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Use of homemade cloth masks in the face of the pandemic by COVID-19 in Brazil

Uso de máscaras de tecido caseiras frente à pandemia por COVID-19 no Brasil

Uso de máscaras de tela caseras frente a la pandemia COVID-19 en Brasil

COVID-19
SPECIAL EDITION

Fabio Leandro da Silva[1]

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[1] Federal University of São Carlos, Department of Hydrobiology, São Carlos, São Paulo, Brazil.

ABSTRACT

Introduction: Currently, the world is experiencing a COVID-19 pandemic. In view of the lack of manufactured face masks, Ministry of Health recommended the use of homemade cloth masks. In this study, it aims to discuss the efficiency, indication and care for the use of homemade cloth masks by the Brazilian population. **Outline**: A reflective analysis based on theoretical references available in search databases (Virtual Health Library, Web of Science, PubMed) and documents of Ministry of Health was conducted, without time filter, in order to obtain information about efficiency, indications and care for the use of cloth masks. **Results**: Studies to verify the effectiveness of cloth masks are still needed, but given the evidence found and lack of resources in the current scenario, the use of cloth masks may help reduce the number of new infections. **Implications**: It is necessary to provide proper instructions for the population on the utilization and disinfection of the item, as well as emphasizing the importance of social distancing, cough etiquette, hand hygiene and social isolation.

DESCRIPTORS

Personal Protective Equipment; Public Health; Precaution; Coronavirus.

Corresponding author:
Fabio Leandro da Silva
Address: Rod. Washington Luiz, s/n,
CEP 13565-905– São Carlos - SP, Brasil
Telephone: +55 ((16) 3351-8111
E-mail: fabioleodasilva@gmail.com

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INTRODUCTION

At the end of December 2019, China informed the occurrence of patients with a pneumonia of unknown cause in the city of Wuhan, province of Hubei.[1] Subsequently, there was an increased number of cases, and it was verified that it is a novel coronavirus (COVID-19), pathogen responsible by Severe Acute Respiratory Syndrome 2 (SARS-CoV-2).[2-3]

Considering the increase in cases outside China and the spread of coronavirus to other countries, World Health Organization (WHO) characterized the COVID-19 contamination in the global scenario as pandemic, on March 11, 2020.[4] The virus is highly contagious and its transmission occurs from person to person through droplets emitted by the infected one by coughing/sneezing as well as by means of touching contaminated surfaces, situations that make the microorganism come in contact with nose, mouth or eyes.[5-8]

Droplet and contact precautions are recommended to prevent the spread of COVID-19,[8] situation that demands the use of Personal Protective Equipment (PPE), among them the face masks. It is noteworthy that it is occurring a mass masking due to population panic, causing a shortage of surgical and medical masks.[9]

In Brazil, this scenario resulted in the shortage of surgical and medical masks, situation that led Ministry of Healthy[10] to recommend, on April 2, 2020, the use of homemade cloth masks. The advice available in electronic format recommends making of a double-sided mask, alerts people to the need for non-sharing of the item, its disinfection with bleach, time of use (i.e., two hours) and the categorization of this mask as physical barrier. In its turn, the Informative Note No. 3/2020-CGGAP/DESF/SAPS/MS classifies the cloth mask as a physical barrier and not as a PPE, as well as providing instructions on recommended cloths' ability to filter, two models to make masks, hygiene measures and use.[11]

The conduction of investigations in this sense contributes to clarification of occasional doubts and provision of scientifically based advice. Therefore, there is the need for more information on cloth mask, especially regarding care during its usage and its performance. After all, is cloth mask effective to prevent respiratory infections? The objective of this text is to discuss the efficiency, indication and care for the use of homemade cloth masks by the Brazilian population.

METHOD

EFFICIENCY OF HOMEMADE CLOTH MASKS

COVID-19 can severely affect individuals with chronic diseases and the elderly, the prevention of transmission and reduction in the number of new infected people are primary objectives.[12] The effect of physical interventions (i.e., surgical and medicals face masks) against respiratory infections among health professionals and the interruption of virus proliferation related to these diseases is supported by literature.[13-15]

Ministry of Health suggests that the population should make their masks, according to the descending order of the ability to filter, with the following clothes: (i) vacuum cleaner bag; (ii) cotton (55% polyester and 45% cotton); (iii) cotton cloth (100% cotton T-shirts) and (iv) antimicrobial pillowcase cloth.[11] The main purpose of cloth mask, according to the said normative, is work as a mechanical barrier and prevent the spread of droplets by the user, reducing the number of new cases of infection.

