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Cloth masks in public places: an essential intervention to prevent COVID-19 in Brazil

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Abstract *There is increasing evidence that the use of masks is an indispensable protective measure against COVID-19, given the high transmissibility of the new coronavirus through the respiratory system, including by asymptomatic individuals. The use of cloth masks in public places has been established as a protective measure to be adopted alongside social distancing and hand hygiene. This narrative review aims to systematize the scientific evidence that informs the widespread use of cloth masks as a preventive measure against COVID-19 and to describe the evolution of positions contrary to or in favor of its use outside the home, in view of the advance of the new coronavirus pandemic globally. The scientific articles, technical notes, governmental decrees and other documents analyzed indicate that widespread use of masks has the potential to reduce the spread of the new coronavirus. We recommend that the Brazilian government adopt strategies to increase the supply of reusable cloth masks to the public, especially to vulnerable populations and to support studies on the impact of this measure to control the pandemic in the country. Finally, it is imperative to ensure that use of masks does not exacerbate stigmatization of racial groups that already face prejudice.*

Key words *Cloth masks, Homemade masks, COVID-19, SARS-CoV-2, Novel coronavirus*

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Introduction

Since the emergence of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), there has been much debate on how best to control the pandemic in both the media and the scientific literature. The principal mechanism of human-to-human transmission of the novel coronavirus is known to be through inhalation of droplets generated from the nose or mouth of infected individuals by breathing, speaking, coughing or sneezing, irrespective of whether or not these individuals are ill or asymptomatic. In addition, the virus is able to remain viable and infectious in aerosols for up to three hours and on hard surfaces for up to 72 hours[1-3].

Because of the prolonged viability of the virus on some materials in the environment, and therefore the additional possibility of SARS-CoV-2 being transmitted through contact with contaminated surfaces[2,4], the initial recommendations to avoid dissemination of the disease involved extensive social distancing and regular, effective handwashing[5-8]. In the case of symptomatic patients or those who tested positive for SARS-CoV-2, the recommendation was self-isolation at home with quarantining of their respective contacts[9].

As the pandemic advanced, the widespread use of facemasks in public spaces (commercial establishments, parks, the workplace, public transport, etc.) began to be discussed as a further means of protection, based on the accumulated experience of other countries in previous epidemics[10]. The debate in favor of this proposal gained ground due to the role of asymptomatic, oligosymptomatic and presymptomatic individuals in disseminating the disease[11-13], in view of the evidence that the incubation period associated with COVID-19 is long[14-16] and the understanding that the viral load is high in the initial stage of the disease[12,17-19].

The adoption of a universal policy on the use of disposable facemasks during the pandemic would lead to a demand that would be difficult to meet, resulting in shortages of protective equipment for healthcare professionals and other habitual users[20,21]. At the beginning of April, the World Health Organization (WHO) issued a recommendation that the use of disposable masks should be limited to healthcare professionals, immunosuppressed individuals, and suspected or confirmed cases of the novel coronavirus. The WHO also warned that there was a lack of evidence supporting the widespread use of masks made from other materials[9]. It was only on June 5, 2020 that the WHO issued guidelines on the use and fabrication of cloth masks to protect against COVID-19 and began to recommend their widespread use in places where transmission of the virus was high and in situations in which social distancing is impossible such as on public transport[22].

The objective of the present paper was to perform a review of the literature about the efficacy of the use of cloth masks in public places for the prevention of COVID-19 and to describe the changes in opinion regarding their use outside the home as the novel coronavirus pandemic spread worldwide.

Methods

This narrative review initially involved a search for papers on the use of masks in the context of the new coronavirus published in the Medline database (PubMed), which includes peer-reviewed scientific publications[23], and the database Scielo, as well as preprints available in the MedRxiv databases, which are together the largest and most important repository of biomedical scientific literature.

To select relevant papers, we searched for the keywords "*mask and covid*" or "*mask and coronavirus*" or "*mask and covid-19*" or "*mask and covid19*" in the titles and abstracts of papers published up to June 12, 2020. Original articles, editorials, letters to the editor, comments and literature reviews in Portuguese, English or Spanish were included as long as the entire paper was available. Articles with data referring only to the use of surgical masks (TNT and similar), respiratory masks (N95, FFP2) and disposable masks; those dealing with masks designed to cover parts of the face other than the respiratory tract (e.g., eye masks and face shields) and those dealing with the use of masks exclusively by healthcare professionals were excluded from the review.

In addition to the scientific papers selected for inclusion, official state and federal documents implemented in Brazil, including decrees, statutes and state legislation available on LegisWeb[24], an online platform; technical notes from the Brazilian Ministry of Health and from the Brazilian National Health Surveillance Agency (ANVISA); and regulations adopted in other countries regarding the use of cloth masks in public spaces during the COVID-19 pandemic were also included. For adoption of cloth masks by other

countries, information was obtained through the website of *Masks4All*[25], a non-governmental organization that gathers information on mask usage across the globe. All sources were consulted before June 12th.

A quantitative synthesis of the most important findings from the selected articles was conducted, based on the following extracted data: authors, journal, title, publication date, type of publication, and authors' recommendation regarding whether or not to use cloth masks as a means of preventing and controlling COVID-19 (Chart 1). The authors' viewpoints were classified as: i) favorable; ii) no opinion or iii) opposed. The temporal evolution of these viewpoints was analyzed.

Additionally, we extracted information about the adoption and efficacy of cloth masks from the literature selected. A qualitative synthesis of these studies' main findings, the arguments that support authors' positions against or in favor of mask usage, as well as differences among countries was also conducted. In this way, all information obtained was synthesized and discussed based on existing published scientific evidence to date.

Chart 1. Selected articles on its position regarding the widespread use of cloth masks.

Author(s)	Journal	Title	Publication date (dd/mm/yy)	Type of publication	Position related to the adoption of the use of face mask
Leung et al.[26]	The International Journal of Tuberculosis and Lung Desease	Let us not forget the mask in our attempts to stall the spread of COVID-19	4-jan-2020	Editorial	Favorable of wearing masks in public places
Zhong et al.[27]	International Journal of Biological Sciences	Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey	15-mar-2020	Cross-sectional study	Favorable of wearing masks in public places
Adhikari et al.[28]	Infectious Diseases of Poverty	Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus disease (COVID-19) during the early outbreak period: a scoping review.	17-mar-2020	Scoping review	Favorable of wearing masks in public places
Leung et al.[29]	The Lancet	Mass masking in the COVID-19 epidemic: people need guidance	21-mar-2020	Commentary	Favorable of wearing masks in public places
Zhai[30]	Building and Environment	Facial mask: A necessity to beat COVID-19	23-mar-2020	Commentary	Favorable of wearing masks in public places
Liu and Zhang[31]	Influenza and Other Respiratory Viruses	Face masks and human-to-human transmission	29-mar-2020	Letter to editor	Favorable of wearing masks in public places
Ma et al.[32]	Journal of Medical Virology	Potential utilities of mask-wearing and instant hand hygiene for fighting SARS-CoV-2	31-mar-2020	Cross-sectional study	Favorable of wearing masks in public places
Worby and Chang[33]	medRxiv preprint	Face mask use in the general population and optimal resource allocation during the COVID-19 pandemic	7-abr-2020	Cross-sectional study	Favorable of wearing masks in public places

