Inequalities in Covid-19 messaging: A systematic scoping review

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Abstract

The impact of the Covid-19 pandemic has been widely documented. While deaths are now in the millions and many more have been impacted in other ways, the impact of Covid-19 has not been felt equally, with it exacerbating existing inequalities and disproportionately impacting a number of populations. With this Covid-19 has created unprecedented challenges in relation to health communication, with the need to reach disadvantaged populations. This systematic scoping review sought to 1) synthesise the existing research regarding communication inequalities in the response to the Covid-19 pandemic, and 2) analyse the recommendations that emerge from this body of evidence on how to best address these inequalities. This review includes 40 studies that fell into three broad groups (1) those revealing a disadvantage or inequality in studies of general population; (2) those focussing on communication with sub-groups disproportionately affected by the pandemic; and (3) those reporting and evaluating practical attempts to address inequalities. The results largely corroborate those found in past pandemics, highlighting the role of sociodemographic, cultural/religious, and economic factors in facilitating/jeopardising the public's capacity to access and act upon public health messaging. In a number of studies it was encouraging to see recommendations from the literature - particularly, lessons learnt on the importance of community partnerships, trusted messengers and the co-creation of health and risk messages - being applied, however many challenges remain unmet. Covid-19 has also highlighted the need to actively tackle misinformation, something which was recognised, but largely unaddressed.

Key words

Covid-19, pandemic communication, health and risk messaging, inequalities, message tailoring

Introduction

A little over two years after its identification, Covid-19 had claimed almost 5.7 million lives (WHO, 2022). The pandemic forced one of the largest changes to life in living memory, with billions hospitalised, countries locked down and an unprecedented strain placed on healthcare systems. Beyond its vast impact, Covid-19 has exacerbated existing inequalities, with several disparities identified in risk and outcomes amongst a number of groups, among others, those who are older, those from racial/ethnic minority groups, migrants, those from lower socioeconomic backgrounds and certain occupational groups, such as transport, health and social care workers. The pandemic has also "brought to the fore the centrality of communication" (Viswanath et al., 2020:1743) as a tool for implementing public health measures crucial for controlling the spread of Covid-19, such as non-pharmaceutical interventions (e.g., physical distancing or face covering), lockdown/quarantine interventions and, more recently, mass vaccination. With widespread (health) disparities across racial, ethnic, gender, geographic and educational lines and an increasingly diverse society the question arises: How to effectively communicate these measures to different segments of the population, particularly those from underserved communities and others disproportionately impacted by the pandemic?

Prior to the pandemic, there was a consensus among communication scholars and practitioners that groups with less social power such as minority language speakers, (forced) migrants and those living in poverty, may require targeted and tailored messaging to ensure they have equal access to health and risk information and are capable to act upon it (Koval et al., 2021; Lin et al., 2014; Ryan et al., 2021; Savoia et al., 2013; Vaughan & Tinker, 2009). Lessons learnt from previous pandemics also indicated a need to use trusted messengers, deploy a mix of communication channels and formats, and most importantly, to actively work with communities in the co-creation of effective communication strategies (e.g., Vaughan & Tinker, 2009). In the context of Covid-19, the challenge of inclusive and equitable communication has further been compounded by uncertainty regarding the course of the pandemic, an explosion of health and scientific information, the polarisation of target audiences, as well as the proliferation of dis/misinformation (Dan & Dixon, 2021).

Commenting on the relationship between broader societal inequalities and communication, Viswanath et al. (2020: 1744) have argued that “Covid-19 driven inequalities in economic, social and health sectors find a parallel in communication”, while Watson (2020: np) has noted that “Covid-19 presents a special problem […] as certain populations at increased risk of contracting and experiencing the worst effects of the virus are also at risk for inadequate health literacy”. Put differently, inequalities in health and communication operate together and exacerbate each other, often through mechanism in which access to information, literacy (be it in relation to a language, media, or health literacy) and trust play vital roles. With Covid-19 far from over, and the looming prospect of future pandemics, it is important to take stock and review the existing research in this area to inform both research and practice.