A study conducted with different kinds of clothes (cloth, sweater, T-shirt, towel, scarf)[16] sought to verify the respiratory protection of polydispersed aerosol. It was found that cloth masks showed instantaneous penetration levels between 40-90% because of the low filtering performance of the clothes, that are not projected for respiratory protection. The researchers pointed out that cloth masks provide marginal protection for the user against submicron aerosol particles, as well as they can serve

as a reminder to people not to touch their mouth or nose.

In another investigation,[17] researchers emphasize that simple and washable masks can be a solution when commercial masks are not available. These authors found a modest level of protection to the user when tested a cotton mask, reinforce the fact of handmade masks by "inexperienced users" may be less effective due to variations in material and assembly. In this sense, the recommendation of clothes by Ministry of Health[11] contributed to ensuring some protection to users, since it indicates the materials that should be used, fit on the face and cleaning for the maintenance of integrity.

Respirators (e.g., N95) provide 50 times more protection than homemade masks, but these can contribute by reducing population exposures to respiratory infections in the short term.[18] The filtration of a cloth mask depends on closeness of yarns, number of layers and type of cloth.[19] Moreover, it is important to note that cloth masks are less safe because they are more loose, by the way, their reuse may lead to contamination, and occasional discomforts may reduce adherence to them.[20-21] The respiratory pathogens present on the external surface of masks used contribute to self-contamination and this risk increases with the duration of use.[22]

The performance of cloth masks to retain particulate material (< 2.5 μm) and their marginal effect are known;[23] nevertheless, investigations are necessary for the use assessment by the general public, real efficiency and reuse.[20-21,24] In a small-scale study,[18] researchers found that surgical masks provide two times more protection than homemade masks, these showed an individual variation of protection and can be used on a large scale. Other researchers[25] verified that a homemade mask made of 4 layers of kitchen paper and one layer of cloth can block approximately 95% of influenza virus present in aerosols,[25] which can be useful to deal with COVID-19.

It is evident that the use of homemade cloth masks consists in an intervention to be implemented in conjunction with the other measures recommended by Ministry of Health (e.g., social distancing, cough etiquette, hand hygiene).

INDICATION OF USE OF HOMEMADE MASKS

World Health Organization (WHO) does not recommend the use of medical masks by people without respiratory symptoms and does not advice the use of cloth masks under any circumstances.[26] Also according to WHO, the health professionals and people with respiratory symptoms should use medical masks.[26] In its meta-analysis, a group of researchers[27] demonstrated that the use of N95 respirators should not be recommended to the general public, as these respirators when compared with surgical masks are not associated with a lower risk of respiratory infection and can cause discomfort.

Cloth masks consist in a physical barrier between the mouth-nose-external environment, depending on circumstances, their use may be worse than not using them.[28] In cases of pandemic and limited resource configurations, the use of cloth masks may be the only solution due to the high demand for surgical and/or medical masks, as they may contribute to reducing the exposure against aerosols and help control infections[20] by novel coronavirus. Physical barriers contribute to the reduction in the spread of respiratory viruses, along with other hand hygiene measures and social isolation.[15] People in quarantine can make use of cloth masks by leaving home or stay in a space where there are more movement of people;[11] however, recommendations are necessary, and other protective measures should be emphasized. Thus, the recommendations present in Informative Note No. 3/2020-CGGAP/DESF/SAPS/MS can be of great value.

Many cases of infection caused by this new virus are asymptomatic. In this sense, the mass use of homemade masks may help provide some protection against the virus transmission by these people, reducing the number of new cases of community COVID-19 infections.[29-30] The improper use of a mask

contributes to increasing chances of contamination. There needs to be proper adjustment, the mask should not be touched during its use, and care for preventing the contamination during the change/removal should be taken.[24,31]

By conducting a comparison of the effectiveness of cloth masks with medical masks in health professionals working in hospitals,[32] some researchers found that the insufficient filtration of cloth masks may result in greater infection risks due to: (i) moisture retention; (ii) high penetration; (iii) higher rates of microorganisms related to influenza-like illness; and (iv) reuse of cloth masks without proper hygiene.

