



PERSPECTIVE ON THE PRIMARY PREVENTION OF COVID-19

COVID-19 FROM THE PERSPECTIVE OF THE PRIMARY PREVENTION

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ABSTRACT

This article seeks to describe the main preventive measures on COVID-19 that is affecting our country, considering epidemiological aspects and recommendations applied and reported in other countries. The topics covered are the prevention of traveling patients, the importance of hand hygiene, respiratory prevention, policies in educational centers, and Prevention for healthcare personnel. This is due to the need for a better characterization of this new health problem in our country, to establish public policies based on the Prevention of complications of this new virus, taking into account assessments based on scientific, preventive and social evidence.

Key words: COVID-19; SARS-CoV-2; Public health (source: MeSH NLM).

RESUMEN

El presente artículo busca describir las principales medidas de prevención primaria sobre el COVID-19 que recientemente está afectando a nuestro país, considerando aspectos epidemiológicos y recomendaciones aplicadas y reportadas en otros países. Los temas abordados son la prevención de los pacientes viajeros, la importancia de la higiene de manos, prevención por vía respiratoria, políticas en centros educacionales y prevención para el personal de salud. Ello obedece a la necesidad de una mejor caracterización de este nuevo problema de salud en nuestro país, para establecer políticas públicas en base a la prevención de las complicaciones de este nuevo virus, teniendo en cuenta las valoraciones basadas en evidencia científica, preventiva y social.

Palabras clave: COVID-19; SARS-CoV-2; Salud pública (fuente: DeCS BIREME).

INTRODUCTION

Coronaviruses are a group of related RNA viruses that produce symptoms of common cold especially in immunocompromised patients; over the years we have identified two strains that are very deadly such as the Coronavirus of the Severe Acute Respiratory Syndrome (SARS-CoV) and the Coronavirus Respiratory Syndrome Middle East (MERS-CoV);

however, in December of 2019 in Wuhan, China, a new strain was associated with numerous cases of pneumonia, which with the passage of days became an epidemic called, at that moment, 2019-nCoV⁽¹⁾.

As weeks passed, the transmission of the new coronavirus (SARS-CoV-2) has reached considerable figures, and it is now considered to be the first major pandemic of the XXI century, as it is in 188 countries

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and territories worldwide according to data compiled by Johns Hopkins University in May 20, 2020, with a number of 4 952 882 confirmed cases; the United States of America, Russia, Brazil, United Kingdom, and Spain are the nations that are recorded the largest number of infected people to the present⁽²⁾. This disease is a public health priority and a number of drastic health measures are being implemented to help prevent further transmission of the virus in the community. Mandatory social isolation was implemented in most parts of the world. As a result, international and national trade has been paralyzed, such as the most popular events of the year, concerts, ceremonies, among others. These health measurements have significantly affected the global economy.

Many nations are making great efforts to protect their health personnel, as they are the only human talent, in addition to the armed forces and the National Guard, who stand firm in their jobs. They are ready to fight to reduce the spread of the disease, the complications of the disease, and the number of fatalities.

In Peru, according to the COVID-19 Situation Room of the Ministry of Health (MINSA), as of May 20 of this year, 104,020 confirmed cases have been registered out of a total of 715,423 samples. The highest figures being presented in departments such as Lima (67,060), Callao (7,381), Lambayeque (5,409), Piura (3,335), Loreto (3,085), La Libertad (2,447), Ucayali (2 371), Ancash (2 354) and Arequipa (2 072). Also, the number of fatal losses in the national territory corresponds to 3 024, showing a mortality rate of 2.91%; while worldwide, 325,712 deaths have been reported^(2,3).

The definition of suspected cases in the country postulates two types of patients. The first case has Acute Respiratory Infection (ARI) in addition to two or more symptoms such as cough, sore throat, difficulty breathing (dyspnea), nasal congestion, and fever. In addition, the first case had contact with a confirmed case for 14 days before the start of the diagnosis plus traveling domestically or internationally to communities with transmission where positive cases were recorded in the 14 days before the onset of symptoms. The second case has a severe acute respiratory infection, fever greater than 38 °C, cough, difficulty breathing, and requiring hospitalization. These concepts have been updated as the epidemic independently progressed in territories.

A review of the numerous measures applied to the primary prevention of COVID-19 at the national

and international levels is necessary to provide a public health perspective from many scenarios at the global level and by which one can postulate the importance of practices such as hand washing, protective equipment, social isolation, and other measures; which are tools of health promotion that allow mitigating critical events such as the one that humanity is currently experiencing⁽³⁾.