The aims of this scoping review are therefore twofold: 1) to understand what communication inequalities exist in the context of Covid-19 and which populations are (most) affected, and 2) to explore whether practices suggested in the past have been implemented to reach, engage, and communicate effectively with disadvantaged groups in the context of this pandemic. The review is not limited to one aspect of health communication but rather covers multiple facets, including research into exposure to different channels of health communication, information seeking, language, message framing, digital and health literacy, and trust in information sources. Inequality refers to differences, variations, and disparities in communication that had the potential to negatively impact groups defined by protected characteristics (age, race, ethnicity, religion and belief, and disability), gender, or socioeconomic disadvantage (e.g., low-income communities, homeless people).

Methods

This review followed a five-step process which included the definition of review questions, development of search strategy, study selection, data extraction, and synthesis (Arksey & O’Malley, 2005). The research process has been documented using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021).

Search strategy

A systematic search was conducted utilising four databases, Scopus, MEDLINE, CINALH and PsychInfo on 26 October 2021. The search syntax - which combines core concepts and terms related to Covid-19, health and risk communication, and inequalities - was tested and refined through several preliminary searches. The final search strategy is shown in Table S1 of the Supplemental Material. Our search yielded 1669 results; after removing duplicates (n = 258), 1411 records were retained for screening and eligibility assessment.

Screening and eligibility criteria

Title and abstracts were independently screened by EK and RE to identify potentially relevant publications. Disagreements (n = 17) were resolved by discussion. Studies were included if they had been peer reviewed and:

(1) focussed in whole or part on Covid-19 related risk and health communication, and
(2) reported empirical research that revealed inequalities in Covid-19 communication and/or set out to explore or address such inequalities.

Studies were excluded if they:

(1) investigated health messaging in relation to other respiratory diseases or health conditions (e.g. H1N1 and MERS);
(2) reported research into the health, economic and social impacts of the Covid-19 without reporting data on health and risk communication;
(3) investigated changes to interpersonal and institutional communication as a result of social distancing guidelines and/or Covid-19 related communication traffic (rather than health and risk messaging related to Covid-19).

Following the abstract and title screening, 90 studies were retained for full text assessment. Full-text articles were also retrieved for any records for which eligibility could not be determined based on the abstract and title. Where full text was not available, the corresponding authors were contacted. If an answer was not obtained following a reminder and a two-moth waiting period, the study was excluded (n = 6). Following the full text assessment, only those studies were retained that met the above outlined criteria in addition to containing extractable data about (in)equality in communication or message targeting to underserved groups defined either by protected characteristics (age, race, ethnicity, religion and belief, and disability), gender, or socioeconomic factors (e.g., low-income communities, homeless people). Disagreements at any stage were resolved through discussion.

The search strategy was updated and complemented on 12 January 2022 by hand searching selected journals of health communication (2020-2022) and by checking the reference lists of the retrieved papers, which yielded 6 additional records for full-text assessment. The full search and study selection process has been documented in Figure 1.

Data extraction and synthesis

Data extraction was undertaken by EK and RE. For 20 percent of studies, the data was extracted in duplicate by EK to ensure accuracy and consistency. The percentage of agreement was over 85% percent on all data extraction fields, which captured: the background (author, year, country and study aims), methods (study design, participants/sample size, demographics and Covid-19 impact for each sub-group where available), Covid-19 messaging (*who* is delivering the message to *whom*, *what* is the content of the messaging, *how* it is delivered, and who may be *disadvantaged*) and results and outcomes (including the reach, feasibility and acceptability of targeted Covid-19 health campaigns where available). The extracted data have been analysed using a narrative synthesis approach to bring together the findings of and draw conclusions from the reviewed body of evidence.

