

Face Masks- the most Convenient and Cost-effective Measure Against SARS-CoV-2 Infections

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The recent threat of Corona virus (SARS-CoV-2) infection and disease (COVID-19) pandemic started since December, 2019 originating in Wuhan City of Hubei province, China.¹ We have witnessed very diverse situations regarding all about the virus and its infection or disease. The notorious virus did not follow any common rule of a virus-all relating to structure, immunobiology, pathogenesis, clinical presentations and treatment or management. Perhaps, this is the principal reason of endless threat of the virus around the globe. Therefore, all concerned healthcare workers are trying their best to find out the effective measures to control the virus. Vaccination, development of more sensitive and specific test methods for early diagnosis of the virus, and effective antiviral agents are few of the significant measures that are on the priority lists of the medical scientists. However, no single measure of the issue was found to support as the most effective means for prevention and control of SARS-CoV-2.^{2,3}

With the same perspective, World Health Organization (WHO) advises to cover mouth and nose with mask as part of a comprehensive package of prevention and control measures to limit the SARS-CoV-2, the virus that causes COVID-19.³ Now, how much a mask helps in the prevention and control of SARS-CoV-2 infection is a big question. WHO says, "a mask alone, even when it is used correctly, is insufficient to provide adequate protection or source control". WHO also includes other infection prevention and control (IPC) measures like hand hygiene, physical distancing

of at least one metre, avoiding of touching one's face, respiratory etiquettes to cover sneezes and coughs, adequate ventilation in indoor settings, testing, contact tracing, quarantine and isolation.^{2,3} According to Centers for Disease Control (CDC), masks work best when everyone wears one.⁴ Because, when someone wears a mask, it can protect (i) him/herself from being infected as well as (ii) others around him/her from being infected from the person wears it, if he/she is carrying the virus having COVID-19 disease or carrying the virus without having any symptom (asymptomatic carrier) by simply preventing the transmission of the virus. CDC also recommends that one should wear a mask even when he/she is sick.⁴ This is because several studies have found that people with SARS-CoV-2 who never develop symptoms (asymptomatic) or those who are not yet showing symptoms (presymptomatic) can still spread the virus to other individuals.⁵⁻⁸

Why masks are important in prevention and control of SARS-CoV-2 infections? It becomes clear considering routes of transmission and pathogenesis of the virus, it becomes clear that SARS-CoV-2 is transmitted from person-to-person by many different routes.^{9,10} Among the different modes of transmission, major routes are: (i) inhalation of the virus contained in droplets directly from coughs and sneezes of infected persons through nostrils (direct infection-droplet infection) or airborne, i.e., indirectly from the air containing expelled droplets (indirect infection-droplet nuclei) and (ii) intake of the virus through mouth to reach upper respiratory tract for exam-

ple pharynx, is significant for infection.⁶ Controlling respiratory infection at source using a face mask is found to be a helpful strategy. In this perspective, wearing the mask appropriately is very important- so that the virus containing droplets cannot enter through any weak areas of mask fitting over the mouth. Usually when the mask is worn casually over nasal bridge, there might be some areas of loose-fitting gaps to allow dusts and droplets/ droplet nuclei to enter nose and mouth. Most often some persons are found to keep the mask below the nostrils- over the chick or even ridiculously under the chick (unpublished observations). These are not recommended and obviously, these sorts of casual wearing of masks cannot protect from the virus.¹¹

Now, who should wear a mask? CDC recommends that everyone 2 years old and above should wear a mask in public places, where he/she is around the people, who are not living in his/her household.⁴ In the same document, CDC also recommends that mask should be worn when caring for someone who is sick (whether at home or at a healthcare setting) and a mask should also be worn if someone is sick with COVID-19 or suspects that he/she is infected with the virus when he/she needs to be around other people, even when he/she is at home.

CDC also recommends who should not wear a mask.^{4,12} They listed 4 categories of people not to wear a mask- for example: (i) children younger than 2 years of old, (ii) anyone who has trouble in breathing, (iii) anyone who is unconscious, incapacitated, or otherwise unable to remove the mask without assistance, and (iv) wearing mask could be difficult for some people with sensory, cognitive or behavioural issues. If some people are unable to wear a mask properly or cannot tolerate a mask, masks should not be worn by them- rather adaptations and alternatives should be considered for these people. In all situations when wearing a mask may not be possible, everyone should make sure to maintain a physical distance of at least one metre from others. Situations could be during dining in a restaurant, or swimming at a beach or pool, or during high intensity working leading to difficulty in breathing.⁴

There are three different categories of masks for use by specific groups of people according to

their nature of the jobs. General public require to wear an ordinary cotton fabric woven mask when he/she is in a crowd or in areas of community transmission. A surgical mask is required for routine healthcare duties by the healthcare workers. A special mask, for example N95 respirator, along with full-gear personal protective equipment (PPE) is required for people working with the identified or suspected COVID-19 patients- even for taking care of such patients in the home.¹² Medical masks and N95 respirators should be conserved for healthcare workers only. Some masks work better than others to stop SARS-CoV-2 outside healthcare settings. CDC recommends masks for general use which fit properly (snugly around the nose and chin with no large gaps around sides of the face), made with breathable fabric like cotton or with tightly woven fabric like fabrics that do not let light pass when held up to a light source and masks with two or three layers and inner filter pockets.⁴ On the other hand, the CDC does not recommend masks that (i) do not fit properly keeping large gaps, being too loose or allow passing too light, (ii) made from materials that are hard to breathe through like plastic or leather, or made from loosely woven fabric or knitted letting light to pass through, (iii) masks with one layer, (iv) masks with inhalation valves or vents and (v) wearing a scarf or ski as a mask.⁴ Finally, considering all available information, it appears that proper use of recommended mask along with keeping social distance and practicing hand hygiene could be the best possible preventive measure for all groups of individuals. Moreover, face masks are relatively cheap, easily available and easy to wear. This is more essential in countries like Bangladesh, where social and physical distancing approach is less feasible. Therefore, universal masking of people strategy can be achievable by which repeated wave of COVID-19 can be prevented.

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