Care to be considered in handling homemade cloth masks

In times of coronavirus, it is necessary to educate the population for the proper sanitation of food and promotion of personal hygiene to control the infection.[7,25] In this case, the hand hygiene, the use of Personal Protective Equipment and cough etiquette adopted by health professionals[33] are of great help. Concerning cough etiquette, the following measures are recommended: (i) cover the mouth and nose when coughing or sneezing with the help of a tissue; (ii) in absence of a tissue, use the arm to cover the mouth instead of hands; (iii) properly dispose of materials containing secretions and/or used to cover the mouth and nose; and (iv) always clean your hands after handling tissues, coughing or sneezing.[34]

In the literature, it is pointed out that simple decontamination methods can sanitize the cloth masks,[35] allowing their reuse. The decontamination methods should remove the virus, not compromise the integrity of mask and not be harmful to the user.[35] Ministry of Health recommends immersing the mask in a container with drinking water and bleach (2–2.5%) during 30 minutes, adopting the proportion of 1 part of bleach for 50 parts of water.[11]

To use a face mask, it is important that hand hygiene occurs before putting on and adapting the mask, and in its removal, hand hygiene should occur before and after.[35] Hand hygiene should be performed with water and soap in the presence of dirt, or alcoholic solution (70%) when there is no visible dirt.[36] Furthermore, the masks should cover the mouth and nose area, adjust to cheek contour, not leave spaces between the face, and the item should be changed in case of humidity.[37]

CONCLUSION

A protective mask can reduce the probability of infection, but it does not eliminate the risk, especially when a disease has more than one transmission route. Thus, any mask, no matter how efficient the filtration is or how good the seal is, will have a minimum effect if it is not used in conjunction with other preventive measures. Although there is still the need for studies conducted on a large scale and focused on verification of efficiency of cloth masks in the face of the novel coronavirus, their usage can help decrease the transmission and work as a mechanical barrier. In the face of COVID-19 pandemic and given the need to avoid occasional contamination because the use of cloth masks, it is necessary to provide detailed and updated instructions according to scientific studies for the population on the proper use of these items and care to be adopted in making, utilization, removal and discard. It is prudent to keep emphasizing the importance of hand hygiene, cough etiquette and the proper disinfection so that the pathogen transmission route breaks. Also, it is necessary to conduct efforts so that the idea that the mask is “magic” does not prevail in popular imagination and only its usage contributes to non-occurrence of contamination.

RESUMO

Introdução: Atualmente, o mundo está vivenciando uma pandemia de COVID-19. Diante da falta de máscaras faciais fabricadas, o Ministério da Saúde recomendou a utilização de máscaras de tecido caseiras. Neste estudo, objetiva-se discutir sobre a eficiência, a indicação e os cuidados acerca do uso de máscaras de tecido caseiras pela população brasileira. **Delineamento:** Uma análise reflexiva apoiada em referências teóricas disponíveis em bases de busca (Biblioteca Virtual em Saúde, *Web of Science*, PubMed) e documentos do Ministério da Saúde foi conduzida, sem filtro de tempo, no intuito de obter informações sobre eficiência, indicações e cuidados acerca do uso das máscaras de tecido. **Resultados:** Pesquisas para verificar a eficácia das máscaras de tecido ainda são necessárias, mas diante da das evidências encontradas e falta de recursos no atual cenário, o emprego da máscara de tecido pode auxiliar na redução de novas infecções. **Implicações:** É preciso fornecer orientações adequadas para a população acerca da utilização e desinfecção do item, bem como ressaltar a importância do distanciamento social, da etiqueta respiratória, da higienização das mãos e do isolamento social.

DESCRITORES

Equipamento de Proteção Individual; Saúde Pública; Precaução; Coronavirus.

RESUMEN

Introducción: El mundo está experimentando actualmente una pandemia de COVID-19. En vista de la falta de máscaras faciales fabricadas, el Ministerio de Salud recomendó el uso de máscaras de tela caseras. Este estudio tiene como objetivo discutir la eficiencia, la indicación y el cuidado con respecto al uso de máscaras de tela caseras por la población brasileña. **Delineación:** Se realizó un análisis reflexivo respaldado por referencias teóricas disponibles en las bases de búsqueda (Biblioteca Virtual en Salud, Web of Science, PubMed) y documentos del Ministerio de Salud, sin filtro de tiempo, con el fin de obtener información sobre eficiencia, indicaciones y atención sobre el uso de máscaras de tela. **Resultados:** Todavía es necesaria la investigación para verificar la efectividad de las máscaras de tejido, pero dada la evidencia encontrada y la falta de recursos en el escenario actual, el uso de máscaras de tejido puede ayudar a reducir nuevas infecciones. **Implicaciones:** Es necesario proporcionar una orientación adecuada a la población sobre el uso y la desinfección del artículo, así como enfatizar la importancia de la distancia social, la etiqueta respiratoria, la higiene de las manos y el aislamiento social.

DESCRIPTORES

Equipo de Protección Personal; Salud Pública; Precaución; Coronavirus.

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COLLABORATION

The author is responsible for the idealization, development, final review of the work and for the content of this manuscript version to be published.

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There are no conflicts of interest to declare.