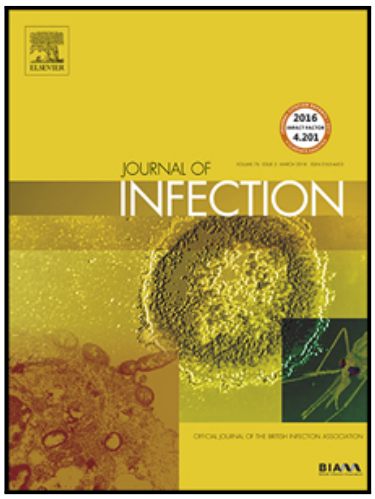

Mass masking as a way to contain COVID-19 and exit lockdown in low- and middle-income countries

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Highlights

- Proper use of face masks by the general public can curtail COVID-19 transmission
- The World Health Organization encourages countries to adopt mass masking policies
- Targeted strategies can increase face mask use even in resource-limited settings
- Impact of mass masking on COVID-19 transmission to be assessed via community trials
- Efficacy of surgical vs cloth masks for COVID-19 warrants further investigations

Mass masking as a way to contain COVID-19 and exit lockdown in low- and middle-income countries

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Key words: COVID-19; prevention; face masks; lockdown; Low- and middle-income countries; World Health Organization

Abstract

In new guidelines published on June 5th 2020, the World Health Organization (WHO) recommends that in areas with ongoing COVID-19 community transmission, governments should encourage the general public to wear face masks in specific situations and settings as part of a comprehensive approach to suppress COVID-19 transmission. Recent online surveys in 206,729 persons residing in nine low- and middle-income countries showed that 32.7%-99.7% of respondents used face masks with significantly differences across age groups and sexes. Targeted health promotion strategies and government support are required to increase mask use by the general population.

We read with interest the research work of Cheng and collaborators on community-wide mask use for Coronavirus Disease 2019 (COVID-19) control.[1] Indeed, face masks are now recommended by the World Health Organization (WHO) to prevent COVID-19 transmission, according to new guidelines published on June 5th 2020.[2] The new recommendations state that in areas with ongoing COVID-19 community transmission, governments should encourage the general public to wear masks in specific situations and settings where physical distancing cannot be achieved, as part of a comprehensive approach to suppress COVID-19 transmission.[2]

Long before the issuance of these guidelines, many Asian countries were already using face masks and this potentially contributed to the rapid containment of COVID-19 in these countries.[1,3] Outside of Asia, routine use of masks by the general population is rare. Most European countries were applying previous WHO recommendations whereby face masks were reserved for COVID-19 patients, carers or healthcare workers. Moreover, there were fears that promoting mass masking could aggravate the shortage of face masks among healthcare workers, especially as cloth (fabric) masks were not initially considered useful for COVID-19 prevention in Europe.[3] The Director-General of the Chinese Center for Disease Control and Prevention went as far as warning Europe and the United States of America (USA) regarding the risks of not enforcing routine wearing of face masks by the general public.[4]

Most low- and middle-income countries (LMIC) outside of Asia also initially deprioritised masks and focused on lockdown strategies in an attempt to “flatten the curve”. However, lockdowns are associated with major socio-economic losses, which may further exacerbate the precarious conditions in resource-limited settings, and thus compliance to such

strategies is implausible (particularly among populations who depend on daily labour for their income). Furthermore, in highly congested settings such as urban slums or refugee camp settings, lockdowns and/or measures of physical distancing are not feasible. The benefits of isolation-based strategies are also limited, given that pre- and asymptomatic individuals are potentially contagious for COVID-19.[5]

We thus welcome the WHO recommendations to use face masks in the general population, as an important component of strategies to stop the epidemic and/or exit the lockdowns, particularly in LMIC. Recent evidence supports a predominantly airborne transmission route for COVID-19, and strongly encourages face mask use in public to prevent inter-human transmission.[6] Modelling studies estimate that the COVID-19 pandemic can be brought to an end if 80% of the population would wear a surgical mask.[7] Moreover, mass masking could also alleviate fears that prevent people from seeking medical care for non-COVID-19 conditions, limiting the collateral damage of the COVID-19 pandemic. On the downside, improper mask use may inadvertently increase COVID-19 transmission via indirect contact routes with the mask serving as a fomite. Mass making may also produce a false sense of security leading to reduced adherence to other preventive measures such as hand hygiene.[3] Finally, surgical masks pose an environmental threat if discarded inappropriately due to their plastic content.[8] It is therefore paramount to monitor both compliance and user practices in ensuring the effectiveness of masks in COVID-19 control.