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Author(s)	Journal	Title	Publication date (dd/mm/yy)	Type of publication	Position related to the adoption of the use of face mask
Zhou et al.[34]	Journal of Medical Virology	Mask is the possible key for self-isolation in COVID-19 pandemic	8-abr-2020	Letter to editor	Favorable of wearing masks in public places
Javid et al.[35]	The BMJ	Covid-19: should the public wear face masks?	9-abr-2020	Editorial	Favorable of wearing masks in public places
Greenhalgh et al.[36]	The BMJ	Face masks for the public during the covid-19 crisis	10-abr-2020	Commentary	Favorable of wearing masks in public places
Wang et al.[37]	Infection Control & Hospital Epidemiology	The COVID-19 outbreak: The issue of face masks	13-abr-2020	Letter to editor	Favorable of wearing masks in public places
Han and Zhou[38]	Journal of Medical Virology	Possibly critical role of wearing masks in general population in controlling COVID-19	15-abr-2020	Commentary	Favorable of wearing masks in public places
Gandhi and Havlir[39]	Open Forum Infectious Diseases	The time for universal masking of the public for coronavirus disease 2020 is now	15-abr-2020	Literature review	Favorable of wearing masks in public places
Cheng et al.[40]	The Lancet	Wearing face masks in the community during the COVID-19 pandemic: altruism and solidarity	16-abr-2020	Commentary	Favorable of wearing masks in public places
Pleil et al.[41]	Journal of Breath Research	The scientific rationale for the use of simple masks or improvised face coverings to trap exhaled aerosols and possibly reduce the breathborne spread of COVID-19	17-abr-2020	Editorial	Favorable of wearing masks in public places
Cowling et al.[42]	The Lancet Public Health	Impact assessment of non-pharmaceutical interventions against coronavirus disease 2019 and influenza in Hong Kong: an observational study	17-abr-2020	Cross-sectional study	Favorable of wearing masks in public places
Desai and Aronoff[43]	JAMA	Masks and coronavirus disease 2019	17-abr-2020	Commentary	Favorable of wearing masks in public places
MacIntyre and Hasanain[44]	Journal of Travel Medicine	Community universal face mask use during the COVID 19 pandemic – from households to travelers and public spaces	18-abr-2020	Opinion article	Favorable of wearing masks in public places
Abd-Elsayed and Karri[45]	Anesthesia and Analgesia	Utility of substandard face mask options for health care workers during the COVID-19 pandemic	20-abr-2020	Literature review	Favorable of wearing masks in public places
Eikenberry et al.[46]	Infectious Disease Modelling	To mask or not to mask: Modeling the potential for face mask use by the general public to curtail the COVID-19 pandemic	21-abr-2020	Cross-sectional study	Favorable of wearing masks in public places
Thomson[47]	The International Journal of Clinical Practice	COVID-19: Leaving lockdown—Of Schrodinger, cats, testing and masks	21-abr-2020	Brief communication	Favorable of wearing masks in public places
Garcia[48]	Epidemiologia e Serviços de Saúde	Use of facemasks to limit COVID-19 transmission	22-abr-2020	Opinion article	Favorable of wearing masks in public places

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Chart 1. Selected articles on its position regarding the widespread use of cloth masks.

Author(s)	Journal	Title	Publication date (dd/mm/yy)	Type of publication	Position related to the adoption of the use of face mask
Chen et al.[49]	International Journal of Environmental Research and Public Health	Hand hygiene, mask-wearing behaviors and its associated factors during the COVID-20 epidemic: A cross-sectional study among primary school students in Wuhan, China	22-abr-2020	Cross-sectional study	Favorable of wearing masks in public places
Lee and You[50]	International Journal of Environmental Research and Public Health	Psychological and behavioral responses in South Korea during the early stages of coronavirus disease 2019 (COVID-19)	22-abr-2020	Cross-sectional study	Favorable of wearing masks in public places
Chiang et al.[51]	Emergent Infectious Diseases	The practice of wearing surgical masks during the COVID-19 pandemic	23-abr-2020	Letter to editor	Favorable of wearing masks in public places
Setti et al.[52]	International Journal of Environmental Research and Public Health	Airborne transmission route of COVID-19: Why 2 meters/7 feet of inter-personal distance could not be enough	23-abr-2020	Editorial	Favorable of wearing masks in public places
Cheng et al.[53]	Journal of Infection	The role of community-wide wearing of face mask for control of coronavirus disease 2019 (COVID-19) epidemic due to SARS-CoV-2	23-abr-2020	Cross-sectional study	Favorable of wearing masks in public places
Konda et al.[54]	ACS nano	Aerosol filtration efficiency of common fabrics used in respiratory cloth masks.	24-abr-2020	Cross-sectional study	Favorable of wearing masks in public places
Victor et al.[55]	EClinicalMedicine	A reality check on the use of face masks during the COVID-19 outbreak in Hong Kong	24-abr-2020	Cross-sectional study	Favorable of wearing masks in public places
Wu and Qi[56]	Genes and Diseases	Masks and thermometers: Paramount measures to stop the rapid spread of SARS-CoV-3 in the United States	25-abr-2020	Commentary	Favorable of wearing masks in public places
Wilson et al.[57]	Journal of Hosp Infect	COVID-19 and non-traditional mask use: How do various materials compare in reducing the infection risk for mask wearers?	26-abr-2020	Cross-sectional study	Favorable of wearing masks in public places
Sunjaya and Jenkins[58]	Respirology	Rationale for unversal face mask in public against COVI-20	30-abr-2020	Commentary	Favorable of wearing masks in public places
Ngonghala et al.[59]	Respirology	Mathematical assessment of the impact of non-pharmaceutical interventions on curtailing the 2020 novel Coronavirus	30-abr-2020	Cross-sectional study	Favorable of wearing masks in public places
MacIntyrea and Chughtai[60]	International Journal of Nursing Study	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 patients	30-abr-2020	Systematic review	Favorable of wearing masks in public places
Hoertel et al.[61]	medRxiv preprint	Lockdown exit strategies and risk of a second epidemic peak: a stochastic agent-based model of SARS-CoV-2 epidemic in France	5-mai-2020	Cross-sectional study	Favorable of wearing masks in public places

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Author(s)	Journal	Title	Publication date (dd/mm/yy)	Type of publication	Position related to the adoption of the use of face mask
Szczesniak et al.[62]	Brain, Behavior, and Immunity	Psychopathological responses and face mask restrictions during the COVID-19 outbreak: Results from a nationwide survey	7-mai-2020	Letter to editor	Favorable of wearing masks in public places
Kang[63]	Disaster Medicine and Public Health Preparedness	Lessons learned from cases of COVID-19 infection in South Korea	7-mai-2020	Cross-sectional study	Favorable of wearing masks in public places
Clements[64]	JMIR Public Health and Surveillance	Knowledge and behaviors toward COVID-19 among US residents during the early days of the pandemic: Cross-sectional online questionnaire	8-mai-2020	Cross-sectional study	Favorable of wearing masks in public places
Esposito and Principi[65]	European Journal of Pediatrics	To mask or not to mask children to overcome COVID-19	9-mai-2020	Literature review	Favorable of wearing masks in public places
Parry[66]	The BMJ	Covid-19: Hong Kong government supplies reusable face masks to all residents	11-mai-2020	Brief communication	Favorable of wearing masks in public places
Soto et al.[67]	Infection Control & Hospital Epidemiology	The feasibility of generalized face mask usage during the COVID-19 pandemic: a perspective from Latin America	11-mai-2020	Letter to editor	Favorable of wearing masks in public places
Huang et al.[68]	Journal of Medical Internet Research	Measures undertaken in China to avoid COVID-19 infection: Internet-based, cross-sectional survey study	12-mai-2020	Cross-sectional study	Favorable of wearing masks in public places
Harnoor et al.[69]	The Indian Journal of Pediatrics	Use of face masks in COVID-19	12-mai-2020	Letter to editor	Favorable of wearing masks in public places
Kashyap et al.[70]	Journal of Clinical Orthopaedics and Trauma	Fast and economic cardboard cutout use to increase compliance of face mask wear during COVID-19 pandemic	13-mai-2020	Brief communication	Favorable of wearing masks in public places
Matusiak et al.[71]	Dermatologic Therapy	Inconveniences due to the use of face masks during the COVID -19 pandemic: A survey study of 876 young people	14-mai-2020	Letter to editor	Favorable of wearing masks in public places
Ogoina[72]	The American Society of Tropical Medicine and Hygiene	COVID-19: The Need for Rational Use of Face Masks in Nigeria	15-mai-2020	Brief communication	Favorable of wearing masks in public places
Feng et al.[73]	Journal of Aerosol Science	Influence of wind and relative humidity on the social distancing effectiveness to prevent COVID-19 airborne transmission: A numerical study	18-mai-2020	Cross-sectional study	Favorable of wearing masks in public places
Noh et al.[74]	Journal of Korean Medical Science	Social distancing against COVID-19: Implication for the control of influenza	18-mai-2020	Brief communication	Favorable of wearing masks in public places
Gao et al.[75]	medRxiv preprint	The epidemiological characteristics of 2019 novel coronavirus diseases (COVID-19) in Jingmen, Hubei, China	21-mai-2020	Cross-sectional study	Favorable of wearing masks in public places