Results

Descriptive results

Our searches yielded 1675 references, of which 40 articles met the inclusion criteria. The majority of studies were carried out in the United States (n = 17), followed by China (n = 4) and the United Kingdom (n = 3). The geographical distribution of the remaining studies is shown on Figure 2. Much of this body of research focused on comprehensive public health guidance related to Covid-19 (i.e., advice for the public about preventive measures, common symptoms, restrictions, testing and vaccination), with some notable exceptions that had a much narrower focus: e.g., Higashi et al. (2021) (health information on Covid-19 and cancer), Blake et al. (2021) (accessing primary health care during the pandemic) and Montgomery et al. (2021) (hand hygiene among people experiencing homelessness). Following from the above, government and major healthcare bodies were the most common messengers, although messaging by faith leaders (e.g., Brewer et al., 2020), community organisations (e.g., Villani et al., 2021; Wieland et al., 2021), and physicians (e.g., Alsan et al., 2021; Torres et al., 2021) has also been researched in the context of the pandemic. The included studies also considered multiple channels of communication from radio and television broadcasts (e.g., Alvarez et al., 2021; Woko et al., 2020) through digital platforms (e.g., Cheng et al., 2021; Kusters et al., 2021) and emergency text alerts (e.g., You & Lee, 2021; Yu et al., 2021) to loudspeakers and door-to-door distribution (e.g., Feinberg et al., 2021; Kalagy et al., 2021).

From a methodological perspective, the included studies relied predominantly on qualitative methods (n = 21), mainly interviewing, focus group discussions, and case studies. 14 studies used quantitative methods - mostly cross-sectional surveys - to assess the reach of Covid-messaging and its reception by and impact on different population groups. This review also identified two studies that stood as outliers amongst the quantitative papers; a randomized controlled trial (Alsan et al., 2021; Torres et al., 2021) and a linguistic landscape study (Kalocsányiová et al., 2021). Lastly, five articles reported mixed methods studies. Overall, the studies enrolled a total of n = 48,454 participants, excluding articles in which the exact participant numbers were unclear. The reviewed studies were categorised according to the study population and aim and then divided into three groups: (1) studies of general population that revealed inequality; (2) studies of sub-groups disproportionately affected by the pandemic; and (3) studies of practical attempts to address inequalities[1]. We discuss the results from each group separately in the next sections.

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[1] Each paper was included in one group only.

Studies of general population that revealed inequality

Most studies in this group explored differences in public perceptions and attitudes towards Covid-19 messaging, often with the aim to assess the association between risk and health communication and the uptake of Covid-19 health advice (e.g., Alvarez et al., 2021; McCaffery et al., 2020; X. Wang et al., 2020; Yu et al., 2021). A few studies (e.g., Higashi et al., 2021) were primarily intended to measure the extent to which communication inequalities exist, however this was quite rare in the reviewed literature. The main characteristics of each study in this group are summarised in Table S2 of the Supplemental Material.

The studies were categorised according to the population groups they had identified as either lacking equal access to Covid-19 health and risk information and/or requiring tailored communications. The results revealed inequalities along race (Woko et al., 2020), language and ethnicity (Blake et al., 2021; Higashi et al., 2021; Kusters et al., 2021; Mayfield et al., 2021; McCaffery et al., 2020), and gender (Alvarez et al., 2021; Yu et al., 2021) among others. Differences were also noted in relation to the research participants' age (X. Wang et al., 2020), educational status (H. Wang et al., 2021), geographical location (Jarynowski & Skawina, 2021; Kalocsányiová et al., 2021), and chronic health conditions and disabilities (Blake et al., 2021; Fernández-Díaz et al., 2020).

There were three studies that explicitly considered the role of language selection in Covid-19 related communication (Higashi et al., 2021; Kusters et al., 2021; McCaffery et al., 2020). Higashi et al. (2021) conducted a multimodal document review study to assess the equity of online Covid-19 information available to Spanish- and English-speaking cancer patients from seven major healthcare providers in the Dallas-Fort Worth area (US), where around 20% of the population is Spanish speaking. The authors concluded that Spanish speakers lacked equal access in both diversity of Covid-19 content and access to further resources, "leaving an already vulnerable cancer patient population at greater risk" (Higashi et al., 2021: 9). A similar study was conducted by Kusters et al. (2021) who examined the local health department websites of the top ten largest US cities by population. This latter study also found discrepancies in the amount, quality, and navigability of Covid-19 information available in languages other than English. In another anglophone setting – Australia – a survey completed by McCaffery et al.

