

# Masks in COVID-19 pandemic: Are we doing it right?

Swayam Pragyan Parida, Vikas Bhatia, Adrija Roy

Department of Community Medicine and Family Medicine, AIIMS, Bhubaneswar, Odisha, India

## ABSTRACT

The coronavirus (COVID-19) pandemic has caused the world to undergo an unprecedented change in a short period. Personal protective equipment such as the face mask or face cover has become a daily necessity. Moreover, since some states and countries have made the use of face covers or face masks compulsory, one cannot ignore or afford to have a wrong or incomplete awareness about face masks. Current information suggests that the two main routes of transmission of the COVID-19 virus are respiratory droplets and contact. This article aims to review the existing information and highlight the need for the use of face masks or face covers to combat the COVID-19 pandemic and promote and provide necessary recommendations. Many countries have implemented or recommended mask wearing in the community, but recommendation for rational use of masks is being issued, as the crisis and shortage for masks are universally existing. The use of different types of masks has been assigned according to the risk of exposure and should be therefore judiciously used. As this is a novel disease, the guidelines are changing every day and one needs to be updated with correct information so that one can protect themselves and their families from this extreme level of the crisis faced by the world now. The use of face covers or masks should not be discouraged as there has been substantial evidence that its use can help reduce the spread of infection. "Mass masking" along with hand hygiene and social distancing are the only effective recommended measures to prevent the spread of the disease.

**Keywords:** Coronavirus pandemic, COVID-19, face mask, N95 masks

## Introduction

The coronavirus (COVID-19) pandemic has caused the world to undergo an unprecedented change in a short period. This disease has grossly and gravely affected the economy, has infringed and interfered with personal freedom, and has taken a toll on healthcare systems all over the world. This public health crisis is overpowering the world with the emergence and spread of 2019 novel coronavirus or the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The presenting symptoms usually are fever, cough, sore throat, breathlessness, fatigue, and malaise among others.<sup>[1]</sup> As the route of spread is through droplet infection and as there could be pieces of evidence of airborne

infection also, the use of face masks has become ubiquitous in this era of this novel coronavirus disease or COVID-19 pandemic. Personal protective equipment (PPE) such as the face mask or face cover has become a daily necessity. Moreover, since some states and countries have made the use of face covers or face masks compulsory, one cannot ignore or afford to have a wrong or incomplete awareness about face masks. The use of masks, worldwide even for the healthcare sector, has never been this prioritized as it is now.

Currently, the information suggests that the two main routes of transmission of the COVID-19 virus are (i) respiratory droplets and (ii) contact. Respiratory droplets are produced when a person infected with the virus coughs or sneezes. Any person who is in close contact, i.e., within 1 m of someone who has respiratory symptoms such as coughing, sneezing, and nasal discharge, is at a higher risk of being exposed to potentially infective respiratory droplets. The respiratory droplets of an infected person may also land on surfaces where the virus could remain viable for a long period; thus, the environment of an

**Address for correspondence:** Prof. (Dr.) Vikas Bhatia, Executive Director, AIIMS Bibinagar, Hyderabad, Telangana, Former Head, Department of Community Medicine and Family Medicine, AIIMS, Bhubaneswar, Odisha, India.  
E-mail: bhatiaaiims@gmail.com

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infected individual can serve as a source of transmission (contact transmission).<sup>[2]</sup>

The guidelines and recommendations differ according to the countries, states, as well as worldwide, and is constantly upgrading and changing as we gain more and more knowledge about the novel disease. Primary care physicians are often the first contacts of those with the COVID-19 disease. They are more prone to get exposed to the virus as often; primary care physicians are involved in the initial screening in the COVID-19 context. This article therefore aims to review the existing information and highlight the need for the use of face masks or face covers to combat the COVID-19 pandemic and promote and provide necessary recommendations.