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Author(s)	Journal	Title	Publication date (dd/mm/yy)	Type of publication	Position related to the adoption of the use of face mask
Clase et al.[76]	Annals of Internal Medicine	Cloth masks may prevent transmission of COVID-19: An evidence-based, risk-based approach	22-mai-2020	Literature review	Favorable of wearing masks in public places
Chiang et al.[77]	International Journal of Surgery	Can universal masking help with our recovery from the COVID-19 pandemic?	23-mai-2020	Letter to editor	Favorable of wearing masks in public places
Goscé et al.[78]	Journal of Infection	Modelling SARS-COV2 spread in London: Approaches to lift the lockdown	24-mai-2020	Cross-sectional study	Favorable of wearing masks in public places
Middleton and Lopes[79]	The BMJ	Face masks in the covid-19 crisis: caveats, limits, and priorities	26-mai-2020	Letter to editor	Favorable of wearing masks in public places
Laestadius et al.[80]	JMIR Public Health and Surveillance	Online national health agency mask guidance for the public in light of COVID-19: Content analysis	26-mai-2020	Cross-sectional study	Favorable of wearing masks in public places
Liang et al.[10]	Travel Medicine and Infectious Disease	Efficacy of face mask in preventing respiratory virus transmission: A systematic review and meta-analysis	28-mai-2020	Systematic review and meta-analysis	Favorable of wearing masks in public places
Majeed et al.[81]	The BMJ	Can the UK emulate the South Korean approach to covid-19?	28-mai-2020	Editorial	Favorable of wearing masks in public places
Chan et al.[82]	International Journal of Environmental Res. Public Health	Sociodemographic predictors of health risk perception, attitude and behavior practices associated with health-emergency disaster risk management for biological hazards: The case of COVID-19 pandemic in Hong Kong, SAR China	29-mai-2020	Cross-sectional study	Favorable of wearing masks in public places
Han et al.[83]	Dermatologic Therapy	Increased flare of acne caused by long-time mask wearing during COVID -19 pandemic among general population	29-mai-2020	Letter to editor	Favorable of wearing masks in public places
Liu et al.[84]	Infectious Diseases of Poverty	Psychological status and behavior changes of the public during the COVID-19 epidemic in China	29-mai-2020	Cross-sectional study	Favorable of wearing masks in public places
Lee et al.[85]	Clinical Infectious Diseases	Impact of public health interventions on seasonal influenza activity during the SARS-CoV-2 outbreak in Korea	30-mai-2020	Cross-sectional study	Favorable of wearing masks in public places
Chu et al.[86]	The Lancet	Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: A systematic review and meta-analysis	1-jun-2020	Systematic review and meta-analysis	Favorable of wearing masks in public places
Liu[87]	Cyberpsychology, behavior, and social networking	COVID-19 information seeking on digital media and preventive behaviors: The mediation role of worry	4-jun-2020	Cross-sectional study	Favorable of wearing masks in public places
Jung et al.[88]	Clinical hemorheology and microcirculation	How we should respond to the Coronavirus SARS-CoV-2 outbreak: A German perspective	5-jun-2020	Cross-sectional study	Favorable of wearing masks in public places

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Author(s)	Journal	Title	Publication date (dd/mm/yy)	Type of publication	Position related to the adoption of the use of face mask
Li et al.[89]	Oral Diseases	Facial protection in the era of COVID-19: A narrative review	7-jun-2020	Literature review	Favorable of wearing masks in public places
Goh et al.[90]	Brain, Behavior, and Immunity	The face mask: How a real protection becomes a psychological symbol during Covid-19?	8-jun-2020	Literature review	Favorable of wearing masks in public places
Greenhalgh[91]	The BMJ	Laying straw men to rest: author's reply to "Urgency and uncertainty: covid-19, face masks, and evidence informed policy	8-jun-2020	Letter to editor	Favorable of wearing masks in public places
Wong et al.[92]	Transboundary Emerging Disease	Uncovering psychobehavioral implications of SARS-CoV-2 infection in Iran	8-jun-2020	Cross-sectional study	Favorable of wearing masks in public places
Zhang et al.[93]	Proceedings of the National Academy of Science of the United States of America - PNAS	Identifying airborne transmission as the dominant route for the spread of COVID-19	11-jun-2020	Cross-sectional study	Favorable of wearing masks in public places
Ho et al.[94]	Science of The Total Environment	Medical mask versus cotton mask for preventing respiratory droplet transmission in micro environments	11-jun-2020	Brief communication	Favorable of wearing masks in public places
Esposito et al.[95]	European Respiratory Journal	Universal use of face masks for success against COVID-19: Evidence and implications for prevention policies	18-jun-2020	Literature review	Favorable of wearing masks in public places
Dkhar et al.[96]	Indian Journal of Public Health	Knowledge, attitude, and practices related to COVID-19 pandemic among social media users in J&K, India	19-jun-2020	Cross-sectional study	Favorable of wearing masks in public places
Wang et al.[20]	European Review for Medical and Pharmacological Sciences	Mask crisis during the COVID-19 outbreak	3-jan-2020	Opinion article	No clear opinion on the use of masks in public places
Feng et al.[21]	The Lancet Respiratory Medicine	Rational use of face masks in the COVID-19 pandemic	5-jan-2020	Commentary	No clear opinion on the use of masks in public places
Wu et al.[101]	EClinicalMedicine	Facemask shortage and the novel coronavirus disease (COVID-19) outbreak: Reflections on public health measures	4-mar-2020	Literature review	No clear opinion on the use of masks in public places
Stone[102]	Nursing Health and Science	Editorial: Facemasks and the Covid-19 pandemic: What advice should health professionals be giving the general public about the wearing of facemasks?	12-abr-2020	Editorial	No clear opinion on the use of masks in public places
Chowdhury et al.[103]	Virusdisease	One month of the novel coronavirus 2019 outbreak: Is it still a threat?	20-abr-2020	Literature review	No clear opinion on the use of masks in public places
Amendola et al.[104]	"Microchemical Journal"	A rapid screening method for testing the efficiency of masks in breaking down aerosols	3-mai-2020	Cross-sectional study	No clear opinion on the use of masks in public places