PREVENTION FOR PATIENTS

Suspected cases and airport protocols

The global crisis has made available many strategies to decrease the spread of the SARS-CoV-2. Today most of the world practices social isolation but previously these strategies were focused on airports, which according to the latest guidelines of the World Health Organization (WHO), have had to constantly train their staff in hand hygiene and prevention of respiratory infections, as well as providing the tools of sufficient protection for them and travelers. Travelers have had to go through three stages which are self-reporting of symptoms, visual observation for clinical signs, and temperature measuring avoiding the use of manual thermometers⁽⁴⁾. However, these actions have only been applied randomly and not comprehensively to all travelers.

This makes it possible to show that two factors influence the detection of the virus. First, the clinical spectrum of any infectious disease depends on its natural history, therefore, detection is difficult when the protocol is performed during the incubation time of an infected person or before showing any symptoms. Secondly, in the detection of symptoms and risks of COVID-19, through questionnaires, only 40% of travelers would be aware of possible exposure. This data increased as the epidemic progressed and has certainly altered its control⁽⁵⁾.

All travelers have had to be in an area fully equipped for suspected cases. This area needed chairs, some beds in case of complicated situations, and enough space to keep one meter apart. These conditions are considered crucial to avoid possible contagion as well as the training of staff responsible for transferring suspicious travelers to the nearest hospital to ensure that they receive better assessment⁽⁴⁾. This protocol, although it has been implemented, it has not been able to contain the outbreak. The closure of borders was an important measure to consider in South American and European countries where the pandemic has already reached considerable numbers⁽²⁾.



Community prevention

The absence of a viable COVID-19 vaccine forces the population to resort to other measures to prevent infection. Such preventive measures are the use of masks, performing hand hygiene, avoiding contact with other people, and the rapid detection of cases and tracing. As well as immediate self-isolation and that of people with whom there was contact, which naturally would avoid a possible transmission chain⁽⁶⁾.

The use of masks in the general population as a preventive measure for COVID-19 is still heterogeneous according to some countries. Despite this, the United States, and the WHO⁽⁷⁾ advise the use of masks in people who are symptomatic or exposed to infected people. Meanwhile, other countries such as Japan, Iran, and Hong Kong also consider exposure to closed, poorly ventilated, or crowded spaces as a criterion for recommending the use of masks in healthy people^(8,9). China encourages the use of masks even for low-risk populations⁽⁸⁾.

The evidence supporting its use in the general population is based on studies that evaluated its preventive potential against similar pathogens such as seasonal coronaviruses⁽¹⁰⁾ or Severe Acute Respiratory Syndrome⁽¹¹⁾. On the other hand, studies based on mathematical models suggest that the widespread use of masks may reduce the community transmission of this new coronavirus⁽¹²⁾.

The evidence supporting the use of masks throughout the population should be especially taken into account in the context of uncontrolled transmission of the virus. The arguments used by health authorities for the general use of masks in the population to be taken into account are in the emphasis above all on health personnel and populations at risk, not forgetting that the population should use masks correctly without neglecting other preventive measures⁽¹³⁾. However, there are problems of distribution and education of the population, which must be improved in order to follow the measures of prevention and proper use of masks.

As a result of distribution problems, an alternative is the use of domestic masks rather than medical⁽¹³⁾. One study reports that cotton masks do not differ significantly from medical masks in the levels of respiratory drops released by sick people in small environments (for example, a bedroom or car). The authors of this research concluded that it is advisable to use cotton masks not only for infected but also for healthy people⁽¹⁴⁾.

A preliminary study showed that hand washing and respiratory hygiene can mitigate the spread of stationary coronaviruses⁽¹⁵⁾, which have transmission mechanisms similar to those used by COVID-19. Simple measures such as hand washing have also been shown to be effective in reducing the transmission of respiratory viruses⁽¹⁶⁾. For this reason, frequent handwashing with soap and water is recommended, where each session should last at least 20 seconds, or alternatively use of disinfectant containing at least 60% alcohol⁽¹⁷⁾. In the case of caregivers of an infected patient, it is recommended to practice this habit under five specific circumstances which are before touching the patient, before performing a cleaning or disinfection procedure, after touching the patient, after having been exposed to body fluids of the patient, and after touching the surrounding area⁽¹⁸⁾.

In addition, some provinces in China issued programs recommending the use of Chinese herbal medicine to prevent this virus. This is based on studies that showed a lower risk of diseases such as SARS or H1N1 influenza for those who used oral Chinese herbal formulas. The most prominent preparations used herbs such as Radix astragali (Huangqi), Radix glycyrrhizae (Gancao), Radix saposhnikoviae (Fangfeng), Rhizoma Atractylodis Macrocephalae (Baizhu), Lonicerae Japonicae Flos (Jinyinhua) and Fructus forsythiae (Lianqiao)⁽¹⁹⁾. However, there is still no evidence available to verify the preventive properties of these formulas with COVID-19.

