Suggestions and Recommendations of Face Mask Usage during COVID 19 Pandemic

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Abstract

Rate of spread of SARS-CoV-2 and number of relevant deaths continue to elevate as the time elapses since its first outbreak. With no readily available curative treatment neither any effective vaccine till now to prevent the infection, practicing personal protection measures remain the only effective way to stay protected from its attack. Those who are directly exposed to the care of any confirmed or suspected COVID-19 patient, including the health care workers and caregivers, have been advised by the World Health Organization (WHO) and Centre for Disease Control and Prevention (CDC) to wear proper face masks or respirators following the guidelines. Transmission of corona virus occurs through respiratory droplets, close personal contact as well as touching stuff or surfaces polluted by the viral particles. However, several studies have already proven the effectiveness of using various face masks, according to the circumstances, in preventing the dissemination of COVID-19. [Bangladesh Journal of Infectious Diseases, June 2020;7(1):27-32]

Keywords: Face masks; prevention; Covid-19 pandemic

Introduction

The outbreak of coronavirus disease 2019 (COVID-19) was initiated in Wuhan, China, in December 2019. With continuing spread of this infection to different parts of the world, World Health Organization (WHO) has made an announcement on the manifestation as a pandemic on March 11, 2020¹. Although sharing similar properties of other respiratory viruses for example mode of
transmission via respiratory droplet and contact\textsuperscript{2,3}, incubation period of 2 to 14 days with a median of about 6 days\textsuperscript{4}, SARS-CoV-2 has shown to have higher rates of mortality that is 6.5 percent globally, as of May 21, 2020 with some regional variations\textsuperscript{5}.

Neither any effective vaccine nor any specific antiviral seem to be available till now, hence, preventive measures appear to be the armors of choice to fight against this deadly battle\textsuperscript{6}. These include washing hands with soap water for at least 20 seconds or using alcohol based hand-rub at frequent intervals, refraining from touching eyes, nose and mouth with unclean hands, avoiding exposure to the sick people, following the respiratory etiquettes while sneezing and coughing, maintaining cleanliness of frequently used objects and surfaces, and seeking medical advice upon any suspicious exposure or symptoms\textsuperscript{6}. As the health care workers directly confront any new outbreak, they should always follow and practice the infection prevention directives on a routine basis, and as a part of it, any exposure to a suspected COVID-19 patient should warrant an immediate placement of N95 respirator. However, in an effort to protect the caregivers or whoever is involved with direct patient care, application of medical masks has proven to be as significantly effective as N95 respirators\textsuperscript{3}.

Types of Mask

Two categories of face masks are available at present\textsuperscript{7}.

1. Medical mask (also known as surgical mask): These are made up of non-woven polypropylene material, flattened (some are cup-shaped) with or without being pleated and fastened to the head using straps. It is recommended by WHO that medical masks and respirators should be dispensed to the health care workers only\textsuperscript{7}. Medical masks with wide variability in filtration capacity are found to allow penetration of tiny aerosol particles varying from 4%-90%. Furthermore, after a sneeze or vigorous cough, all sided open surgical masks permit particle to escape around the mask’s edges. However, for protecting Health Care Workers(HCW) from respiratory infection for example, Influenza, surgical masks seem to be non-inferior to N-95 respirator in routine health care set-up\textsuperscript{8}.

2. N-95 respirators and equivalent: Korean Ministry of Health and Welfare recommended N-95 respirators and its equivalent like KN95,FFP2 etc for HCW to prevent inhalation of minute infectious particles(less than 5um) admixed with dust\textsuperscript{8}. Additionally, in comparison to ordinary surgical mask, N-95 respirators and the equivalent ones are proven to afford better respiratory defense against aerosol particles as the respirators can filter out at least 95% pertinent aerosol particles. Importantly, N-95 respirator masks as well as its equivalents are recommended in circumstances with excessive risk of aerosolization, such as, bronchoscopy and intubation. However, in developing countries, two issues are of concern in massive utilization of respirators specifically cost factors and user compliance\textsuperscript{9}.