## Global Scenario

All over the world, as the number of cases has exceeded the two million mark, prevention remains the only strategy to combat this pandemic. The current guidelines on the use of masks by the World Health Organization (WHO) states that wearing a medical mask is one of the essential preventive measures that can limit the spread of certain respiratory viral diseases. This also includes the coronavirus disease. However, the use of mask alone is not sufficient to provide an adequate level of protection, and other measures should also be adopted. Whether or not masks are used, maximum compliance with hand hygiene and other Infection Prevention and Control measures are critical to prevent human-to-human transmission of COVID-19.<sup>[2]</sup> The Centre for Disease Control and Prevention (CDC) also states that cloth face coverings should not be placed on children under age 2 or anyone who has trouble in breathing or is unconscious, incapacitated, or otherwise unable to remove the mask without assistance.<sup>[3]</sup>

The recommendations globally and from different countries are listed here.<sup>[4]</sup> The WHO declared “If you are healthy, you only need to wear a mask if you are taking care of a person with suspected SARS-CoV-2 infection.” China had recommended people at moderate and low risk of infection to use surgical or disposable masks for medical use. People at very low risk of infection were asked not to wear a mask or can wear a nonmedical mask (such as cloth mask).

Hong Kong directed that surgical masks can help in the prevention of transmission of respiratory viruses from people who are ill. It is essential for symptomatic people (even if they have mild symptoms) to wear a surgical mask at least. Wearing a surgical mask when moving out of the house, taking public transport, or staying in crowded places is essential. It is important to wear a mask properly and practice good hand hygiene before wearing and after removing a mask. Singapore directed to wear a mask if you have respiratory symptoms, such as a cough or running nose. Japan had commented on facemasks in the COVID-19 context that the effectiveness of wearing a face mask for protection from contracting viruses is thought to be limited. If a face mask is worn in confined, poorly ventilated spaces, it might help from catching droplets emitted from

others; however, if one is in an open-air environment, the use of face mask could be inefficient. In the United States of America (USA), the CDC did recommend that people who are well wear a face mask (including respirators) to protect themselves from respiratory diseases, including COVID-19. Recently, the CDC has developed guidelines for face covers including how to make them and use them appropriately. The USA had earlier requested people to stop buying face masks which were leading to unnecessary hoarding and indiscriminate use. The United Kingdom said that the use of face masks play a crucial role in places such as hospital settings. Germany’s recommendation said that there is not enough evidence to prove that wearing a surgical mask could significantly reduce a healthy person’s risk of becoming infected. According to the WHO, wearing a mask in situations where it is not recommended to do so can create a false sense of security because it might lead to neglecting fundamental hygiene measures, such as proper hand hygiene. Israel, Austria, the Czech Republic, Hong Kong, and Mongolia are also among the countries that have implemented or recommended mask wearing in the community. Recommendation for rational use of masks is being issued, as the crisis and shortage for masks are universally existing.<sup>[5]</sup>

## Indian Scenario

The Ministry of Health and Family Welfare (MOHFW), Government of India, has been giving guidelines relating to judicious mask use in various population groups. The guidelines state, “not everyone needs to wear masks.”<sup>[6]</sup>

Indian states of Odisha, Delhi, Uttar Pradesh, and Maharashtra and union territory of Chandigarh were among the first in the country to have made covering the mouth with any cloth or homemade masks compulsory. Covering the nose and mouth with face covers or masks is definitely recommended to curtail the virus. Both the WHO and the MOHFW agree upon the given issue and hence have individually produced guidelines for the safe use of face covers.

## Use of Masks by the Community

The MOHFW directs that persons without symptoms are not to use mask and the fact that healthy persons should not be using medical masks had also been highlighted. It was because it creates a false sense of security that can lead to neglecting other essential measures, such as washing of hands and social distancing.

It was earlier claimed that there was not enough scientific evidence to show health benefit of using masks for healthy persons in the community. Erroneous use of masks or continuous use of a disposable mask for longer than 6 h or repeated use of the same mask may actually increase risk of getting an infection. It also incurs unnecessary cost.<sup>[7]</sup>

The above information has now been made redundant, and the MOHFW recently issued the importance of use of face covers

for everyone. The use of homemade face covers for everyone has been highlighted and made compulsory to be used by the public stepping out of their homes or being in public places.

