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Physical interventions to interrupt or reduce the spread of respiratory viruses. Part 1 - Face masks, eye protection and person distancing: systematic review and meta-analysis

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Abstract

OBJECTIVE To examine the effectiveness of eye protection, face masks, or person distancing on interrupting or reducing the spread of respiratory viruses.

DESIGN Update of a Cochrane review that included a meta-analysis of observational studies during the SARS outbreak of 2003.

DATA SOURCES Eligible trials from the previous review; search of Cochrane Central Register of Controlled Trials, PubMed, Embase and CINAHL from October 2010 up to 1 April 2020; and forwardand backward citation analysis.

DATA SELECTION Randomised and cluster-randomised trials of people of any age, testing the use ofeye

DATA EXTRACTION AND ANALYSIS Six authors independently assessed risk of bias using the Cochrane tool and extracted data. We used a generalised inverse variance method for pooling using a random-effects model and reported results with risk ratios and 95% Confidence Intervals (CI).

RESULTS We included 15 randomised trials investigating the effect of masks (14 trials) in healthcare workers and the general population and of quarantine (1 trial). We found no trials testing eye protection. Compared to no masks there was no reduction of influenza-like illness (ILI) cases (Risk Ratio 0.93, 95%CI 0.83 to 1.05) or influenza (Risk Ratio 0.84, 95%CI 0.61-1.17) for masks in the general population, nor in healthcare workers (Risk Ratio 0.37, 95%CI 0.05 to 2.50). There was no difference between surgical masks and N95 respirators: for ILI (Risk Ratio 0.83, 95%CI 0.63 to 1.08), for influenza (Risk Ratio 1.02, 95%CI 0.73 to 1.43). Harms were poorly reported and limited to discomfort with lower compliance. The only trial testing quarantining workers with household ILI contacts found a reduction in ILI cases, but increased risk of quarantined workers contracting influenza. All trials were conducted during seasonal ILI activity.

CONCLUSIONS Most included trials had poor design, reporting and sparse events. There was insufficient evidence to provide a recommendation on the use of facial barriers without other measures. We found insufficient evidence for a difference between surgical masks and N95 respirators and limited evidence to support effectiveness of quarantine. Based on observational evidence from the previous SARS epidemic included in the previous version of our Cochrane review we recommend the use of masks combined with other measures.

Competing Interest Statement

Tom Jefferson (TJ) was in receipt of a Cochrane Methods Innovations Fund grant to develop guidance on the use of regulatory data in Cochrane reviews (2015-018). In 2014-2016, TJ was a member of three advisory boards for Boehringer Ingelheim. TJ was a member of an independent data monitoring committee for a Sanofi Pasteur clinical trial on an influenza vaccine. TJ is occasionally interviewed by market research companies about phase I or II pharmaceutical products for which he receives fees (current). TJ was a member of three advisory boards for Boehringer Ingelheim (2014-16) TJ was a member of an independent data monitoring committee for a Sanofi Pasteur clinical trial on an influenza vaccine (2015-2017). TJ is a relator in a False Claims Act lawsuit on behalf of the United States that involves sales of Tamiflu for pandemic stockpiling. If resolved in the United States' favor, he would be entitled to a percentage of the recovery. TJ is co-holder of a Laura and John Arnold Foundation grant for development of a RIAT support centre (2017-2020) and Jean Monnet Network Grant, 2017-2020 for The Jean Monnet Health Law and Policy Network. TJ is an unpaid collaborator to the project Beyond Transparency in Pharmaceutical Research and Regulation led by Dalhousie University and funded by the Canadian Institutes of Health Research (2018-2022). TJ consults for Illumina LLC on next generation gene sequencing (2019-). TJ was

respiratory infections). John Conly holds grants from the Canadian Institutes for Health Research, Alberta Innovates-Health Solutions and was the primary local Investigator for a Staphylococcus aureus vaccine study funded by Pfizer for which all funding was provided only to the University of Calgary for the conduct of the trial. All other authors have no interests to declare.

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Author Declarations

All relevant ethical guidelines have been followed; any necessary IRB and/or ethics committee approvals have been obtained and details of the IRB/oversight body are included in the manuscript.

Yes

All necessary patient/participant consent has been obtained and the appropriate institutional forms have been archived.

Yes

I understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance).

Yes

I have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if applicable.

Yes

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Lisa Mair • 9 months ago

I'm so reassured that others are noticing that their conclusion does not match what their data showed. I've seen this in several of the pro mask studies. Like in the Lancet mask study, authors admit that the data is low certainty of evidence and that there were confounding variables, but they still strongly recommend masks. The WHO recommends masks but then admits data is weak. It's very common. Do you think it's because of encouragement of a specific conclusion due to funding? It is well known that research usually favors the desired result of the

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