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Author(s)	Journal	Title	Publication date (dd/mm/yy)	Type of publication	Position related to the adoption of the use of face mask
Kim[105]	Journal of Korean Medical Science	What type of face mask is appropriate for everyone-mask-wearing policy amidst COVID-19 pandemic?	8-mai-2020	Literature review	No clear opinion on the use of masks in public places
Lam et al.[106]	International Journal of Nursing Studies	Uncertainty surrounding the use of face masks in the community amid the COVID-19 pandemic	20-mai-2020	Letter to editor	No clear opinion on the use of masks in public places
King[107]	The BMJ	Covid-19: face masks could foster distrust and blame	20-mai-2020	Letter to editor	No clear opinion on the use of masks in public places
Cheng[108]	The BMJ	Covid-19: are face masks a good long term strategy?	20-mai-2020	Letter to editor	No clear opinion on the use of masks in public places
Lazzarino et al.[109]	The BMJ	Covid-19: Important potential side effects of wearing face masks that we should bear in mind	21-mai-2020	Letter to editor	No clear opinion on the use of masks in public places
Schroter[110]	The BMJ	Social distancing for COVID-19: is 2 metres far enough?	21-mai-2020	Letter to editor	No clear opinion on the use of masks in public places
Azlan et al.[111]	Plos One	Public knowledge, attitudes and practices towards COVID-19: A cross-sectional study in Malaysia	21-mai-2020	Cross-sectional study	No clear opinion on the use of masks in public places
Szepietowski et al.[112]	Acta Derm Venereologica	Face mask-induced itch: A self-questionnaire study of 2,315 responders during the COVID-19 pandemic	25-mai-2020	Cross-sectional study	No clear opinion on the use of masks in public places
Aggarwal et al.[113]	Indian Journal of Public Health	Facemasks for prevention of viral respiratory infections in community settings: A systematic review and meta-analysis	2-jun-2020	Systematic review and meta-analysis	No clear opinion on the use of masks in public places
Zhao et al.[114]	Nano letters	Household materials selection for homemade cloth face coverings and their filtration efficiency enhancement with triboelectric charging	2-jun-2020	Letter to editor	No clear opinion on the use of masks in public places
Garcia Filho et al.[115]	Epidemiol. Serv. Saude	Internet searches for measures to address COVID-19 in Brazil: a description of searches in the first 100 days of 2020	8-jun-2020	Cross-sectional study	No clear opinion on the use of masks in public places
Mahase[97]	The BMJ	Covid-19: What is the evidence for cloth masks?	7-abr-2020	Opinion article	Opposed wearing masks in public places
Szarpak et al.[98]	Cardiology Journal	Cloth masks versus medical masks for COVID-19 protection	10-abr-2020	Letter to editor	Opposed wearing masks in public places
Lazcano-Ponce and Alpunche-Aranda[99]	Salud Publica de Mexico	[Public health literacy in the face of the Covid-19 pandemic emergency]	18-abr-2020	Editorial	Opposed wearing masks in public places
Martin et al.[100]	The BMJ	"Face masks for the public during COVID-19 urgency and uncertainty: COVID-19, face masks, and evidence informed policy"	26-mai-2020	Letter to editor	Opposed wearing masks in public places

Results

Below, we present the results obtained through this narrative review, which is not intended to provide an extensive and detailed description of the existing literature, but rather to critically explore a theme where our understanding is still under development.

The search for papers revealed 450 articles, out of which 93[10,20,21,26-115] met selection criteria and were included in this review (Figure 1).

The manuscripts selected were classified according to the month and type of scientific publication (Figure 2). Within the period studied, April (n=33)[33-37,39-47,49-60,97-99,102,103,115] and May (n=35)[10,42,61-82,84,100,104-112,116] had the highest number of publications. Opinion pieces, editorials and commentaries were predominant up to April (n=25), after which cross-sectional and modeling studies began to prevail (Figure 2). Of the manuscripts analyzed, 49,5% were opinion pieces, commentary, letters and editorials; 34,4% were transversal studies; and 16,1% were literature reviews metanalysis[10,28,39,45,60,65,76,86,89,90,95,101,103,105,113] (Figure 2).

The papers were also classified with respect to their position on the widespread use of cloth masks (Figure 3). Of the scientific papers included (n=93), 77.4% (n=72) were favorable to the widespread use of cloth masks in face of the COVID-19 pandemic[10,26-96] and 4.3% (n=4)[97-100] were against its usage. It is important to highlight that all the papers that were against the use of masks were opinion pieces, commentaries, letters or editorials. Among those that were in favor of the widespread use of cloth masks were transversal studies (n=28)[18,27,33,42,46,49,50,53-55,57,59,61,63,64,68,73,75,78,80,82,84,85,87,88,92,93,96] and the literature reviews (n=10)[10,28,39,45,60,65,76,86,89,90,95], among 35 and 15 existing studies for these categories respectively (Chart 1). The first publications about the theme were divided among those discussing the potential implications of widespread use of masks on mask supply and on the recommendation for use of masks as an additional protective measure to prevent pandemic spread. From April onwards, recommendations of widespread use of masks grew from 9.72% (n=7)[18,26-31] to 90.28% (n=65)[10,33-96]. This difference can also be observed among countries (Figure 4), which began to recommend the use of cloth masks when outside the house from April onwards (the different dates in which countries adopted the measure can be assessed on Table 1).

The evolution of recommendations regarding the use of cloth masks to prevent the spread of COVID-19 throughout the course of the pandemic

As the COVID-19 pandemic advanced, discussions began to be held on the use of masks in public spaces as a public health intervention, with some favorable opinions[10,18,20,26-31,34,35,37,39-82,84-96,102,103,116–120] and some opposing views[97-100]. Opinions against the wide-

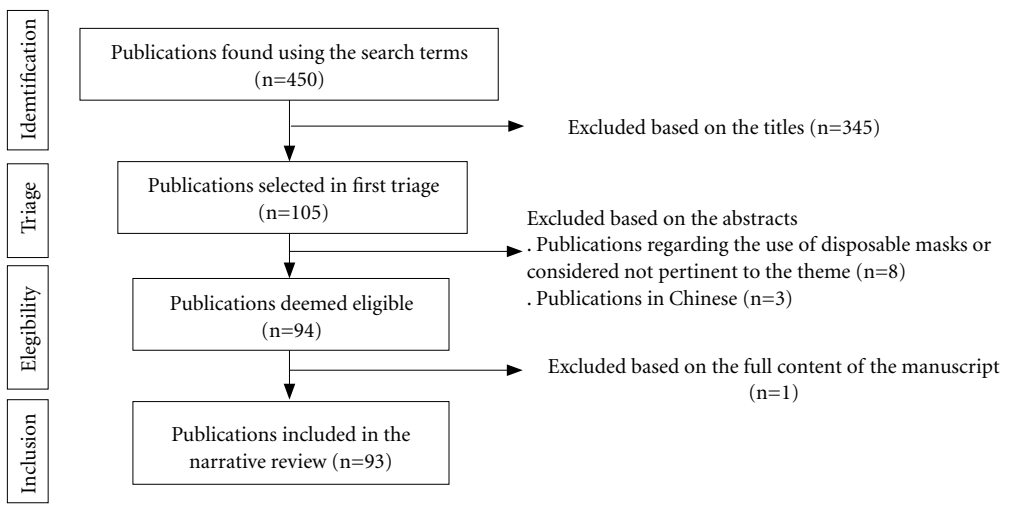

Figure 1. Flowchart illustrating the selection process for the articles included in this narrative review.

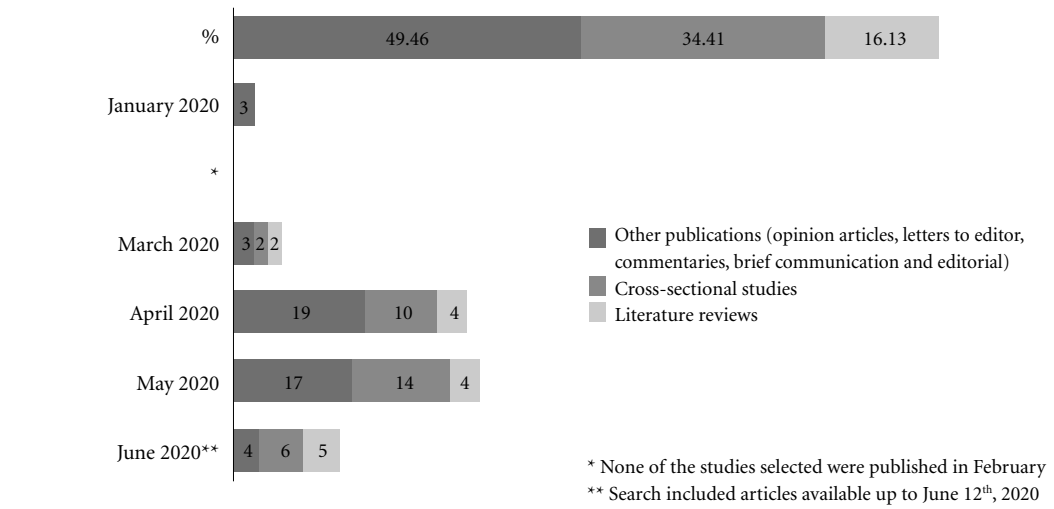

Figure 2. Types of scientific publications on the use of cloth masks to fight the pandemic by the month of publication.

