The COVID-19 pandemic and mask-wearing in Africa

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Background. Like the rest of the world, most West African countries have put strategies in place to fight the COVID-19 pandemic in progress. Among several strategies adopted is that of obliging people to wear a mask in public areas and within communities, which is not without risk.
Objective. To attract the attention of health authorities to the risks of the widespread use of masks by the general population, if the measures linked to their use are not scrupulously observed.
Methods. We used PubMed, the Cochrane Library, Google Scholar, the World Health Organization (WHO) databases, the National Collaborating Center for Environmental Health (CCNSE) of Canada and Public Health Ontario as databases. All available documentation making a link between the effectiveness or usefulness of wearing masks (medical or not) and this practice in public spaces, the community or the general population was analysed. The content was extracted, and then synthesised according to a descriptive and analytical method related to the theme.
Results. The majority of studies to date are unanimous in affirming that the promotion of the wearing of masks in public reduces contact transmissibility by reducing the amount of aerosols of certain bacteria and viruses emitted by people with or without symptoms. However, this is on the condition that measures related to the use of masks are scrupulously respected. In addition, to effectively fight against COVID-19, the use of masks must be combined with the practices of all other preventive measures.
Conclusion. This analysis recommends that the health authorities of African countries develop production guidelines, standardise these, use disinfection and/or reuse masks, based on our sociocultural realities.

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The coronavirus disease 2019 (COVID-19) pandemic in progress continues to spread around the world, directly or indirectly impacting communities.[1,2] Indeed, over three-quarters of the nations and territories of the world have been affected, and cases are identified daily in previously unaffected areas.[3] As of 26 May 2020, there were a total of 5 404 512 confirmed cases worldwide, with nearly 99 780 deaths (the American continent was then the most affected area, with 2 454 452 cases including 59 157 deaths), while Africa (the least contaminated continent so far) recorded 83 044 confirmed cases, including 3 042 deaths, spread across the continent.[4] Although data on 19-COVID are changing rapidly all over the world, the increase of confirmed cases and deaths in Africa seems to occur more slowly than in other world regions.[5,6] However, to further contain the spread of COVID-19, countries have implemented public health measures and strict social measures. Among them are restrictions on travel within and between countries, instructions to stay at home and closure of schools, shops and places of worship.[7]

Most West African countries, in addition to adopting the measures listed above, mandated the use of masks in the community and in public spaces, distributing information about how the masks should be used to the general population.

In a health emergency context, making the wearing of masks (medical or not) obligatory in public spaces seems logical to prevent infections by respiratory viruses, including COVID-19.[8] The World Health Organization (WHO), however, until proven otherwise, did not recommend mask-wearing for people who were not sick, because this could result in considerable risk.[8] However, it encourages countries to use masks in the community.[9] Faced with such a situation, one might ask whether promoting the wearing of masks in the community and in public spaces, as advocated by certain West African countries, constitutes a contributing factor to COVID-19 exposure. In other words, given the fact that the majority of people in Africa live in rural areas with low levels of education, might not mask-wearing constitute a source of dissemination of the virus, rather than containing or slowing its spread?

Methodology

We used the PubMed Central, Cochrane Library, Google Scholar and WHO databases, as well as Canada's National Collaborating Centre for Environmental Health and Public Health (CCNSE), Ontario, as data sources. Peer-reviewed scientific and review articles, as well as study reports that contained data on the usefulness or effectiveness of the use of fabric masks at community level, were selected.

The search keywords used were: (mask (MeSH terms) OR mask (all fields)) AND against (all fields) AND (COVID-19 (all fields) OR COVID-2019 (all fields) OR severe acute respiratory syndrome coronavirus 2 (supplementary concept) OR severe acute respiratory syndrome coronavirus 2 (all fields) OR 2019-nCoV (all fields) OR SARS-CoV-2 (all fields) OR 2019nCoV (all fields) OR ((Wuhan (all fields) AND (coronavirus (MeSH terms) OR coronavirus (all fields)) AND (2019/12 (PDAT) OR 2020 (PDAT)).

In accordance with the scoping study method,[10] we did not distinguish between studies or attempt to assign any weight to their data. The content of the selected works was extracted, and then synthesised according to descriptive and analytical methods related to the theme.