(2020) showed that respondents who reported speaking a language other than English at home (LOTE) experienced more difficulty in accessing and understanding government messaging than those who spoke English as their primary language. They were also more likely to endorse misinformation about Covid-19/vaccination. The same pattern of results was observed by McCaffery et al. (2020) among people with inadequate health literacy. The risk of excluding minority language speakers - including signers - from accessing crucial health information about Covid-19 was also noted by Blake et al. (2021) and Kalocsányiová et al. (2021).

Blake et al. (2021) analysed communications from government, media, and local general practitioner (GP) services in Te Papaioea (New Zealand) to understand how people were advised to seek care during lockdown. The study concluded that all three of these sources neglected the cultural and social diversity of the local population, in addition to relying primarily on access to telecommunications or the internet for their messaging. This further marginalised communities that were already disadvantaged, among them older people, Māori, Pasikifa, and people with chronic health conditions and disabilities. The promotion of health care seeking behaviours was also investigated by Mayfield et al. (2021) in a sample of community clinic patients in North Carolina (US). Black and Latino/Hispanic patients and people without a comprehensive insurance were identified as hard(er) to reach groups by the study authors, who acknowledged that existing barriers (such as digital poverty, lack of trust and a desire not to be contacted out of experiences of discrimination or fear of not being able to pay for healthcare) were likely to limit the impact of Covid-19 messaging campaigns. Trust in Covid-19 information sources – including mainstream and social media, public health authorities and the former US president (Donald Trump) – was also central to the study of Woko et al. (2020) who investigated potential contributors to vaccination intention among Black Americans.

Age, education, and gender also emerged as important factors, particularly in relation to exposure to risk and prevention messages (X. Wang et al., 2020), and the impact of messaging on individuals (Alvarez et al., 2021; H. Wang et al., 2021; Yu et al., 2021). Taking a closer look at some of the studies, X. Wang et al. (2020) showed that older, less educated Chinese men reported lower exposures to risk communication messages than the general population. Similarly, Yu et al. (2021)

detected age and gender differences in their study of emergency alert text messages in China. Their results were similar to those of You and Lee (2021), who found that engagement with emergency Covid-19 text messages was positively associated with both female sex and older age. Finally, Alvarez et al. (2021) also revealed a gendered pattern in their exploration of perceptions of mass media in Spain, with women reporting higher levels of anxiety and fear compared to men when watching, listening, or reading news about the disease or the pandemic more broadly.

Interestingly, there were two studies that considered population heterogeneity in their design and yet revealed little to no differences related to race, educational status, gender, or healthcare status groupings (Torres et al., 2021; van Scoy et al., 2021). The randomised control trial of Torres et al. (2021), which aimed to determine whether public health messages delivered by physicians improved Covid-19 knowledge, beliefs, and practices and to assess the differential effectiveness of messages acknowledging the unequal burden of the disease on Black Americans, concluded that the intervention was equally impactful for both Black and White participants. There were no statistically significant differences by sex or political affiliation either, even though the campaign was more impactful among participants with lower income. Similarly, the research of van Scoy et al. (2021) into the perceptions of early pandemic communication in the US concluded that concerns about media messaging were equally distributed across sub-groups defined by race, gender, educational attainment, and healthcare worker status. Likewise, confusion, distrust and anxiety, attributed to flawed messaging, permeated the responses from all subgroups, even though respondents who were white, male or those with higher educational attainment were disproportionately affected by distrust.

In two of the studies (Jarynowski & Skawina, 2021; Kalocsányiová et al., 2021), the exposure to and content of public health messaging were explored from a geographical (area-level) perspective. Kalocsányiová et al. (2021) carried out a comparative linguistic landscape analysis in the London Borough of Hackney (UK). Their study revealed significant differences in the amount, content, and prominence of Covid-19 signage between more affluent and deprived neighbourhoods, with signage in deprived areas, including signage about key preventive measures such as staying at home and/or self-isolation, limiting non-essential travel and wearing a face covering lagging behind that in less deprived area. In contrast, the geographical focus of Jarynowski and Skawina (2021) was much broader – based on “socio-epidemiological data” (which combined data based on internet searches, infection/deaths rates and vaccine refusal rates), the authors delineated several potential sub-populations in Poland in need of targeted messaging to boost vaccine uptake.