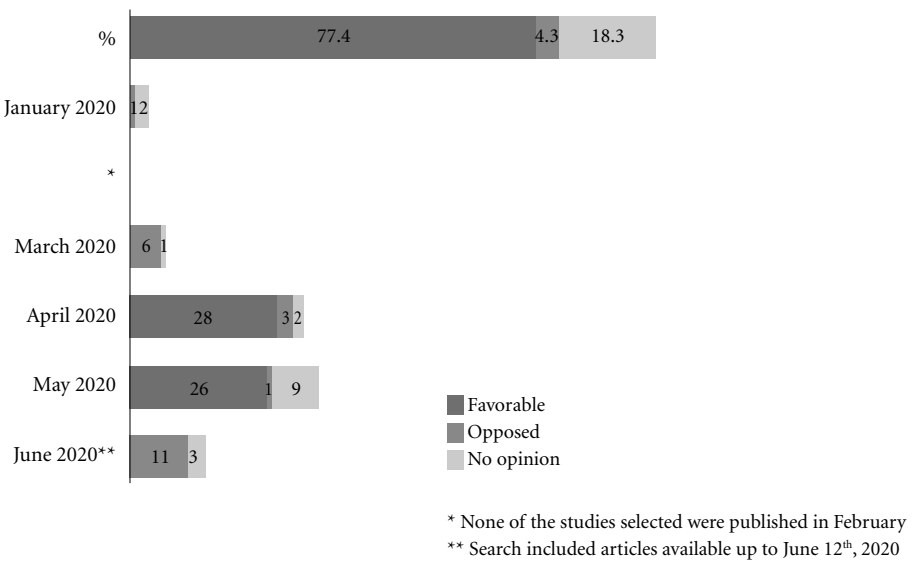

Figure 3. Positions of scientific publications on the widespread use of cloth masks to fight the pandemic by the month of publication.

spread use of masks[97-100] in public spaces were found mainly up to the first week of March and were based on suppositions that: i) this recommendation could result in the population relaxing social distancing measures[9,121]; ii) inappropriate handling and use of masks could increase the risk of transmission of the novel coronavirus[122]; iii) the increased demand for masks could aggra-

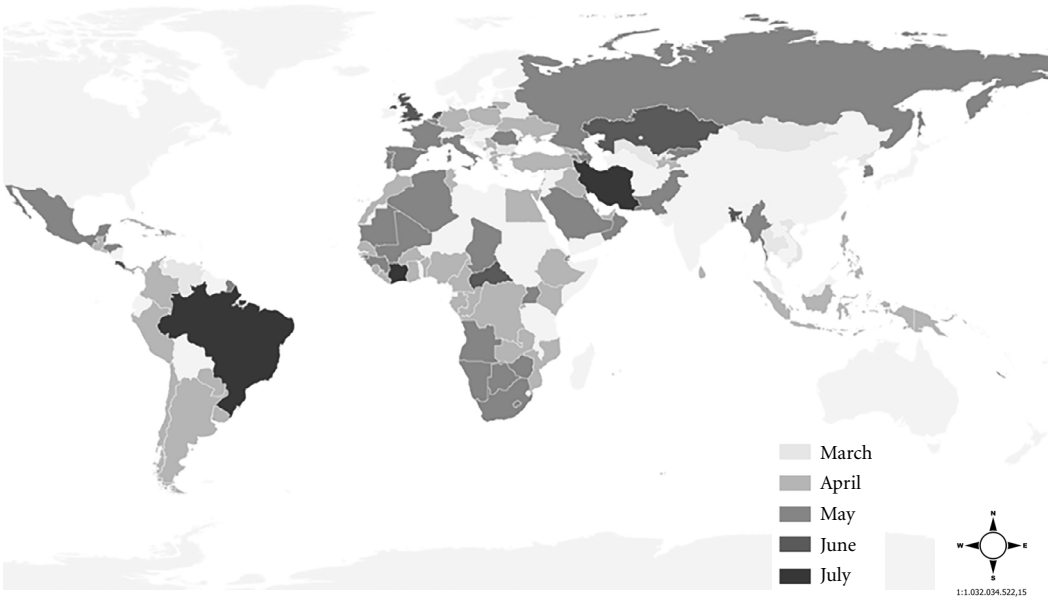

Figure 4. Countries that have regulated the use of masks in public spaces since the beginning of the pandemic.

Source: Adapted from Mask4All (https://masks4all.co/pt/).

Table 1. Chronological order of countries that officially decreed the use of face masks in public places*.

Country	Request date (DMY)
	March
Mongolia	14/03/2020
Vietnam	16/03/2020
Czech Republic	18/03/2020
Venezuela	18/03/2020
North Korea	19/03/2020
Uzbekistan	22/03/2020
Slovakia	25/03/2020
Thailand	25/03/2020
Bosnia and Herzegovina	29/03/2020
Slovenia	29/03/2020
Austria	30/03/2020
Bulgaria	30/03/2020

it continues

Table 1. Chronological order of countries that officially decreed the use of face masks in public places*.

Country	Request date (DMY)
	April
Israel	01/04/2020
Taiwan	01/04/2020
Cuba	02/04/2020
Philippines	02/04/2020
Turkey	03/04/2020
Colombia	04/04/2020
Indonesia	05/04/2020
Kenya	05/04/2020
Antigua and Barbuda	06/04/2020
Trinidad and Tobago	06/04/2020
Peru	07/04/2020
Ukraine	07/04/2020

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vate the shortage of surgical masks for healthcare professionals[18,21,69,121,123,124]; and iv) this recommendation could result in unscrupulous price increases. We highlight, once more, that the published materials that were contrary to the use of cloth masks by the general public were exclusively opinion pieces, commentaries and editorials, which did not present scientific evidence that

Table 1. Chronological order of countries that officially decreed the use of face masks in public places*.

Country	Request date (DMY)
Morocco	07/04/2020
Panama	07/04/2020
Tunisia	07/04/2020
Benin	08/04/2020
Chile	08/04/2020
El Salvador	08/04/2020
Ecuador	08/04/2020
Mozambique	08/04/2020
Bahrain	09/04/2020
Gabon	10/04/2020
Lithuania	10/04/2020
Sri Lanka	11/04/2020
Ethiopia	11/04/2020
Guatemala	12/04/2020
Honduras	13/04/2020
Cameroon	14/04/2020
Singapore	14/04/2020
Poland	16/04/2020
Andorra	18/04/2020
Guinea	18/04/2020
Dominican Republic	18/04/2020
Zambia	18/04/2020
Bahamas	19/04/2020
Liberia	19/04/2020
Rwanda	19/04/2020
Argentina	20/04/2020
Georgia	20/04/2020
Iraq	20/04/2020
Luxembourg	20/04/2020
Paraguay	20/04/2020
Senegal	20/04/2020
Jamaica	22/04/2020
North Macedonia	22/04/2020
Qatar	22/04/2020
Sao Tome and Principe	22/04/2020
Sierra Leone	22/04/2020
Ghana	23/04/2020
Uruguay	23/04/2020
Mauricio Islands	24/04/2020
Egypt	26/04/2020
East Timor	26/04/2020
Germany	27/04/2020
Burkina Faso	27/04/2020
Grenada	27/04/2020
Greece	27/04/2020
Lebanon	27/04/2020
United Arab Emirates	28/04/2020
Nigeria	28/04/2020
Serbia	29/04/2020
Montenegro	30/04/2020
Congo (Congo-Brazzaville)	30/04/2020
Saint Kitts and Nevis	30/04/2020
Tajikistan	30/04/2020
	May
South Africa	01/05/2020
Azerbaijan	01/05/2020
Belize	01/05/2020
Botswana	01/05/2020
Malta	01/05/2020
Zimbabwe	01/05/2020
Spain	02/05/2020
Equatorial Guinea	02/05/2020
Namibia	02/05/2020
Honduras	03/05/2020
Oman	03/05/2020
Italy	04/05/2020
Portugal	04/05/2020
Cape Green	05/05/2020
Lesotho	05/05/2020
Belgium	06/05/2020
Mauritania	06/05/2020
Uganda	06/05/2020
Chad	07/05/2020
Moldova	07/05/2020
Monaco	07/05/2020
Latvia	08/05/2020
Southern Sudan	08/05/2020
Angola	09/05/2020
Djibouti	10/05/2020
France	11/05/2020
Dominica	11/05/2020
Haiti	11/05/2020
Kyrgyzstan	11/05/2020
Russia	11/05/2020
Barbados	12/05/2020
Kuwait	12/05/2020
Myanmar (formerly Burma)	13/05/2020
Saint Lucia	13/05/2020
Guinea Bissau	15/05/2020
Romania	15/05/2020
Algeria	18/05/2020
Armenia	18/05/2020
Mali	20/05/2020
Mexico	20/05/2020
South Korea	26/05/2020
Spain	26/05/2020
Saudi Arabia	30/05/2020