It is considered that the best way to prevent the disease is to avoid contact with the virus. Therefore, isolation, quarantine, and community containment measures are the best weapon to reduce the spread of the virus. Isolation refers to the separation of infected people in order to prevent them from spreading to the non-sick. Quarantine is the restriction of mobilization for uninfected people who were exposed to the virus. Whereas community restraint is defined as an intervention aimed at reducing the interaction and mobility of citizens, including measures such as social distancing or the mandatory use of masks⁽²⁰⁾.

Such measures can achieve satisfactory results if the population follows them and the monitoring system is adequate. In particular, community restraint violates some individual rights that demand greater ethical implications. However, this action was instrumental in reducing viral spread in China. On the other hand, mathematical models estimate that the effectiveness in the control of outbreaks depends on the rapid



isolation of the infected person and the effective tracing of their contacts^(21,22). The collaboration of the population is important in this process.

The above-mentioned measures should be taken with special consideration by older adults and people with serious underlying diseases. As for newborns, since they have an immature immune system and their symptoms are difficult to detect, it is also advisable to have more preventive measures with them. It is considered that those who are most at risk are those born to mothers who are suspected or diagnosed with this new coronavirus and who live in or are going to travel to an area of the recent spread of the virus⁽²³⁾.

Policies in educational centers

Due to the current health emergency, many universities have developed contingency plans that will be implemented when case numbers begin to decline and free transit resumes. One example was China, which, during the outbreak, in order to avoid unnecessary population aggregation, used applications that enabled virtual learning. These tools allowed students to listen and review lectures, thus promoting self-learning and constant improvement on topics of personal interest⁽²⁴⁾.

In the case of Peru, the Universidad Nacional Mayor de San Marcos (UNMSM) has recently published a contingency plan to prevent the spread of the virus in the Faculty of Medicine for the completion of compulsory social isolation and the resumption of normal work. This plan has been prepared to implement measures based on three fundamental principles: (I) promote the adoption of preventive behaviors such as proper handwashing and respiratory hygiene practices, (ii) detection and management of people with suspected symptoms of COVID-19, and (iii) management of rest days in people diagnosed or suspected of infection. These actions will allow the development of a scenario in which health promotion will play an important role in countering negative consequences in the academic field of students⁽²⁵⁾. The Ministry of Education (MINEDU), if the quarantine period is to be extended, will establish rules that allow classes to continue in public or private universities through virtual model according to the Emergency decree No. 026-2020⁽²⁶⁾. This measure is highly questioned as it ignores the practical and direct learning required by careers such as those related to Health Sciences, Engineering, and Architecture. The country needs to assess both the benefits and limitations of the use of such means.

In another scenario, if the period of quarantine lengthens, especially in the most affected countries, then the economic and social impacts will be disastrous. However, if control of the outbreak is achieved and the borders open, many exchange students worldwide will have the opportunity to live their academic and cultural experiences in a host country. Although it must not overlook the fact that most of these young people are from Asian and European continents and these are considered key points where the epidemic began. The chaos and panic that will continue could generate social problems such as xenophobia. To avoid this, the student centers of South America and other countries should establish preventive measures that could provide reliable information about the disease in their local and foreign environment. The knowledge that would certainly be important to rule out or monitor suspicious cases. Also, appropriate behavior, which will be strengthened through virtual talks or social media campaigns that promote the non-discriminatory and empathetic treatment of international students during the course⁽²⁷⁾.

Prevention for health personnel

Health professionals need preventive measures in addition to those taken by the general population. In particular, performing procedures that generate aerosols entails a high risk of contagion. These include tracheal intubation, noninvasive ventilation, tracheotomy, cardiopulmonary resuscitation, manual ventilation before intubation, and bronchoscopy; all of which are associated with increased coronavirus transmission⁽²⁸⁾.

As a result, WHO provided recommendations for health personnel to perform such procedures⁽²⁹⁾. This information can be supplemented by an article that exposes strategies that seek to decrease aerosol transmission of COVID-19⁽³⁰⁾. This focuses on ophthalmic care; however, some of its recommendations can be used for other practices. Such measures are shown in Table 1.

On the other hand, training health personnel on Personal Protective Equipment (PPE) to use when dealing with a suspected case is essential. Table 2 summarizes the protective equipment considered as an outbreak protection package by the Korean government⁽³¹⁾.

In Canada, to prevent nosocomial transmission of COVID-19, many hospitals have considered it important to keep care personnel and health professionals in charge of merely complicated cases

that need to be in the Intensive Care Unit (ICU), hospitalization or require immediate medical assistance such as in complications of chronic diseases or acute conditions. In this way, the emergency service is not saturated and it reduces the risk of contagion. The consultations are mostly attended from home, thus highlighting the role that telecommunications in health or telemedicine in times of health emergencies⁽³²⁾.