Results

After reviewing the research results, 23 studies were included in our review. We excluded articles that did not approach the subject from the desired angle of examination (i.e. link the efficiency or usefulness of wearing masks (medical or otherwise) and such use in public spaces, the community or the general population.

COVID-19 contamination pathways

Knowledge about the different modes of transmission of the novel coronavirus is essential to design prevention strategies. Several scientific studies have confirmed person-to-person transmission of COVID-19, mainly through droplets when an infected person coughs or sneezes, and by direct or indirect contact with the mucous membranes of the eyes, mouth or nose.[11-16] However, uncertainties remain regarding the role of transmission in asymptomatic people (with absence of significant symptoms such as coughing or sneezing).[16]

At the time of writing, there is no evidence indicating that COVID-19 is transmitted by air in community settings,[16] even if some authors, such as Li *et al.*,[12] discuss the possibility of aerosol transmission in a relatively closed environment with exposure to high concentrations of aerosol (in the context of a medical intervention that generates aerosols).

Furthermore, we must consider the essential question of the capacity of the new coronavirus to survive or be transmitted from surfaces. Some studies[8,16] have documented the presence of the SARS-CoV-2 virus (which causes COVID-19) on environmental surfaces touched by patients who test positive, without specifying its survival time in the environment. Moreover, although several case reports suggest vertical transmission of COVID-19 from mother to child, to date there is no evidence, and the series of cases reported to date suggest that this is not common.[16] In addition to these factors, a dog was recently infected through the nasal and oral cavity with a low viral load, without any signs of illness. It is believed to be the first case of human-to-animal transmission confirmed.[17]

Evidence regarding widespread use of masks by the general population

The lack of evidence on the effectiveness and usefulness of wearing masks as a preventative measure for COVID-19 in the general population continues to fuel controversy. The WHO maintains that 'healthy people should wear a mask when they are caring for another person who is suspected of having a COVID-19 virus infection'.[8,9,18] However, some authors[9,17] indicate that it is always better to use masks than not to use them at all.

Different types of masks

Although there is no universal classification in the literature, the CCNSE in Canada[18] identifies two main types of mask: (*i*) medical masks, including surgical or intervention masks and respirators (types N95, N99 and N100, and FFP2 or FFP3); and (*ii*) non-medical masks, including homemade cloth masks.

Each type of mask is associated with both advantages and disadvantages, as well as factors that need to be considered for their safe use. According to Ramakrishnan,[9] the N95 surgical mask is intended for single use, and should be discarded after 4 - 6 hours of continuous use, or discarded immediately if visibly dirty or wet. Surgical masks and respirators should never be washed with soap and water, nor disinfected with alcohol for reuse, because these practices neutralise the electrostatic charge of the filter layer and compromise its structural integrity, reducing its filtration efficiency. However, cloth masks can be washed with soap and water and reused as long as the tissue is intact.[9] Regarding widespread use of masks, O'Keeffe[18] in April 2020 noted that most recommendations on the generalised use of masks refer to cloth masks, while N95-type surgical masks are reserved for healthcare settings.

Potential advantages of the widespread use of masks in public

Although the wearing of a mask (medical or not) by healthy people living with a sick subject or in public spaces may potentially be beneficial in terms of prevention, there is no evidence at this time that it can prevent infections by respiratory viruses, including COVID-19.[8] Based on this observation, the option chosen by most West African states of mandating the wearing of masks in public spaces is not without risk.

Some authors[15] note that masks have two potential functions. They can protect the wearer from exposure, and/or protect other people from exposure to aerosols or respiratory droplets from the wearer of the mask (source control).

Due to the high contagiousness of COVID-19 even in asymptomatic or pre-symptomatic patients, the majority of studies to date are unanimous in stating that wearing a mask reduces transmissibility by contact, by reducing the quantity of aerosols transmitted by people with or without symptoms.[1,18-23] In this regard, the promotion of mask-wearing in public, especially in

the context of the COVID-19 pandemic, can only reduce the spread of the virus when measures related to the use of masks are scrupulously observed. If masks are used correctly, the decrease in transmission could significantly reduce the number of deaths, as well as negative economic and social impacts on the population.