it continues

Table 1. Chronological order of countries that officially decreed the use of face masks in public places*.

it continues

Table 1. Chronological order of countries that officially decreed the use of face masks in public places*.

Country	Request date (DMY)
Pakistan	31/05/2020
	June
Kazakhstan	01/06/2020
Netherlands	01/06/2020
Maldives	12/06/2020
Central African Republic	12/06/2020
Bangladesh	15/06/2020
United Kingdom	15/06/2020
Costa Rica	27/06/2020
	July
Ivory Coast	01/07/2020
Brazil	**03/07/2020**
Iran	05/07/2020

*Depending on the country, the request to use masks may vary from 'any' public place, to only specific public places, such as public transport, shopping malls, schools, among others.

Source: Mask4All (https://masks4all.co/what-countries-require-masks-in-public).

cloth mask use was ineffective in preventing the dissemination of the disease[97-100].

Evidence regarding the use of masks in public spaces to prevent the spread of respiratory infectious diseases

Studies conducted prior to the current pandemic had already confirmed the effectiveness of the widespread use of facemasks, including cloth masks, outside the home as a strategy for controlling the spread of infectious respiratory diseases[10,18,44,56,125,126], including SARS[127]. According to a study conducted in the United Kingdom[128], the effectiveness of the use of masks in combatting respiratory diseases depends on three main factors: i) the capacity of the mask to block the virus (its effectiveness); ii) the proportion of individuals wearing masks in public spaces (compliance with use); and iii) the rate of transmission of the disease.

Studies also suggest that, although their effectiveness is less than that found with surgical masks, cloth masks, if used properly, act as a mechanical barrier against transmission of the virus, preventing or reducing contact between individuals and contaminated droplets[18,57,104,105,125,126,129,130]. This reduction occurs because, if a contaminated droplet falls on the woven fabric of a mask instead of on an individual's mouth or nose, it tends to be retained in the fabric weave, hence reducing the number of contaminated droplets that reach the respiratory tract. By avoiding contamination of the user, cloth masks help defer the spread of the epidemic[38] and contribute towards establishing a longer and flatter epidemic curve[97]. Nevertheless, if the masks are positioned on users' faces inadequately, with open lateral spaces, for example, they can have their protective effect reduced by up to 60%[54].

Researchers at Duke University in the United States analyzed 14 types of mask to evaluate their effectiveness in protecting against respiratory droplets from speech. The results showed that, indeed, the N95 professional masks are the most effective (droplet transmission was reduced to less than 0.1%), followed by 3-layer surgical masks or cotton-polypropylene masks (droplet transmission reduced by 90% or more compared to no facial covering). Handmade cotton facemasks are the next most effective, offering good protection and eliminating 70-90% of droplets from speech, with a performance that is equivalent to that of N95 masks fitted with respiratory valves[131].

Also, with respect to the filtration efficiency of cloth masks, a study conducted in Taipei found no statistically significant differences in the concentration of aerosol particles in the 20-1,000 nm range in enclosed spaces (car and bedroom) following the presence of persons with influenza using 3-layer cloth masks versus those same individuals using surgical masks[94], suggesting that the filtration efficiency of both models was similar. In the United States, in view of the shortage of professional masks during the COVID-19 pandemic, the Centers for Disease Control and Prevention (CDC) even issued a recommendation for healthcare professionals not working directly with infected patients to use cloth masks[45].

Evidence regarding the use of cloth masks in public spaces to prevent COVID-19

In relation to the proportion of individuals who wear masks, there are considerable differences in the regulations adopted in different countries and regions and also in the compliance rates of the population with these measures, even when the use of masks is recommended. The compliance of individuals with the prevention

measure depends, among other factors, on the consistency of the information provided by the public authorities, the trust of the population in the public and health authorities and on the population's knowledge regarding the disease[132]. Nevertheless, at the end of March, around three months after the beginning of the pandemic, Laestadius et al.[80] evaluated the guidelines and information on the use of masks on the official sites of health agencies and ministries of 25 countries and reported a lack of standardization and alignment of the information provided to the public.

The first country to make the use of masks in public spaces obligatory was Mongolia on March 14, followed by Vietnam, Venezuela and the Czech Republic[133] (Table 1). Up to July 13, 2020, six months after the beginning of the pandemic, 129 countries had begun to recommend the widespread use of masks in public spaces, either in general or in a more restricted manner. In another 17 countries, the need to wear a mask was obligatory in only parts of the country (municipalities/states)[133]. Hence, of the 193 sovereign states, up to July 13, 146 had adopted the use of masks as a means of preventing the dissemination of COVID-19, highlighting the relevance of this measure from a public health viewpoint (Figure 4). According to Li et al.[89], the efficacy of mandatory use of cloth masks is one of the greatest lessons from this pandemic. Today, masks are considered to be able to reduce the severity of COVID-19, and to create the possibility that new infections are asymptomatic[134].

Some countries recommended the use of masks at the beginning of the pandemic even in the absence of consolidated scientific evidence on the effectiveness of the measure in reducing the rate of spread of the virus[81], possibly based on the precautionary principle, which is defined as a strategy for approaching issues of potential harm when extensive scientific knowledge on the matter is lacking. According to Greenhalgh et al.[36], this principle must be applied to relevant questions involved in protecting public health, particularly when cost-benefit analyses suggest few potential adverse effects and the possibility of achieving significant benefits[135].

The beneficial effects of the early adoption of cloth masks in some countries were evident in studies that compared the spread of COVID-19 in different regions and in those that screened for cases of SARS-CoV-2 infection. One transnational study, for example, compared the spread of the pandemic in Austria and the Czech Republic, with results suggesting the effectiveness of the use of masks in combatting COVID-19[128]. Both countries established social distancing requirements on the same date; however, only the Czech Republic simultaneously incorporated the obligatory use of masks. From then on, the number of coronavirus infections in Austria was seen to rise, while in the Czech Republic the epidemic curve remained long and flat. It was only when Austria also made the use of masks obligatory by governmental decree that the curves returned to similar trajectories[128].

Likewise, Cheng et al.[40] compared the course of the incidence of COVID-19 in Hong Kong with the course of the disease in another eight countries, and attributed the low contamination rate in Hong Kong to the universal and voluntary adoption of the use of masks by the majority of the population at the beginning of the pandemic (96.6% during the study). That same study traced some routes of transmission among the first 961 reported cases of the infection in Hong Kong, with findings showing eleven clusters of 113 patients in leisure spaces where masks were not used, including restaurants, karaoke lounges and fitness clubs, and revealing that only three clusters occurred in the workplace environment where masks were required[53]. Other epidemiological studies that followed transmission routes also concluded that transmission rates were lower in situations where masks were used[31,75].