3. Non-medical mask: In contrast, these are made up of woven cotton fabric with a larger pore size than the medical masks. The implications of wearing these masks by the healthy group of people in the community require to be determined by extensive experimentation,as recommended by WHO. Meanwhile, a makeshift directive towards the use of non-medical masks may be issued by the decision makers. In congruence, the essential criteria of non-medical masks are stated below:\textsuperscript{7,10}

a) Type of material being used: Cotton fabric, bandana cloth, T-shirt etc.
b) Number of layers of fabric/tissue: minimum of two layers.
c) Multiple layered fabrics to be used that do not pose any breathing restriction
d) Water resistant properties of the material
e) Having ties or ear loops to ensure comfortable fitting of the mask.
f) Reusable after being laundered and machine dried without any damage or alteration to the shape.

Instructions on Wearing a Mask\textsuperscript{11}

- First of all, adequate cleaning hands either with soap water or alcohol based hand rub is essential before putting on a mask in order to manage a suspected or confirmed COVID-19 case.
- While using respirators, a proper fitting test should be performed to comply with the manufacturer’s guidelines.
- In an effort to ensure irrevocable, expedite and durable fit, accurate adjustment of the metal nose clip and straps are necessary.
- When a satisfactory attachment may not seem achievable, a crosswise positioning of the straps may be of aid.
- In cases of surgical masks, as an alternative to the respirators, a proper fit and adjustment are advisable through using the metal nose clips.
Indications of using masks

Endangered group of people such as elderly and those with co-morbid conditions, should put on face masks in any circumstances\(^{12}\). However, draping nose and mouth with different categories of face masks is highly advisable in the following circumstances:

**In the community**

- The health care workers must have adequate accessibility for use of medical masks.
- Additionally, all individuals including symptomatic ones suffering from high temperature, weakness, cough, sore throat, breathlessness etc. should also wear a medical mask to reduce transmission from the wearer\(^7\).

**At Home**

- Any person exhibiting, mild symptoms or suspected as COVID-19 case should use a medical mask to the most feasible extent. Notably, the used masks should be discarded on a daily basis.
- Besides that, each person, including caregivers, exposed to a suspected COVID-19 case or with mild symptoms should also wear a medical mask with the same instructions of use\(^7\).

**Health Care Facility**

- All individuals symptomatic or not(except people with respiratory distress and persons who cannot put off masks by themselves, for example, unconscious patients and children less than two years old)\(^{10}\) must wear a medical mask while waiting in the triage as well as while being transported from one place to another place inside or outside the health care facility.
- However, isolation in a room does not necessitate wearing a medical mask.
- Health care workers must ensure wearing a medical mask while visiting suspected or confirmed COVID-19 patients.
- Procedures like -manual ventilation before intubation, non-invasive ventilation, endotracheal intubation, bronchoscopy and cardiopulmonary resuscitation, etc. generally produce aerosol. Therefore, cautions need to be achieved with respirators like N95, FFP2 or equivalent along with face shields that prevent inhalation of minute viral particles through aerosol\(^7\).