In particular, otolaryngologists and head and neck surgeons are specialists who constantly treat cases whose symptomatology is similar to that of 2019-nCoV. As a result, these medical personnel requires additional protective resources to perform

outpatient examinations and surgical procedures, and it is recommended that they reduce their care for non-emergency cases⁽³³⁾. Similarly, Dermatology departments are also at risk of contagion because they work with mucous membranes of the skin. For this reason, in China, it was decided to promote online consultations for mild patients, and for those with suspicious symptoms were referred to specialists (pulmonologists, radiologists) for disposal examinations. If they are positive, and if skin lesions are present, these should be sent through photographs to the doctor in charge to assess whether or not to go for a home consultation, which should be performed in a sterile environment⁽³⁴⁾.

Table 1. WHO recommendations and adaptations of the article by Yu YX et al. to reduce the spread of COVID-19 by aerosols.

WHO	Recommendations from Yu YX et al.
<ul style="list-style-type: none">• It must be performed in a ventilated environment (air flow of at least 160 L/s per patient) or negative pressure (with at least 12 air changes per hour and a controlled flow direction when using mechanical ventilation).• The number of people inside must be the minimum necessary.• Health personnel should use:<ul style="list-style-type: none">- N95 masks or equivalent.- Eye protection (glasses, face shields).- Long-sleeved lab coat.- Clean non-sterile gloves.- Apron in case the procedure can generate large amounts of fluid and the gown cannot resist it.	<ul style="list-style-type: none">• There must be daily ventilation (accumulated time > 2h), an air purifier can also be used.• 30w ultraviolet lamps can be placed every 10 m² at a height of no more than 2m that light up for 30-60 min after a procedure.• Health personnel should avoid face-to-face communication with the patient and seek a distance greater than one meter.• Seek in patients the use of medical or surgical masks to reduce the formation of aerosols.• Turn off the air conditioning in the place.• Decrease, as far as possible, the duration of the procedure.• Instruct the patient not to try to speak.

Source: Information from the WHO and the study published by Yu YX et al.⁽³⁰⁾.



Table 2. Recommendations for Personal Protective Equipment when used by health personnel to prevent SARS-CoV-2 infection.

Situation or behavior	Respiratory Protection			Body Protection		Eye Protection	
	Surgical mask	N95 equivalent or equivalent respirator	Motor air purifying respirator	Disposable gloves ^(a)	Long arm disposable coat	Protective clothing for the whole body, with slippers	Safety glasses or face shield
Quarantine		R		R		R	R
Screening Desk		R		R	R		
Quarantine Clinic Reception and Guide		R		R	R		
Treatment and care in quarantine clinics		R		R	R	R	R
Transportation (ambulance driver) ^(b)		R		R			
Transportation (quarantine officer, health center, and emergency medical technicians)		R		R		R	R
Ambulance disinfection		R		R		R	R
Visit, treatment and care of suspected cases		R		R	R	R	R
Procedures that produce aerosols ^(c)		R	R	R	R	R	R
Radiological examinations		R	R	R	R	R	R
Respiratory samples		R	R	R	R	R	R
Sample handling (laboratory) ^(d)		R	R	R	R	R	R
Transport of samples				R			
Transport of corpses		R		R		R	
Cleaning and disinfection of hospital rooms		R		R	R	R	R
Packaging and handling of medical waste		R		R	R	R	R
Transport of medical waste	R			R	R		

Source: Adapted from Sun Huh⁽³¹⁾.

Legend: R, recommended.

a) Double gloves should be worn taking into account the risk of breakage and exposure to infections when performing medical treatment, nursing, testing, and cleaning of suspected and confirmed patient areas.

b) If the driver's seat is not protected or if there is a possibility of contact with a suspected or confirmed patient, wear protective clothing for the whole body, including slippers, KF-94 or equivalent mask, and gloves (add safety glasses or mask if necessary).

c) Aerosol-producing processes include endotracheal intubation, cardiopulmonary resuscitation, bronchoscopy, airway aspiration, tracheotomy care, necropsy, continuous positive air pressure, nebulizer therapy, and sputum discharge induction.

d) The selection, use, and management of personal protective equipment in sample handling laboratories should follow the guidance of the Biosafety Laboratory (Biosafety Assessment Division, National Institute of Health, Centers for Disease Control and Prevention of Korea). A long-arm lab gown and disposable gloves are required to work on the Class II Biosafety desk.



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CONCLUSION

Prevention measures applied by the general population such as hand hygiene, respiratory hygiene, educational policies; and prevention measures in personal health are of great importance for reducing the incidence of COVID-19.

There is a need to take into account the preventive measures reported in other countries and apply them to our country. As a result, improving the public health and preventive policy concerning this virus. It is recommended subsequent assessments based on scientific, social, and economic evidence especially in the context of our country.

It should be noted that to date there have been no exhaustive investigations that take into account the impact of these measures in Peru, highlighting that the confirmed cases of this new coronavirus are increasing.

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