Based on data from the spread of the pandemic in Italy and New York, both severely affected by COVID-19, Zhang et al.[93] showed that being obliged to cover the nose and mouth avoided more than 76,000 new cases of novel coronavirus infection in Italy and more than 66,000 in New York[93]. The measures that made the use of cloth masks obligatory in public spaces in the states of New York and Washington were adopted after predictive modeling indicated that the widespread adoption of masks, even the less effective ones, could reduce transmission of the novel coronavirus, helping flatten the epidemic curve and the mortality peaks[46,59]. According to other studies, the recommendation to maintain a physical distance of two meters from others in public places is only effective if the measure is associated with the use of masks[52,73] and the COVID-19 pandemic can only be contained if the majority of the population or, preferably, the entire population wears cloth masks in public spaces[21,118,128,136].

Brooks et al.[135] compared the use of masks with herd immunity obtained through vaccina-

tion, since the more people complying with this preventive measure in public areas where social distancing is impossible, the greater the community protection[135]. The same authors stated that the collective protection achieved with the use of cloth masks might reduce the number of new infections and avoid the interventions that are more disruptive to society such as closing commercial establishments and imposing lockdown - the public policy that requires citizens to stay at home.

Although several studies have indicated the effectiveness of masks in controlling the pandemic and despite the fact that a growing number of countries now require cloth masks to be used in public spaces, the rate of compliance by populations varies dramatically. Certainly, health authorities' recommendation to use masks influences the behavior of the population, as shown in a study, still in preprint stage, conducted in the United States. According to that report, there was a 12% increase in the use of masks among Americans in only five days following the announcement by the CDC[137]. Nevertheless, of all the studies included in this review, the highest rates of compliance with the use of masks were in the Asian countries that had a previous history of using this resource to control other infectious respiratory diseases and protect against air pollution[42,49,50,96,111].

The populations of South Korea and Singapore, for example, were already wearing masks in public spaces, particularly after the SARS outbreak in 2003, which made it simpler to carry over the measure to the backdrop of the SARS-CoV-2 pandemic. In South Korea, right at the beginning of the pandemic, over 60% of the population were already wearing masks[50]. In Hong Kong, the use of masks in public spaces increased from 74.5% to 98.8% among individuals interviewed between January and March 2020[42]. Various studies conducted in Hong Kong reported similar compliance rates of 97% to 99%[82], with the widespread use of cloth masks being considered one of the most effective strategies in combatting the pandemic in the region[42]. In China, compliance with the use of masks is over 80%[68,84,138]. In comparison, in India and Malaysia studies on the behavior of the population in relation to the pandemic showed lower compliance with masks, which were adopted by 70% and 51% of those interviewed, respectively[96,111].

The effectiveness of the use of cloth masks in controlling COVID-19 is well supported in the literature when implemented in conjunction with other measures aimed at combatting the pandemic such as effective hand washing and social distancing[86]. The use of cloth masks without the adoption of these other measures cannot, however, be interpreted by the public as a solution to the health crisis, since their efficacy remains controversial when other recommendations are not adhered to[60,113].

Evidence of the use of cloth masks to prevent COVID-19 in Brazil

In Brazil, an evaluation of online search patterns showed a peak in interest regarding coronavirus in the country on March 21 and considerable interest by the Brazilian population regarding the use of masks shortly after publication of the Ministry of Health guidelines[115].

The first two states of Brazil to officially require the use of masks in public spaces as an additional measure against the virus were Pará and Santa Catarina on April 16, followed by Minas Gerais, Amapá and Goiás[8] (Table 2). Already devastated by the pandemic, the state capital cities of Manaus and Rio de Janeiro did likewise by issuing municipal decrees on April 14 and April 18, respectively. Figure 5 shows the Brazilian states according to the month in which the obligatory use of masks in public spaces was officially decreed.

At federal level, the proposed bill number 1,562/2020, which made the use of masks obligatory in public spaces and in private spaces accessible to the public throughout the country for the duration of the state of calamity instituted due to the pandemic, was approved by congress on June 9 and referred for sanctioning by the president[139]. However, the president only sanctioned Law number 14,019 on July 2, 2020[140] by which time all the states in Brazil except for the state of Rio de Janeiro already required the use of masks in public spaces. Furthermore, the president vetoed important parts of the proposed bill such as the use of masks in public offices and buildings and in commercial and industrial establishments, religious temples, teaching institutes and other indoor spaces in which people gather. The presidency also excluded from the proposed bill the clause that increased fines for repeat offenders and those not wearing a mask in enclosed spaces[139]. In accordance with the text that was sanctioned, establishments will also not be obliged to supply masks free of charge to their employees and neither will the authorities be obliged to provide masks to populations in a sit-

Table 2. Date on which the Brazilian states sanctioned the mandatory use of masks in public places.

State*	Date (D/M/Y)
	April
PA[1]	16/04/2020
SC[2]	16/04/2020
MG[3]	17/04/2020
AP[4]	18/04/2020
GO[5]	19/04/2020
AC[6]	20/04/2020
MA[7]	20/04/2020
RS[8]	20/04/2020
PI[9]	22/04/2020
DF[10]	23/04/2020
PE[11]	23/04/2020
RO[12]	26/04/2020
MT[13]	27/04/2020
SE[14]	27/04/2020
PR[15]	28/04/2020
BA[16]	29/04/2020
	May
AL[17]	04/05/2020
RN[18]	04/05/2020
SP[19]	04/05/2020
TO[20]	05/05/2020
ES[21]	08/05/2020
AM[22]	13/05/2020
PB[23]	16/05/2020
MS[24]	18/06/2020
RR[25]	27/05/2020
CE[26]	30/05/2020
	June
RJ[27]	03/06/2020

*LegisWeb, available in: https://www.legisweb.com.br/.
Sources: [1] Decreto Nº 609, 16/04/2020; [2] Portaria SES Nº 251, 16/04/2020; [3] Decreto Nº 47918, 17/04/2020; [4] Decreto Nº 1539, 18/04/2020; [5] Decreto Nº 9653, 19/04/2020; [6] Decreto Nº 5496, 20/03/2020; [7] Decreto Nº 35746, 20/04/2020; [8] Decreto Nº 17099, 20/04/2020; [9] Decreto Nº 18947, 22/04/2020; [10] Decreto Nº 40648, 23/04/2020; [11] Decreto Nº 48969, 23/04/2020; [12] Decreto Nº 24979, 26/04/2020; [13] Decreto Nº 465, 27/04/2020; [14] Decreto Nº 40588, 27/04/2020; [15] Lei estadual Nº 20189, 28/04/2020; [16] Lei estadual Nº 14261, 29/04/2020; [17] Decreto Nº 69722, 04/05/2020; [18] Decreto Nº 29668, 04/05/2020; [19] Decreto Nº 64959, 04/05/2020; [20] Decreto Nº 6092, 05/05/2020; [21] Decreto Nº 4648-R, 08/05/2020; [22] Decreto Nº 42278, 13/05/2020; [23] Decreto Nº 40242, 16/05/2020; [24] Decreto Nº 15456, 18/06/2020; [25] Decreto Nº 28835-E, 27/05/2020; [26] Decreto Nº 33608, 30/05/2020; [27] Lei estadual Nº 8.859, 03/06/2020.

uation of socioeconomic vulnerability, contrary to what was stipulated in the original bill. It is important to emphasize that supplying masks to vulnerable populations or even to the entire population of cities or regions is a measure that has already been adopted by the governments of other nations[66] and in some Brazilian states such as Bahia, for example. For these and other reasons, the Brazilian government has been held up as an example of how not to proceed during a health crisis.