| Type of Facility      | Type of User                | Activity                                                                 | Type of Mask Recommended                          |
|-----------------------|-----------------------------|--------------------------------------------------------------------------|----------------------------------------------------|
| **Health Care Facilities** |                             |                                                                          |                                                    |
| **In-Patient Facility** |                             |                                                                          |                                                    |
| Patient room          | Health care workers         | Close contact with COVID-19 patients while providing direct care         | Medical mask                                       |
|                       |                             | Performing aerosol-generating procedure on COVID-19 patients              | Respirator N95 or FFP2 or equivalent along with face shield |
| Cleaners              |                             | Cleaning the rooms of COVID-19 patients                                  | Medical mask                                       |
| Visitors              |                             | Entering the room of a COVID-19 patient                                  | Medical mask                                       |
| Rest of the places of patient transit (wards, corridors etc.) | All staff                   | No contact with COVID-19 patients                                        | Non-medical mask needed.                          |
| **Triage**            |                             |                                                                          |                                                    |
|                       | Health care workers         | Primary screening not involving direct contact                            | Non-medical mask needed.                          |
|                       | Patients with respiratory symptoms | Any                                                                  | If tolerated by patient, medical mask should be offered. |
|                       | Patients without respiratory symptoms | Any                                                                  | Non-medical mask needed.                          |
| **Laboratory**        | Lab Technician              | Manipulation of respiratory                                              | Medical mask                                       |
| Administrative areas | All staff, including health care workers | Administrative activities not involving any exposure to COVID-19 patients | Non-medical mask needed. |
|----------------------|----------------------------------------|---------------------------------------------------------------|---------------------------|

### Out-Patient Facilities

| Consultation room | Health care workers | Physical examination of patient with respiratory complaints | Medical mask |
|-------------------|---------------------|------------------------------------------------------------|---------------|
| Patients with respiratory symptoms | Any | If tolerated, offer medical mask | Non-medical mask needed. |
| Patients without respiratory symptoms | Any | Non-medical mask needed. | Medical mask |
| Cleaners | Cleaning the room following and in between consultations with patients having respiratory symptoms | Medical mask |

| Waiting area | Patients with respiratory symptoms | Any | If tolerated, offer medical mask |
|--------------|-----------------------------------|-----|---------------------------------|
| Patients without respiratory symptoms | Any | Non-medical mask needed. | Medical mask |

| Administrative areas | All staff, including health care workers | Administrative tasks | Non-medical mask needed. |
|----------------------|----------------------------------------|---------------------|---------------------------|

| Triage | Health care workers | Primary screening not involving direct contact | Non-medical mask needed. |
|--------|---------------------|-----------------------------------------------|---------------------------|
| Patients with respiratory symptoms | Any | If tolerated by patient, medical mask should be offered. | Non-medical mask needed. |
| Patients without respiratory symptoms | Any | Non-medical mask needed. | Medical mask |

### Community

| Home | Patients with respiratory symptoms | Any | If tolerated by patient, medical mask should be offered, except while sleeping. |
|------|------------------------------------|-----|--------------------------------------------------------------------------------|
| Caregiver | Accessing the patient’s room, but directly not involved in patient’s care or assistance | Medical mask |
| Caregiver | Involved in direct patient care, or disposal of COVID-19 patient’s excreta and waste | Medical mask |
| Health care workers | Direct contact with COVID-19 patient at home while providing care or assistance | Medical mask |

| Public places (schools, shopping malls, railway stations etc.) | Individuals without respiratory symptoms | Any | Non medical mask needed. |
|---------------------------------------------------------------|----------------------------------------|-----|---------------------------|

### Points of entry

| Administrative Areas | All staff | Any | Non medical mask needed. |
|---------------------|-----------|-----|---------------------------|

| Screening areas | Staff | Primary screening (Temperature measurement) not requiring direct contact | Non medical mask needed. |
|-----------------|-------|---------------------------------------------------------------|---------------------------|
| Staff | Secondary screening for example interrogating passengers for symptoms suggestive of COVID-19 disease including travel history | Medical mask |

| Cleaners | Cleaning the area where febrile patients were screened | Medical mask |
|----------|---------------------------------------------------------|---------------|
| Ambulance or transfer medium | Staff | Accessing the area, but not involved in direct assistance | Medical mask |
| Staff, health care workers                  | Assisting in passenger transportation to a health care facility                         | Medical mask                     |
|--------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------|
| Cleaners                                   | Decontamination of isolation area                                                       | Medical mask                     |
| Health care workers                        | Transportation of suspected COVID-19 patients to the referral health care facility       | Medical mask                     |
| Driver                                     | Driving only the suspected COVID-19 disease patient with a separate driver’s compartment | No mask needed.                  |
|                                            | Actively loading or unloading suspected COVID-19 patient                                | Medical mask                     |
|                                            | Driving the suspected COVID-19 patient with no separate driver’s compartment            | Medical mask                     |
| Suspected COVID-19 patient                 | Being transported to the referral health care facility                                   | If tolerated, offer medical mask  |
| Cleaners                                   | Decontamination following and in between transportation of suspected COVID-19 patients to the referral health care facility | Medical mask                     |

