



Short Communication

To Mask, or Not to Mask?

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Abstract

Objectives: The main objective of this commentary is to provide an updated insight into the wearing of facemasks and its effectiveness as a public health measure to prevent the spread of coronavirus disease 2019. **Study Design:** Current data on masks as protective equipment and new mask guidance was surveyed, as provided by different studies and reports from different countries. **Methods:** The authors identified several key publications on indications about the utility of facemask wearing were introduced across affected countries since the beginning of the COVID-19 pandemic. **Results:** Despite the constant lack of consistency in facemask wearing policies, empirical observations back up that facemasks have proven to be beneficial for protection of both healthcare workers and the public to prevent COVID-19 spread. **Conclusions:** When masks are worn and combined with other recommended mitigation measures, they protect not only the most vulnerable population, but the whole community. Recommendations for masks will likely keep varying as more is learned about various mask types and as the pandemic evolves. With the emergence of more transmissible SARS-CoV-2 variants, it is even more important to adopt widespread mask wearing until effective levels of vaccination are achieved.

Background

Over one year into the pandemic, among the variety of public health and hygiene measures that have been gradually adopted worldwide, the most visually noticeable is the wearing of facemasks. Different, mandatory or voluntary, practices, and contradictory indications about the utility of facemask wearing were introduced across affected countries. Across Europe, face masks have been adopted as one of the measures to reduce the COVID-19 spread, despite the fact that wearing masks in Europe is not common or familiar, and it is often only associated with some Asian or Middle East countries [1], where its use is deeply connected to social and cultural practices, as well as political, ethical, and health-related concerns, personal, and social meanings [2]. At the beginning of the pandemic, there was a lack of consistency among political leaders and experts, who advised against the use of facemasks by the public due to a sense that their potential risks, such as self-contamination, could outweigh the potential benefits, and that public use, would lead to depletion of the supply needed for healthcare workers. Experts then shifted their thinking about potential benefits of masks to include protecting others against infection with SARS-CoV-2 (source control); similar to how surgical masks in the operating room protect patients. However,

self-protection is the main reason why infection prevention and control experts recommend healthcare workers to wear a facemask when entering a patient's room who may have a viral respiratory infection. With COVID-19, however, facemasks have proven to be beneficial for protection of both healthcare workers and the public. This has since been backed up by empirical observations. Epidemiological evidence from Cochrane [3] or the World Health Organization point out that, for population health measures, we should not generally expect to be able to find controlled trials, due to logistical and ethical reasons, and should therefore instead seek a wider evidence base. Therefore, we should not be surprised to find that there are no randomised clinical trials for the impact of masks on community transmission of any respiratory infection in a pandemic.

Framework and Transmission Characteristics

While there remains much uncertainty around the true effectiveness of facemasks-especially when factoring in differences in mask types, levels of adherence, and patterns of human behaviour-there is evidence to confirm that masks can provide a measure of protection and containment for respiratory viruses [3]. Systematic reviews of facemask use suggest relative risk

(RR) reductions for infection ranging from 6-80%, including for betacoronavirus infection (e.g., COVID-19, SARS, MERS). For COVID-19, this evidence is of low or very low certainty because it is derived from observational studies with important risk of various biases, or indirect evidence from randomised studies of other (non-betacoronavirus) respiratory viruses with methodological limitations. Only one observational study has directly analysed the impact of mask use in the community on COVID-19 transmission that looked at the reduction of secondary transmission of SARS-CoV-2 in households by facemask use. It found that facemasks were 79% effective in preventing transmission, if all household members used them prior to symptoms occurring. The study did not look at the RR of different types of mask. In a systematic review sponsored by the World Health Organization [4], physical distancing, facemasks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 were studied, observing that facemask use could result in a large reduction in risk of infection. However, the review included only three studies of mask use outside healthcare settings, all of which were of SARS, not of SARS-CoV-2, and were too underpowered to draw any conclusions [5-7]. Another study found the use of masks was strongly protective, with a risk reduction of 70% for those that always wore a mask when going out [8], but it did not look at the impact of masks on transmission from the wearer. It is not known to what degree analysis of other coronaviruses can be applied to SARS-CoV-2. None of the studies looked at the RR of different types of mask [2].

