total check-ins and number of locations across all states in which they have a presence and self-reported the total number of positive COVID-19 cases documented between employees and members who have been in the club. MXM, as the world's leading experts on Operational Member Experience Management and the only company that solely focuses on the Fitness and Wellness Industry, previously conducted a study surrounding the lack of concentrated outbreaks in fitness facilities with affirming results.

The check-in data proves that health clubs – when following strict cleaning and safety protocols – are safe. Also, gyms are responsible for educating and informing people that they should feel comfortable and confident going into fitness facilities right now. The data shows that people can safely return to their workout routines with proper sanitization protocols in place. Working out has never been more important to help boost immunity and improve mental health. It is time to acknowledge that gyms are safe and that they do not present health risks.

Access to fitness centers is key to keeping people healthy [40–42]. Physical activity plays an essential role in maintaining a healthy immune system and reducing COVID-19 risk factors such as obesity, heart disease, lung disease, and diabetes [43–45]. The Centres for Disease Control and Prevention (CDC) notes that 42.4% of USA adults and approximately 18.5% of children and adolescents are considered obese [46]. Physical fitness has long-term mental health benefits as well, including reducing the risk of stress and depression [47–49]. Notably, one in five people experience mental health illness, and people with mental illness have a 40% higher risk of developing cardiovascular and metabolic diseases than the general population [50,51].

6. COVID-19 and Pet Animals – Is Infection with SARS-CoV-2 Possible?

It is vital to mention that canine respiratory coronaviruses are not the same as the SARS-CoV-2 accountable for the COVID-19 pandemic in the humans [52]. Dogs have had to coevolve with their own respiratory and enteric coronaviruses [53]. The *Coronaviridae* Study Group of the International Committee on Taxonomy of Viruses is accountable for creating the classification of viruses and taxon nomenclature of the family *Coronaviridae*. This group has recently evaluated the human pathogen's placement, cautiously named 2019-nCoV, within the *Coronaviridae*, providing an updated classification of the phylogeny and taxonomy of coronaviruses [54]. Canine respiratory coronavirus (CRCoV) is a coronavirus of dogs, widespread in North America, Japan, and across Europe [55]. CRCoV was detected in dogs more than decade ago. It has been related with respiratory disease, particularly in kennel dog populations [56]. The virus is highly pathogenic, causing severe lesions [57], and the medication treatment is extremely sensitive especially when making decision to use antibiotics without thinking on animal welfare [58]. It is genetically and antigenically distinct from enteric canine coronaviruses [59]. It is not clear, if earlier human exposure to CRCoV can afford any protection against later exposure to SARS-CoV-2 [60]. Additional research studies are required to ascertain if humans that co-exist with dog pets that have previously been exposed to CRCoV might develop a stronger immunity to SARS-CoV-2 than those who have not had this exposure [61].

There's been a huge interest in the press about companion and zoo animals serving as reservoirs for SARS-CoV-2 [62]. It has been indicated that SARS-CoV-2 can infect cats but not dogs [63]. Cats may be infected with SARS-CoV2, the coronavirus that causes COVID-19 and spread it to other cats, but dogs are not susceptible to the infection [64]. The team at Harbin Veterinary Research Institute in China has proposed that chickens, pigs, and ducks are not likely to catch the virus [65]. However, since

COVID-19 is an emerging and rapidly evolving pandemic with the potential to use animals as reservoir hosts [66]. There are quite a few recent reports about SARS-CoV-2 infections in mink and ferrets and linked cases of COVID-19 in humans at Netherlands fur farms [67]. This reminds us of previous outbreaks of avian influenza virus H9N2 infections in farmed mink [68]. Beyond mink and ferrets, we do not know much more at this stage.

Furthermore, pigs, cats, ferrets, and primates have been identified as good candidates for susceptibility to SARS-CoV-2 [69,70]. It is essential to point out that SARS-CoV-2 is not originally a human virus [71]. SARS-CoV-2 belongs to a β-coronavirus family, and the sequencing studies carried out so far suggest that the virus in humans is identical to the horseshoe bat coronavirus, pointing to bat as the natural and reservoir host [72]. The SARS-CoV-2 genome is closest to that of severe acute respiratory syndrome-related coronaviruses from horseshoe bats, and its receptor-binding domain is closest to that of pangolin coronaviruses [73]. However, it has been proposed that the recent outbreak of COVID-19 did not come directly from pangolins [74,75]. Recent studies also suggested that *Bovidae* and *Cricetidae* should be included in screening intermediate hosts for SARS-CoV-2 and could be unexplored reservoir hosts [76].

7. Conclusions

The virus, characterized as the severe acute respiratory syndrome coronavirus, responsible for causing the COVID-19 disease, has caused more than 3 724 000 cases and more than 258 000 deaths worldwide. The virus soon spread worldwide due to human-to-human transmission, thus making it a worldwide pandemic. The outbreak of COVID-19 has had and continues to have a massive influence on people's lives and economies. The spread of the current outbreak has been difficult to contain due to the spread of the virus to high population density areas, making isolation difficult. Despite the increase in the number of confirmed cases of COVID-19 around the world, many unanswered questions and disputes remain.

Acknowledgments: This research was funded by the Ministry for Education, Science and Technological Development of the Republic of Serbia.

Conflicts of Interest: The authors declare no conflict of interest.

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