Finally, there was one study that evaluated the accessibility of Covid-19 information published by the World Health Organisation (WHO) on its website (Fernández-Díaz et al., 2020). Using web content accessibility guidelines as a benchmark, Fernández-Díaz et al. (2020) concluded that the WHO was not accessible to all citizens, among them groups of older people who have vision problems as a result of physical ageing.

Studies of sub-groups disproportionately affected by the pandemic

There were eleven studies that explored the challenges of reaching certain sub-groups within the population and/or the messaging preferences of groups that have been disproportionately affected by the pandemic. These included religious and ethnic minorities (Elers et al., 2020; Garcia et al., 2021; Kalagy et al., 2021; Vanhamel et al., 2021), immigrants and speakers of minority languages (Brønholt et al., 2021; Wild et al., 2021), various age groups (Brown & Reid, 2021; Cheng et al., 2021), people living with a physical disability or mental illness (Bailey et al., 2021), and others who are particularly deprived, among them people experiencing homelessness, refugees, and Roma and traveller communities (Eshareturi et al., 2021; Montgomery et al., 2021). Detailed information about each study’s design and outcomes is shown in Table S3.

Similarly to the studies of general population, the studies focused on these groups exposed unmet information needs which generally arose from: (1) *language barriers and insufficient or inadequate translation* into community/migrant languages (Brønholt et al., 2021; Elers et al., 2020; Vanhamel et al., 2021; Wild et al., 2021); (2) lack of information reflecting the *lived experience of individuals and/or considerate of their specific circumstances or vulnerability* (Bailey et al., 2021; Cheng et al., 2021; Dai & Hu, 2021; Eshareturi et al., 2021; Montgomery et al., 2021); and (3) *hard-to-*

access or ineffective communication channels (Cheng et al., 2021; Kalagy et al., 2021; Vanhamel et al., 2021).

The reviewed studies also converged in showing that individuals excluded from Covid-19 communications, be it because of a limited language proficiency or the absence of TV, radio and internet use in their community, were often the most vulnerable to Covid-19 – e.g., older people from immigrant or ethnic minority backgrounds, travellers and non-citizens in precarious employment who were far less likely to be able to work from home. Other key observations that emerged from this body of research related to different processes of *message targeting*, among them: the testing and tailoring of translated materials with culturally and linguistically diverse groups (Feinberg et al., 2021; Wild et al., 2021); the deployment of trusted messengers and venues with cultural significance to deliver Covid-19 related information (Garcia et al., 2021; Vanhamel et al., 2021; Wild et al., 2021), and the need for acknowledging the unequal burden of disease and historical trauma, for instance, in African Americans or amongst those with a disability (Bailey et al., 2021; Garcia et al., 2021). Vanhamel et al. (2021) and Wild et al. (2021) also noted that efforts to reach communities that are disproportionately affected by public health emergencies, such as Covid-19, risk being interpreted as singling out of certain groups by the general population as disease-spreaders or rule-breakers. Health messaging should therefore be also geared towards the prevention and mitigation of enacted and anticipated stigma.

There were also some interesting findings with regards to the timing and frequency of (tailored) messaging during a pandemic. The study of Brønholt et al. (2021) shed light on minority language speakers' uncertainty and frustration about accessing essential Covid-19 information with delay (if at all), while the data collected by Bailey et al. (2021) suggested that a high volume and frequency of risk communication messages, combined with economic uncertainty and isolation brought on by stay-at-home orders, led to negative emotional responses (e.g., fatalism or heightened fear and anxiety) among the most vulnerable to Covid-19.