In the Brazilian context, the use of cloth masks as an additional protective measure against the COVID-19 pandemic is particularly relevant for socially vulnerable populations in view of the impossibility of adopting social distancing measures in various settings, e.g. in peripheral areas and slums and on public transport[34,39,40,42,46,59]. In general, when resources are scarce, provision of masks should be strategic, and prioritize at-risk groups, as well as suspected and confirmed cases of infection, to optimize the protective effect at population level[33]. On the other hand, we highlight the need to take into consideration the potential effects of adoption of this protective measure for certain segments of the population such as when singling out certain age groups, ethnicities or races. Specifically, we would like to draw attention to the possibility that the widespread use of masks by the black population exposes this social group to greater harassment from the police and to situations of prejudice and racial discrimination[141]; and that the widespread use of masks hampers non-verbal communication with groups with an already diminished ability to communicate such as the deaf and/or dumb[142].

Discussion

This narrative synthesis shows the rapid progress made in the acquisition of knowledge and the changes that have occurred in perceptions regarding this additional means of containing SARS-CoV-2 transmission, highlighting not only the prolific scientific contribution during the pandemic but also how COVID-19 has challenged the limits of knowledge. The large number of articles published daily and the low quality of many of these studies on this theme alongside the absence of observational studies about the correct use of masks, reveal the difficulties to produce scientific reviews in this moment when publications are increasing exponentially.

In face of the course of the pandemic and the evidence accumulated over recent months, the recommendation regarding the widespread use of cloth masks in public has been highlighted as

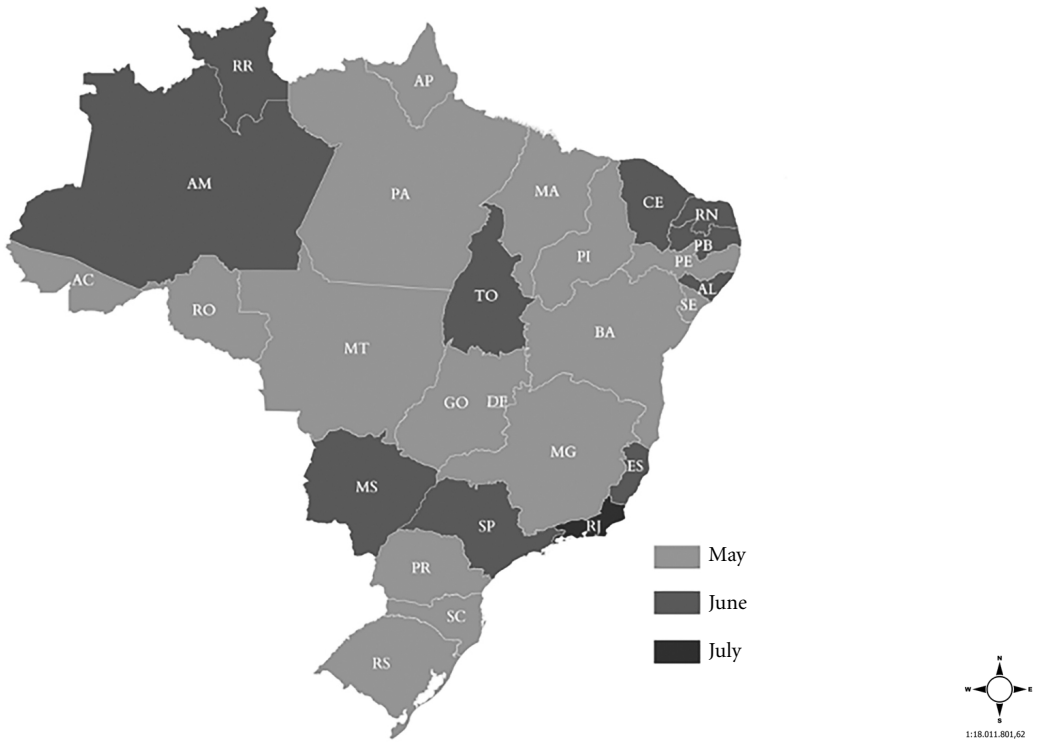

Figure 5. Brazilian states that have signed laws establishing mandatory use of cloth masks in public spaces by the month of the officially published decree.

Source: Site LegisWeb (https://www.legisweb.com.br/).

an important strategy to: i) reduce the spread of the novel coronavirus[26,29,35,39,40,42,46,48,51,54-56,58,59,135]; ii) reduce the possibility that disposable masks could be discarded inappropriately, resulting in a secondary source of infection of the disease[20,72,122]; and iii) help contain the transmission of other infectious/contagious diseases such as influenza[42,74,85,143]; reducing the burden of disease in the population, avoiding overwhelming the healthcare system and guaranteeing better healthcare for those who need it.

Therefore, widespread adoption of the use of cloth masks can also be considered an example of civic duty. It is a minor effort and a highly effective, low technology solution that can change the epidemiological trajectory of countries, improving national and global efforts to combat COVID-19[135].

This literature review allowed us to evaluate at national and international levels the importance of adopting cloth masks as an additional measure to prevent the transmission of SARS-CoV-2. Despite its broad scope, this review has a few limitations. First, the narrative review can be criticized by its less rigid structure, when compare to systematic and integrative reviews. Nevertheless, it is an adequate alternative to identify gaps in the literature and to critically explore understudied themes[144], and has the advantage that it could be completed in a short time, which matches the urgency of the theme. Second, the inclusion of pre-print manuscripts (such as the MedRxiv bibliographic database) that have not yet been peer reviewed can also be questioned, yet their inclusion was important in this manuscript as they too contributed to informing recommendations during the pandemic.

Evidence accumulated over the few months of this epidemic supports the hypothesis that the widespread use of cloth masks in public spaces represents a promising public health intervention that, in association with the preventive

measures of social distancing and hand-washing, contributes towards decelerating the spread of COVID-19, reducing the number of cases and the number of deaths. This evidence has been rapidly reflected in public policies as an increasing number of countries began to adopt the obligatory use of masks in public spaces. A study conducted in Germany showed that the use of masks was perceived by society as a social contract and that the mandatory use of masks was seen as more just than relying on voluntary use[145]. Many understood that the existing evidence already provides enough elements for an action based on the precautionary principle. In this specific case, this is an intervention that has the potential to be highly effective with a low risk of adverse effects[146].

In Brazil, where there is a shortage of disposable masks, where the capacity to test and screen suspected cases is limited and there is major urban overcrowding, with many homes lacking water supply and also being overcrowded, the use of cloth masks could be even more relevant in combatting the spread of the disease. Their use becomes essential, particularly in view of the slackening of social distancing measures and the implementation of strategies to promote a gradual return to activities[40,47,147], which have already begun to be discussed and implemented by public authorities despite the fact that the pandemic continues to ravage the country. The current previsions for post-pandemic scenarios suggest that the use of cloth masks in public spaces will constitute an important measure in slowing down a possible second wave of infection[61,78]. Furthermore, educational actions aimed at promoting the correct use of cloth masks as a new social norm are also required[35,90].

Therefore, coordinated actions are required from the public authorities to: i) support or develop strategies to increase production of masks and ensure their distribution to the public, including via donation to more vulnerable groups and those with fewer resources, as well as permitting the sale of masks in commercial establishments that are allowed to stay open during the pandemic; ii) encourage and increase the domestic production of cloth masks and production by self-employed seamstresses, guaranteeing fair working conditions, pay and health protection; and iii) guarantee that racial groups and socioeconomically deprived segments of the population are not stigmatized with the adoption of compulsory requirements to wear masks in public spaces.

Conclusion

Widespread use of cloth masks in public spaces is an effective health intervention when combined with social distancing and hand washing, and it has been adopted at greater or smaller scales across all continents with the advance of the pandemic throughout the world as it can contribute to reduce the transmission rates of SARS-CoV-2.

Cloth masks represent a cheaper, logistically viable option and one that is accessible to the general population, as well as being environmentally sustainable and an option that helps avoid depleting stocks of professional masks.

Collaborations

N Ortelan, AJF Ferreira and L Leite planned, carried out the search, sorting and synthesis of the articles, prepared the figures and tables and wrote the manuscript, also contributing as the first authors. JM Pescarini, AC Souto and ML Barreto helped to review the content. EML Aquino supervised the preparation of the document and carried out the critical review and final correction of the manuscript. All authors approved the final version of this manuscript.

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