Between March and June 2020, an international consortium (www.ICPCovid.com) organised online surveys in LMIC to monitor adherence to COVID-19 preventive measures, including face mask use. Only data of consenting respondents who were at least 18 years old and who self-identified as either male or female were analysed

(n=206,729). Adherence to face mask use ranged from 32.7% to 99.7% in the surveyed countries during the ongoing pandemic (Table 1).

Table 1. Survey characteristics and overall adherence to mask use for COVID-19 prevention

Country	Period of the survey	Number of respondents	Median age in years (IQR)	Participants with a university degree: n/N (%)	Participants who reported using face mask: n/N (%)	Face mask use mandatory at the time of survey	Number of COVID-19 cases (and deaths)[d]
Brazil	April 3rd to 9th	25,103	48.0 (37.0 – 58.0)	22,383/25,103 (89.2%)	11,480/25,103 (45.7%)	No	1,313,667 (57,070)
Democratic Republic of Congo	April 23rd to June 8th	3,380	34.0 (27.0 – 44.0)	1,491/3,380 (44.1%)	1,404/3,252[a] (43.2%)	Yes[b]	6,826 (157)
Ecuador	April 1st to 7th	1,632	24.0 (21.0 – 37.0)	1,322/1632 (81.0%)	1,496/1,632 (91.7%)	No[c]	55,255 (4,429)
Mozambique	May 11th to 17th	3,770	33.0 (27.0 – 40.0)	2,596/3,770 (68.9%)	3,541/3,770 (93.9%)	Yes	859 (5)
Peru	June 5th to 11th	3,264	41.0 (29.0 – 53.0)	3,068/3,264 (94.0%)	2,988/2,997[a] (99.7%)	Yes	275,989 (9,135)
Somalia	April 21st to May 7th	4,116	22.0 (20.0 – 24.0)	3,812/4,116 (92.6%)	2,107/4,116 (51.2%)	No	2,878 (90)
Thailand	March 24th to 25th	161,580	43.0 (34.0 – 52.0)	NA	151,834/ 161,580 (94.0%)	Yes	3,162 (58)
Uganda	April 16th to 30th	1,713	34.0 (28.0 – 42.0)	1,655/1,713 (96.6%)	561/1,713 (32.7%)	No	833 (0)
Vietnam	March 31st to April 6th	2,171	28.0 (23.0 – 37.0)	1,676/2,171 (77.2%)	2,158/2,171 (99.4%)	Yes	355 (0)

[a] *Missing data on face mask use*
[b] *Mandatory face mask use was initially implemented only in Kinshasa (as from April 20th), and in other parts of the country during the month of May*
[c] *Face mask use was highly encouraged, but only became mandatory as from April 8th*
[d] *National statistics as of the 29th June 2020 (Available at: https://covid19.who.int/)*
NA: Not available

In countries where masking was mandatory or highly encouraged by the government during the early phases of the COVID-19 outbreak, adherence rates were >90%. In Brazil, the initial low adherence to face mask use together in combination with little or no confinement measures may have contributed to the high COVID-19 mortality in this country. Where data were available on the type of mask used, reusable cloth masks (more cost-beneficial and environmentally friendly than surgical masks) were the most frequent accounting for 4,413/8,636 (51.1%) of all mask types. Our study shows that even in countries where no pre-existing culture of mask use existed, high uptake of mass masking was feasible. The differential rate of uptake between sexes and age groups, as shown in Table 2, suggests that targeted health promotion strategies to (further) stimulate mask use may need to be developed, and that COVID-19 prevention strategies need to be contextualized to each setting/population.

