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LETTERS TO THE EDITOR

ROBOTICS AND BIOMEDICAL INNOVATIVE APPLICATIONS IN PUBLIC HEALTH DURING THE COVID-19 PANDEMIC

INNOVATIVE APPLICATIONS OF ROBOTICS AND BIOMEDICS IN PUBLIC HEALTH DURING THE COVID-19 PANDEMIC

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LETTERS TO THE EDITOR

Mr. Editor

Coronaviruses (CoV) are a large family of viruses that cause disease in humans, which can cause everything from common colds to acute respiratory syndromes(1). On January 7, 2020, the World Health Organization office in China reported a new coronavirus (SARS-CoV-2) as the cause of cases of atypical pneumonia in Wuhan City, Hubei Province in China(1).

Currently, SARS-CoV-2 infection has spread worldwide. On April 6, 2020, the total number of registered confirmed cases worldwide is 1 210 956, where there are 67 594 deaths and 4810 new cases in the last 24 hours(2).

COVID-19 disease caused by this new coronavirus usually presents symptoms such as fever, dry cough, dyspnea, and in some patients may require treatment in a hospital setting; Unfortunately, there is still no definitive treatment or vaccination, there are only support and prevention measures to prevent the spread and spread of the virus(1).

According to the Prevention and Control of Infections (PCI) guideline, when a new coronavirus (nCoV) infection is suspected during medical care, it provides us with strategies to prevent or limit transmission in health care settings that include: applying standard precautions to all patients; ensure triage, early recognition and control of sources of infection; apply empirical complementary precautions in cases with the suspected virus; execute administrative control measures; and apply environmental and engineering controls(1).

During the history of humanity, the development and use of robots has been based on optimizing the person's job in tasks of high risk or difficult to access; Subsequently, with the analysis of clinical needs and the advancement of Robotic and Biomedical Engineering, it has been determined to innovate in the construction of complex mechatronic systems, in order to provide intensive support to Public Health in direct relation to health personnel, patients and all the main actors in the process of quality control and monitoring in the diagnosis, treatment, monitoring and prevention of disabilities, diseases and infections to avoid risks in the population.

In the current situation of the large-scale spread of COVID-19, whereas contagion increases, the role of robots (designed with Teleoperation and Artificial Intelligence technologies) in society becomes essential because they are need to be used in hospital settings, urban environment, and also using Telemedicine consultancy to have access to all communities in the world, with the aim of preventing the spread of the virus.

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In the Hospital Environment, in order not to expose and protect health personnel, the use of robots and various biomedical equipment have been implemented, such as the monitoring of vital signs with remote-guided robotic arms to measure temperature. Furthermore, in minimally invasive procedures, a disposable bio-mechatronic device called "Endoscopic Capsule" controlled by magnetism is being used, which provides a new modality of diagnosis without contact and free of infection[3]. Other applications consist of the use of robots for UV light sterilization of clinical facilities and medical equipment; They are also used to manufacture personal protective equipment for 3D printing technologies.

In the Urban Environment, mobile robots have been observed walking the streets of some Asian cities, which according to their type of application, can be ground robots for the collection of potentially infected waste, as well as disinfection tasks for sidewalks and roads. Additionally, aerial robots, such as Drones, are used for the delivery of medicines or other products of essential use, in addition to the early detection of patients with respiratory symptoms (coughs and sneezes)[4].

In order to improve communication between communities, there are robotic systems with autonomous displacement in which Telemedicine is coupled, which makes it possible to perform remote triage to patients, allowing direct questions about the presence of respiratory symptoms, history of exposure to the virus (contact with a patient with COVID-19 or traveling within the last 14 days before the onset of symptoms). In this way, it allows guiding the population in case they need to stay home, need to carry out a diagnostic test or immediately go to a hospital; furthermore, this technology allows the population to be educated on the importance of social distancing and the promotion of good hygiene and sanitation practices[5].

In conclusion, it is suggested to promote multidisciplinary work among engineering and health sciences in the American Continent and Worldwide, through research, development and innovation projects in biomedical engineering, in order to be ready to face a global emergency and national as the current pandemic caused by SARS-CoV-2[6].

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