The CDC does not recommend N95 respirators as a protective measure for the general public. Those are among critical supplies that must continue to be reserved for healthcare workers and other medical responders.

### Types of Masks Recommended for COVID-19 Pandemic

Different kinds of face masks and face covers recommended for use to combat COVID-19 pandemic include the medical masks as well as the common face covers. The medical masks include the N95 respirators and the surgical masks also known as three-layered surgical masks. The National Institute for Occupational Safety and Health (NIOSH) is the United States Federal Agency which is responsible for conducting research and making recommendations for the prevention of work-related injury and illness. The approved PPE including N95 respirators used are according to the standards set of NIOSH and Occupational Safety and Health Administration.<sup>[8,9]</sup> Figure 1 shows the types of masks recommended for use in COVID-19. The homemade masks or cloth masks can be of various types and made from various materials, The guidelines for which have been clearly provided by the MOHFW as well as the CDC.

The respiratory masks are classified and certified into N, R, or P depending on their ability to offer resistance to oil-based particles. N stands for “not oil resistant,” and these masks can only be used for particles that do not contain oil. R stands for “somewhat resistant to oil” which has a service life for at about 8 h, and P stands for “strongly oil proof” which has a service life for at least 40 h. P and R are used only for industrial settings and are not relevant to this discussion. N is further divided into N95, N99, and N100 depending on the filtration efficacy. N95 means that this mask can filter at least 95% of particles which are  $>0.3 \mu$ , whereas N99 means that it can filter off 99% of these particles.<sup>[10]</sup>

Table 1 has been adapted from the CDC which explains the basic differences between the surgical mask and the N95 respirator.<sup>[11]</sup>

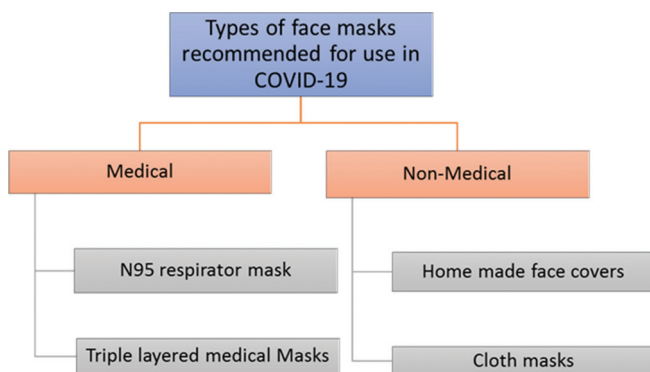


Figure 1: Types of masks recommended for use in COVID-19

Other than these masks, the CDC and the MOHFW recommend the use of homemade face covers for the community. The medical masks (surgical masks and N95 respirators) have been asked to be used by the COVID-19 patients, suspects, or frontline workers.

### Homemade face covers

The CDC recommends wearing cloth face coverings or cloth mask in public settings where other social distancing measures are difficult to maintain, especially in areas of significant community-based transmission.

The CDC also advises the use of simple or homemade cloth face coverings to slow the transmission of the virus and help people who are asymptomatic from transmitting it to others. Cloth face coverings fashioned from household products or made at home from common low-cost materials can be used as additional, voluntary public health measure to prevent and control the spread of the disease. The MOHFW also recommends the use of homemade face covers and gives detailed pictorial guidelines including videos of how to make them and use them rationally.

Currently, people are gripped with the fear of coronavirus infection and face masks are a very important component to save us from catching an infection. However, due to the pandemic, the world is facing a shortage of these masks, and hence, judicious use of face masks is paramount.

With the increase in the use of face mask, indiscriminate disposal of face masks has also been an associated problem. Irresponsible behavior has led to such act of disposal. This not only increases the chances of extensive spread of infection but also completely dissolves the purpose of protecting oneself by the use of masks.

The MOHFW recommends that this homemade face cover is not recommended for healthcare workers or frontline workers or those working with people COVID-19 patients or those infected with the virus themselves. These people are required to wear specified PPE. Wearing of face covers is especially recommended for people living in densely populated areas across India.