Source Control

Laboratory studies have demonstrated the efficacy of masks and other fabrics as a barrier to small particles and microbes. Surgical and N95 masks limit and redirect the projection of airborne whereas filtration efficiency, which may correlate with containment, has been estimated to be 80% for fitted surgical masks against small particles, or up to 96% against microbes [2,3]. Surgical masks were three times more effective than homemade masks, though droplet transmission from infected individuals wearing the latter was nevertheless reduced. Generally, however, the theoretical protective effect of masks may be diminished by a number of factors: compliance and effective use may be inadequate, masks may not be replaced frequently enough to prevent contamination, and finally, COVID-19 infection may even occur via alternative routes, such as ocular transmission. Nevertheless, the best evidence for airborne (or aerosol) transmission of COVID-19 is from outbreaks and through the detection of virus in air samples [9,10]. What is meant by airborne or aerosol transmission is the inhalation of the smallest droplets by exposed individuals. This is the case whether the virus is contained in “ballistic” droplets emitted at close range from an infected person or in aerosolized particles over longer distances, minutes or more after leaving the source. Coughing has been associated with the highest aerosol emissions, with a peak concentration at least 10 times greater than the mean concentration generated by speaking or breathing.

Consequently, the wearing of masks-in addition to vigilant hand hygiene-has been put forth as a means to mitigate disease transmission, especially in healthcare settings [9]. Much research has indicated that masks can provide significant protection to the wearer, although proper mask fitting is critical to realizing such benefits [5-7]. Alternatively, masks can potentially reduce outward transmission by infected individuals, providing protection to others [10].

Implementation Considerations

From a public health perspective, it is important to emphasise the importance of other risk mitigation strategies, aimed at reducing the number, proximity, and duration of interpersonal contacts, respiratory and hand hygiene measures, and engineering measures in built environments. No single intervention, therefore, seems to give invulnerability to SARS-CoV-2. Therefore, future steps should include conducting high quality studies, including use of standardised cloth masks, for both the estimates of effects and contextual factors in tandem with ongoing evidence synthesis. Current best evidence includes the possibility of important relative and absolute benefits of wearing a facemask. As no intervention is associated with affording complete protection from infection, a combination of measures will always be required, now and during the next pandemic.

Individual and collective responsibility and trust in the institutions and in the official assessment of recommendations as to the adopted measures are crucial to build up a degree of epistemic agreement [5]. However, this relies on communicating certainty [7], of which very little has been seen during COVID-19 pandemic. Hence, the acceptance of official advice varied among countries, cultures, and political contexts, with some degree of contradiction.

Which is why the general public can't help but wonder, with or without a mask? It's a confusion exacerbated by changing rules that vary by countries, states, provinces or even neighbourhood, all while the very real threat of infection remains, in some places more than others. However, recent observations directly demonstrate that wearing of surgical masks or KN95 respirators, even without fit-testing, substantially reduce the number of particles emitted from breathing, talking, and coughing. While the efficacy of cloth and disposable masks is not as clear and confounded by shedding of mask fibers and the importance of regular changing of disposable masks and washing of homemade masks is mandatory for its correct use, observations indicate it is likely that they provide some reductions in emitted expiratory particles, in particular the larger particles ($>0.5 \mu\text{m}$) [10].

In the case of being fully vaccinated, the Centres for Disease Control and Prevention in the U.S. recently recommended that people vaccinated against the coronavirus resume wearing masks in schools and in public indoor spaces in parts of the country where the virus is surging, marking a sharp turnabout from their advice just a few months ago.

On the other hand, the World Health Organization recommends on wearing masks, especially indoors, and making its use as a normal part of being around people. Vaccines are effective against the worst outcomes of infection, even with variants, and conditions have clearly improved since last year [9]. However, being in an area with a high number of new COVID-19 cases wearing a mask indoors in public and outdoors in crowded areas or when you are in close contact with unvaccinated people is highly recommended, especially in patients with other conditions [8,10].

Conclusions

In summary, it is therefore indisputable that mask wearing will reduce emission of virus-laden aerosols and droplets associated with expiratory activities and help in mitigating pandemics associated with respiratory disease such as COVID-19. Parallel to the principle of herd immunity for vaccines, the greater the extent to which the intervention-mask wearing -is adopted by the community, the larger the benefit to each individual member. The prevalence of mask use may be of greater importance than the type of mask worn. Recovery of the countries from the COVID-19 pandemic requires the combined efforts of their populations working together in unified public health action. When masks are worn and combined with other recommended mitigation measures, they protect not only the most vulnerable population, but the whole community. Recommendations for masks will likely keep varying as more is learned about various mask types and as the pandemic evolves. With the emergence of more transmissible SARS-CoV-2 variants, it is even more important to adopt widespread mask wearing until effective levels of vaccination are achieved.

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