Exposure factors to COVID-19 related to the improper use of masks

Whatever the type of mask, it must be used and disposed of properly if it is to be effective, and in order to prevent it from becoming a vector of transmission. In this context, it is important to develop an effective communication strategy to explain to people through clear messages what kind of mask to wear, when, and how to do so, as well as the importance of always strictly applying all other barrier measures (such as hand hygiene and physical distancing).[8]

If this is not done, mask-wearing, particularly in the West African context, marked by the rurality of the majority of the population and low levels of education, may be a source of virus spread rather than helping to contain it.

In this regard, exposure factors to COVID-19 related to the improper use of non-medical or cloth masks include:

- lack of hand hygiene: before touching the mask, hands should be washed with warm water and soap for at least 20 seconds, or be disinfected with hydro-alcoholic gel containing at least 60% alcohol
- inadequate conditions of the face: the surface of the face should be clean and dry, with hair pushed back to fully expose the face
- incorrect mask-wearing: the mask, with its attachments (cords or elastic), must be placed over the nose and mouth and attached to the head or ears; if necessary, it should be adjusted to completely cover the nose and mouth as well as the cheeks, so as not to leave gaps
- improper mask removal: removing the mask should be done with clean hands, while avoiding touching the front of the mask upon removal; it must then immediately be put in a covered bin or a plastic bag, making sure to close the bag tightly; after removal, hands must be kept clean (by washing with soap and water or with hydro-alcoholic gel)
- unsuitable conditions for cleaning and reusing the mask: for reuse, the mask should be washed by putting it directly into a washing machine using a hot cycle, then dried completely.

Note that masks that cannot be washed must be discarded and replaced as soon as they are wet or soiled. In addition, it is important to avoid touching the face after wearing a mask. Immediately wash hands with soap and water or an alcohol-based hand sanitiser (60% minimum alcohol).

The WHO has since updated its guidance and now advises authorities, in order to effectively prevent the transmission of COVID-19 in areas of community transmission, to encourage mask-wearing by the general public in specific situations and places, as part of a comprehensive approach to combating the transmission of SARS-CoV-2.[24]

Discussion

Mask-wearing is part of a set of specific anti-infectious measures to limit the spread of certain viral respiratory infections, including COVID-19. It can allow healthy subjects to protect themselves (in the event of contact with an infected person), as well as preventing subjects carrying viruses from transmitting them (source control).[24]

Far from discussing the quality or effectiveness of masks made in West Africa, or the legitimate ethical concerns around the mandatory use of masks at community level, our analysis focuses primarily on the issue of the use and the correct disposal of masks, a *sine qua non* condition in terms of the usefulness and effectiveness of community mask-wearing, especially in the West African context.

In reality, it is very difficult even for those countries with a culture that incorporates mask-wearing, such as in parts of East Asia, to strictly and rigorously enforce all measures relating to the use and disposal of masks as listed above, let alone for African countries.

Accordingly, Leung *et al*.[22] stress that it is not easy to achieve the recommended barrier measures, especially in Western cultures faced with the demands of maintaining the livelihoods of citizens and communities.

Given the pressing need to combine the use of masks with the practice of all other preventive measures to effectively combat COVID-19, some authors, such as Howard *et al*.,[19] strongly recommend trusting the ability of the general public to act responsibly, while empowering them through precise messages of awareness and information on the combination of the different preventive measures.

Decisions by governments and local authorities to recommend or impose the wearing of masks should be made based on local conditions, the availability of masks, resources and the preferences of the population.[24]

Conclusion

Despite the uncertainties around the usefulness and effectiveness of the massive use of masks in the community, this review analysis of the issue shows a potential benefit, however small, from such use during the epidemic phase of COVID-19. In addition to education on other barrier measures necessary to effectively fight COVID-19, promotion of mask-wearing at community level should be accompanied by clear information and awareness messages on the correct use and disposal of masks. Therefore, this articles recommends that health authorities in West African countries develop clear and applicable directives on the production, standardisation, use, disinfection and/or reuse of fabric masks for the general public, tailored according to our sociocultural realities.

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