### The Basic Do’s and Don’ts of Wearing a Mask<sup>[6]</sup>

- Unfold the pleats of the mask; make sure that they are facing down
- Change the mask after 6 h or as soon as they become wet
- Place the mask over your nose, mouth, and chin and ensure that there are no gaps on either side of the mask, adjust to fit
- Never reuse disposable masks and dispose the used masks into closed bins after disinfecting them<sup>[6]</sup>
- Avoid touching the mask, while using it
- Do not touch the potentially contaminated outer surface of the mask, while removing it

**Table 1: Understanding the difference between an N95 respirator and surgical mask**

	<b>N-95 Respirators</b>	<b>Surgical Mask</b>
Testing and Approval	Evaluated, tested, and 84 approved by NIOSH	Cleared by the U.S. Food and Drug Administration (FDA)
Intended Use and Purpose	Reduces wearer's exposure to particles including small particle aerosols and large droplets (only non-oil aerosols).	Fluid resistant and provides the wearer protection against large droplets, splashes or sprays of bodily or other hazardous fluids. Protects the patient from the wearer's respiratory emissions.
Face Seal Fit	Tight-fitting	Loose-fitting
Fit Testing Requirement	Yes	No
User Seal Check Requirement	Yes. Required each time the respirator is donned (put on)	Yes
Filtration	Filters out at least 95% of airborne particles including large and small particles	Does Not provide the wearer with a reliable level of protection from inhaling smaller airborne particles and is not considered respiratory protection
Leakage	When properly fitted and donned, minimal leakage occurs around edges of the respirator when user inhales	Leakage occurs around the edge of the mask when user inhales
Limitations	Ideally should be discarded after each patient encounter and after aerosol generating procedures. It should also be discarded when it becomes damaged or deformed; no longer forms an effective seal to the face; becomes wet or visibly dirty; breathing becomes difficult; or if it becomes contaminated with blood, respiratory or nasal secretions, or other bodily fluids from patients.	Disposable. Discard after each patient encounter.

- Do not leave the mask hanging from the neck
- After removal of mask, clean your hands with soap and water or use alcohol-based hand rub disinfectant.

The use of different types of masks has been assigned according to the risk of exposure and should be therefore judiciously used.<sup>[12]</sup> Although the N95 and similar masks are efficient in protecting the wearer against viruses such, they are not easy to breathe and often get moist and hot after wearing it for more than 30 min [Table 1]. They are therefore not meant for routine household use or while simply stepping out of the house. These are mainly meant for healthcare providers who come in close contact with the COVID-19 patients.<sup>[10]</sup>

Recent literature on the use of face covers or masks in COVID-19 situation has suggested its benefits in preventing the transmission of the virus.<sup>[12-14]</sup> It is therefore universally recommended in India and worldwide to use face masks while stepping out of the house. However, rational and appropriate risk of exposure-based choice of mask is also extremely important for its optimal effects and effectiveness.<sup>[15-18]</sup>

## Recommendations

As this is a novel disease, the guidelines are changing every day and one needs to be updated with correct information so that one can protect themselves and their families from this extreme level of the crisis faced by the world now.

The recommendations therefore include:

- Correct and timely information should be disseminated in a timely and effective manner. Effective communication strategies and clear short messages should be brought forward

to the public

- The use of homemade masks should be encouraged among the community to save the essential medical masks for our frontline workers
- Rational use of face masks is, therefore, the need of the hour. Advocacy for rational use needs to be strengthened further to save the frontline workers, whose need for masks are far greater than the general population
- A need for a unanimous compiled directive on the use of masks also needs to be brought forth to judiciously use face masks
- Proper donning–doffing and disposal methods are to be adopted by not only the frontline workers but also the general population. Videos and guidelines though freely available often do not reach out to the public.
- Information and regulations about reuse and disinfection of reusable masks need to reach out to everyone. Strengthening of communication strategies is once again at the utmost level of necessity now.
- The use of face covers or masks should not be discouraged as there has been substantial evidence that its use can help reduce the spread of infection. “Mass masking” along with hand hygiene and social distancing are the only effective recommended measures to prevent the spread of the disease.

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## Conflicts of interest

There are no conflicts of interest.



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