

Mask Wearing Practice- First Line Defence against Communicable Diseases

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Since long the face masks have been considered as the first line of defence against spreading of a number of diseases. The masks protect health care personnel from the splashes of body discharges or fluids during different medical procedures at hospitals or other places by blocking transmission of respiratory droplets. By this way it offers the most affordable protection against diseases caused by numerous notorious microorganisms. The mask serves as a protective barrier that prevents the spread of infectious droplets when we talk to each other face to face or cough or sneeze. The viruses are highly contagious and have the potential to cause severe illness. Without vaccinations readily available for everyone, wearing masks is one of the most affordable and effective ways to slow down the spread of virus. Different types of face masks can be found in the market. Most common among them are disposable face masks. For medical procedure surgical mask, filtering face piece respirator, N 95 respirator etc are commonly used.¹⁻³

Previous studies from 2008 found that properly fitted and methodically used surgical masks are 68% effective for prevention of transmission of respiratory diseases while N95 masks are more than 90% effective.^{1,3-5}

A. J. Jessup, a physician of New York was the first to recommend use of cotton masks for limiting infection during 1878 yellow fever pandemics along Mississippi river valley in USA. Back in 1897 surgeon W Johann Mikulicz from University of Breslau, Poland and surgeon Paul Berger from France started wearing cap and gauze piece masks for covering nose, mouth, beard.⁶ In 1905 Alice Hamilton, a physician from Chicago published an article in the Journal of American Medical Association recommending mask wearing by doctors and nurses during surgeries for prevention of scarlet fever. Dr Wu Lien-teh from China prescribed the masks made of gauze and cotton as a prophylactic apparatus for prevention of Pneumonic plague in 1910.⁶ Masks were used routinely in operation theatre

during 1920s. Facemask became an essential component for the inhabitants of Yokohama & Tokyo, Japan in 1923 when the sky was filled with residual ash from Fukushima reactors damage caused by Kanto earthquake. During influenza epidemic of 1934 infected people also used masks for precaution purpose. Disposable paper masks were manufactured during 1930s and single use synthetic masks were increasingly made in 1960s. Later on filtering masks made of non-woven synthetic fibres was the first choice of doctors.⁶

Community mask wearing reduces transmission of viruses by preventing infected persons from exposing others through coughing, sneezing or even talking from near distance. It has been found that more than 50% of these persons are in the pre symptomatic phase or never develop any symptoms which is very alarming.^{1,7-9} Masks block exhalation of virus-containing droplets into the air which is known as source control. Most of these droplets are smaller than 10µm in diameter and known as aerosols. These small droplets and the dried particles which are called droplet nuclei can remain suspended in the air for a prolonged period while larger droplets fall out of the air rapidly. At indoor enclosed spaces with poor ventilation system where an infected person is present for prolonged time like the lecture gallery, conference room, corporate offices, cinema hall, even the shopping mall or departmental stores, the concentrations of these small droplets can build sufficiently to transmit infection by landing on exposed mucous membranes of the eye, nose and mouth of healthy persons. Recent laboratory experiments showed multilayer cloth masks could block 50% to 70% of exhaled small droplets and particles.^{7,9,10} Cloth mask's filtration capacity is highly dependent on its design, fitness and materials used. It is imperative that the user must be educated on the different types of masks available, how and when to wear them and how to handle them correctly.

Mask wearing can become uncomfortable specially for longer period in warm environments. Covering the nose and mouth may inhibit verbal and nonverbal communication among children and deaf persons. Although, children aged

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7 to 13 years have been shown to be able to make accurate inferences about the emotions of others with partially covered faces. The US Food and Drug Administration has recently approved transparent surgical mask which may be helpful in such circumstances.^{5,11,12} Depending on the design, masks can increase the lung's dead space. In extreme cases, carbon dioxide retention (hypercapnia) can occur as side effect.¹³

International and National health organizations have adopted divergent policies on the subject. Recently, the Centers for Disease Control and Prevention (CDC) and the European Center for Disease Prevention and Control (ECDC) have advocated the use of non-medical face mask for personal protection.¹⁴

Health officials have recommended that medical-grade face masks, such as respirators, be prioritized for use only by medical personnel to prevent the shortage of supply for this product. Meanwhile, cotton masks are recommended for the use of public. Since COVID-19 pandemic of 2020, the World Health Organization (WHO) recommends that tourists, employees, students and other healthy persons should wear masks, when two meters of social distance cannot be maintained. Not only COVID but other air borne virus diseases and allergens can be easily prevented by simply wearing masks while going outside from home. As a strategy of respiratory infection control, it is the prime duty of policy makers to encourage general population for mask wearing practice. People should be also advised about the correct procedure for using mask by touching only the string, not the barrier part. Also some people repeatedly open and close nose by lowering masks and put them in chin, these behaviours lower the protective capability of masks and there is chance of infection. Hence it is advocated that concerned authorities should popularize wearing masks in correct procedure as regular practice.

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