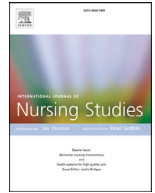




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## Letter

**Response to 'MacIntyre et al., 2020: A rapid systematic review of the efficacy of face masks and respirators against coronaviruses and other respiratory transmissible viruses for the community, healthcare workers and sick patient'**



Dear Editor,

With the rapid emergence of COVID-19, public health officials, companies, and individuals in the public have scrambled to find solutions to prevent and treat this fast-spreading virus, but because of the novelty of the virus, few data are available on the effectiveness of possible solutions. Consequently, we have sometimes had to rely on studies done on the prevention and treatment of other upper respiratory infections, such as influenza.

One popular practice for reducing the transmission of COVID-19, which has been widely recommended, is for people to wear face masks in public places and other venues where they will be in close proximity to other people. The equipoise about the effectiveness of face masks in these circumstances is in contrast to the well-established role of face masks to prevent the spread of viruses in hospital settings, especially with the use of N-95 face masks. MacIntyre and Chughtai (2020) present their findings of a systematic review of randomized controlled trials assessing the effect of face masks in the community to prevent the transmission of influenza and other influenza-like illnesses. They concluded that face masks could be effective at preventing COVID-19 transmission, based on the results of eight randomized studies.

However, upon closer inspection, their conclusion might be a bit optimistic. Here, we review issues of concern regarding the information they used to support their conclusion. These issues of concern fall primarily into several categories: favoring the results of a (possibly biased or spurious) sub-analysis over the null results of the primary/overall randomized analysis; relying on results of multiple testing with the possibility of experiment-wise error; and failure to separate the effects of hand hygiene from the effects of face masks.

In the MacIntyre et al. (2020) study, there was no beneficial effect of wearing face masks in the intention-to-treat population. The review reports that in the subgroup of people who were adherent, face masks were beneficial, but adherence was low (<30% by day five), resulting in a biased sample. Any difference seen may be because people who wore the face masks were notably different in other ways than those who did not wear them.

The two studies by Cowling et al., (2008/2009) (Cowling et al., 2009, 2008) are actually preliminary and final results of the same study, which did not find any difference between masks plus hand

hygiene and any of the other groups (hand hygiene or control group) in the primary analysis. They did do a sub-analysis, and they did find that both the hand hygiene group and the masks plus hand hygiene had less influenza (confirmed by PCR) than doing nothing (no difference between the two intervention groups), but when considering clinical symptoms, there was more influenza-like illness in the face mask group than in the hand hygiene only group. This suggests that face masks could actually increase virus transmission.

In another study by Aiello et al. (2010) there was no difference in rates of influenza-like illness between the face mask only group and the control group. However, there was a trend towards lower influenza-like illness with the addition of handwashing (in addition to masks), suggesting that it is the handwashing and not the masks that are lowering influenza rates.

In the study by Aiello et al. (2012) the use of face masks plus hand hygiene was no better at reducing rates of influenza-like illness than hand hygiene alone in the cumulative analysis. If looking at individual weeks, only the face mask plus hand hygiene group had significantly lower rates of illness in the later weeks, not the face mask only group, suggesting that it is the handwashing and not the masks that are lowering influenza rates.

Larson et al. (2010) did not find a significant benefit among the face mask and hand hygiene groups (there was no face mask only group) in incident rates of influenza. They did find a benefit in reducing the secondary attack rate, but they also reported that the hand hygiene group (not the face mask group) had fewer people in the household with influenza symptoms. Simmerman et al. (2011) likewise, did not find any reduction in influenza from the use of face masks or handwashing. In fact, they found a higher rate of influenza-like illness among both the handwashing group and the handwashing group plus face masks than in the control group.

Suess et al. (2012) did not find any differences in incident influenza or secondary attack rates in the overall analysis. They did do many sub-analyses, but caution should be practiced when interpreting the results, considering the experiment-wise error, which can lead to spurious results when multiplicity of testing is being done. The Sues et al., study is a good example of this when some of the sub-analyses indicate that face masks are beneficial in reducing incident influenza, but in other sub-analyses, it is the hand hygiene and not face masks that appear to reduce incident influenza.

Of the seven separate randomized studies MacIntyre and Chughtai include in their review, none of them show a benefit of face mask use in the community to prevent the incidence of respiratory viruses, and the results of the sub-analyses are equivocal, sometimes suggesting that masks prevent virus transmission but other times increase transmission. Based upon these studies, there is little evidence to show that face masks prevent influenza

and influenza-like illnesses. It may be that face masks for COVID-19 will have different outcomes, but we cannot know for sure until an adequately powered, well-conducted randomized trial is performed, one of which is set to be completed in July 2020 (<https://clinicaltrials.gov/ct2/show/NCT04337541>). In evaluating whether face masks work in the community in reducing respiratory viruses, there is biologic plausibility, which has led to wide-spread popularity. However, this enthusiasm does not justify incorrect/biased summaries of published articles.

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