Special importance to rapid-response teams assisting with public health investigations

| Community                                   |                                                                                       |                                  |
|---------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------|
| Anywhere                                    | Rapid-response team investigators                                                      |                                  |
| Interrogating suspected or confirmed COVID-19 patients or their contacts             | If done from distance (e.g. over telephone or virtual meeting), no mask is needed |                                  |
| Face to face interrogation without any direct contact with any suspected or confirmed COVID-19 patient | Medical mask |                                                                 |

Table 2: Dos and DON’Ts of mask usage

| Dos                                                                 | DON’Ts                                                                 |
|---------------------------------------------------------------------|------------------------------------------------------------------------|
| • Tight fit placement of the mask draping the mouth and nose as well as to ensure the least free space between the face and the mask. | • DO NOT touch the front of the mask but untie from back. |
| • Abstaining from touching the mask while wearing it.               | • DO NOT reuse the one time use masks.                                  |
| • Following every removal or after every, if any, unintentional touch, hands must be cleaned by an alcohol-based hand rub or alkaline soap and water. | |
| • Damp masks require quickest disposal, and need to be replaced with a new clean and dry one. | |

Durability of Mask Usage

• The standard respirators- N95, FFP2 or other equivalent respirators can be used for prolonged hours during treating patients with identical diagnosis. Nevertheless, a single respirator may cause discomfort if worn uninterruptedly for more than 4 hours and, hence, should be put off accordingly\textsuperscript{13}.

• A study by Ahmed et al\textsuperscript{14} stated that usage of face masks by the health care workers for at least 6 hours can significantly reduce infection rate.

Recycling and Decontamination

Being made of degradable materials, standard methods of disinfection for instance boiling, heating, or using chemical and radiation are apparently practically unsuitable for recycling of mask! Therefore, no single standard mean seems to
be available for effective disinfection of disposable masks and respirators. However, few processes, for example, Ultraviolet germicidal irradiation (UVGI), microwave generated steam (MGS), moist heat (MH), ethylene oxide and vaporized hydrogen peroxide etc. have been recommended as alternatives to decontaminate respirators.\textsuperscript{13}

In the face of scarcity, All India Institute of Medical Science (AIMS) and Bangabandhu Sheikh Mujib Medical University (BSMMU) recommended extended use of N95 masks for HCWs by providing them with five N95 masks with five small paper made bags for every 20 days. HCWs are advised to keep each of their supplied masks in paper bag after having completed their duty to dry it out for subsequent four days. The same maneuver is applicable for another three N95 masks and the fifth one is advised to keep preserved. After four days the respirator can be used again. AIMS also recommended to use each of the respirator for maximum five times as per advice of CDC, Atlanta.\textsuperscript{16}

**Ideal Method of Mask Disposal**

Each used mask should be disposed in a leaded container. In addition, prior to wearing and following removal of a mask, proper hand hygiene must be ensured.\textsuperscript{13}

**Conclusion**

Researchers and scientists are working hard day and night to find out the effective vaccine and specific drug to minimize the spread and mortality caused by corona virus. Meanwhile, using different categories of face masks in specific circumstances, keeping social distance (at least 2 meters), maintaining personal hygiene etiquettes and covering face while sneezing and coughing can provide a shield from this alarming infestation. Face mask alone should not be considered as an excuse to disregard other health measures as mentioned here. Additionally, being the frontline fighters, the health care workers must properly abide by the recommendations approved by the health care authorities with utmost priority for their protection.

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