Table 2. Age- and sex-stratified face mask use by participants

Continent	Country	Face mask use by age groups: n/N (%)				P-value[a]	Face mask use by sex: n/N (%)		P-value[a]
		18-25	26-40	41-60	> 60		Male	Female	
South America	Brazil	422/1,720 (24.5%)	2,227/6,618 (33.7%)	5,561/11,743 (47.4%)	3,270/5,022 (65.1%)	< 0.001	2,701/7,097 (38.1%)	8,779/18,006 (48.8%)	< 0.001
	Ecuador	842/935 (90.1%)	336/369 (91.1%)	288/295 (97.6%)	30/33 (90.9%)	< 0.001	578/642 (90.0%)	918/990 (92.7%)	0.054
	Peru[b]	424/425 (99.8%)	1,067/1,073 (99.4%)	1,184/1,185 (99.9%)	313/314 (99.7%)	0.229	1,086/1,090 (99.6%)	1902/1,907 (99.7%)	0.614
Asia	Thailand	13,511/14,413 (93.7%)	51,959/55,295 (94.0%)	75,059/79,834 (94.0%)	11,305/12,038 (93.9%)	0.629	42,177/44,828 (94.1%)	109,657/116,752 (93.9%)	0.217
	Vietnam	840/846 (99.3%)	910/910 (100%)	387/391 (99.0%)	21/24 (87.5%)	< 0.001	715/721 (99.2%)	1,443/1,450 (99.5%)	0.320
Africa	Democratic Republic of Congo[b]	256/667 (38.4%)	742/1,541 (48.2%)	347/915 (37.9%)	59/129 (45.7%)	< 0.001	696/1,128 (61.7%)	708/2,124 (33.3%)	< 0.001
	Mozambique	696/760 (91.6%)	1,975/2,094 (94.3%)	780/820 (95.1%)	90/96 (93.8%)	0.019	2,017/2,174 (92.8%)	1,524/1,596 (95.5%)	< 0.001
	Somalia	1,781/3,474 (51.3%)	297/589 (50.4%)	26/46 (56.5%)	3/7 (42.9%)	0.834	1,022/2,490 (41.0%)	1,085/1,626 (66.7%)	< 0.001
	Uganda	94/257 (35.8%)	303/964 (31.4%)	148/451 (32.8%)	18/41 (43.9%)	0.245	293/1,006 (29.1%)	268/707 (37.9%)	< 0.001

[a] *Chi Squared test*
[b] *Missing data on mask use*

A few points are worth noting when interpreting our findings: As this was an online survey, respondents were more likely to be young adults with a higher level of education; hence the results are not generalizable to the national population. Also, the cross-sectional nature of our surveys may not capture the rapid evolution of preventive measures and behaviour during this COVID-19 pandemic; indeed, the different time points of our surveys may influence the findings on mask use. For instance in Brazil during a second (n=4650) and third survey (n=1890), face mask use increased to 89.7% and 96.9% respectively following the government's progressive implication in ensuring mask wearing in public.

Many unknowns persist regarding the effectiveness of mass masking to prevent infection with respiratory viruses, including COVID-19. Results from cluster randomized controlled trials on the use of masks among young adults living in university residences in the USA indicated that face masks may reduce the rate of influenza-like illness, but showed no impact on the risk of laboratory-confirmed influenza.[9] A recently published meta-analysis demonstrated that either disposable surgical masks or reusable 12–16-layer cotton masks were associated with protection of healthy individuals within households and among contacts of cases.[10] So far, no trial has documented the added value of mass masking for COVID-19 prevention in a community-based setting, although this is suggested by observational reports.[1]

As there is currently no effective vaccine or treatment against COVID-19, the mass masking policy of the WHO is a prudent move for COVID-19 prevention. We therefore urge the public health and scientific communities to invest in strategies to promote mask use among all tiers of the population, and to further build the evidence-base for optimal COVID-19 prevention strategies.

Author Statements

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Author contributions

RC conceived the surveys and drafted the initial manuscript; JNSF cleaned and analysed the data, and edited the initial draft; All authors participated in data collection, critical review and approval of the final manuscript.

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