Studies of practical attempts to address inequalities

There was a total of 13 studies which implemented and assessed interventions, among them tailored communicative strategies, aimed at reducing Covid-19 related health inequalities. Out of these, 11 articles presented case studies of community engagement through multisector partnerships in the US, Iran, Israel, and Ireland (Brewer et al., 2020; Despres et al., 2020; Feinberg et al., 2021; Fletcher et al., 2020; Humeyestewa et al., 2021; Karamidehkordi et al., 2021; Liebman et al., 2020; Ramos et al., 2020; Romem et al., 2021; Villani et al., 2021; Wieland et al., 2021). In addition, this review also identified a virtual ethnography of a Chinese volunteer-driven disability support network (Dai & Hu, 2021) and a randomised control trial which investigated the effectiveness of physician-delivered Covid-19 prevention messages in Black and Latinx communities in the US (Alsan et al., 2021).

In the case studies, the focus was primarily on partnerships involving faith leaders (Brewer et al., 2020; Fletcher et al., 2020; Romem et al., 2021), indigenous community leaders (Humeyestewa et al., 2021), and community-health partnerships catering for the needs of those living on the margins of society (Despres et al., 2020; Feinberg et al., 2021; Villani et al., 2021; Wieland et al., 2021). The majority of communicative “interventions” outlined in these case studies (e.g., creation and dissemination of culturally tailored digital resources about Covid-19, virtual town halls and church services, door-to-door outreach etc.) focused on both awareness-raising and the prevention of community outbreaks of Covid-19 through promoting protective measures and vaccination. The digital content curation model discussed in Despres et al. (2020) also addressed the inequitable impact of Covid-19 on Latinx people in the US while supplying community advocates with localised data tools, including blog posts exploring food (in)security or paid sick leave during the pandemic, and peer-modelled stories of Latinx people meaningfully responding to the Covid-19 crises. There were also three case studies (Karamidehkordi et al., 2021; Liebman et al., 2020; Ramos et al., 2020) advising specifically agricultural/rural communities on how to modify their work practices and environment to halt the spread of Covid-19. One of them – Liebman et al. (2020) – considered partnerships with researchers (e.g., microbiologists studying Covid-19 aerosols) as one of the best avenues for translating science into practical prevention strategies for those providing healthcare to agrarian populations.

In regard to evaluation and impact assessment, most of the studies relied on the authors reflection on the action – i.e., a retrospective contemplation of the community engagement partnerships and their success in bringing timely and relevant Covid-19 information to communities – to draw results and conclusions about what works. Incorporation of community voices (including faith leaders' voices) in risk and health messaging, participatory generation of pandemic communications, active tackling of Covid-19 myths and misinformation, as well as regular revision of message contents in response to community concerns have all been identified as key facilitators of effective communication. To show impact, around half of the studies (Brewer et al., 2020; Despres et al., 2020; Feinberg et al., 2021; Fletcher et al., 2020; Karamidehkordi et al., 2021; Ramos et al., 2020; Wieland et al., 2021) reported reach and engagement data, although these were mostly limited to the number of viewings and/or individuals reached[2]. How the messaging impacted vulnerable communities' risk and efficacy perceptions and actual behaviour (e.g., compliance with protective measures) was largely unexplored leaving somewhat in doubt the effect these studies have had.

As indicated earlier, the review has also identified a randomised controlled trial which investigated the impact of public health messages tailored for Black and Latinx communities on Covid-19 knowledge and information-seeking (Alsan et al., 2021). The intervention consisted of video messages that varied by physician race/ethnicity, acknowledgement of racism/inequality, and community perceptions of mask wearing. Interestingly, the incidence of information-seeking increased for race-concordant messages for Black but not Latinx respondents. Other tailoring of the content (e.g., acknowledgement of unequal treatment in healthcare, economic difficulties and fears of deportation in public health videos) did not make a significant difference. The final study in this group was the virtual ethnography of Dai & Hu (2021): the study highlighted the empowering role of a disability support network which provided emergency Covid-19 communications in formats accessible to people with hearing impairment, visual impairment, and intellectual and developmental

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[2] Brewer et al. (2020) and Wieland et al. (2021) also reported positive outcomes related the feasibility and acceptability of their emergency risk communication proposals.

disabilities. Dai & Hu (2021) also offered examples of good practice for effective communication with individuals living with disabilities during a pandemic. The main characteristics of each study reviewed above are summarised in Table S4 of the Supplemental Material.

Discussion

The Covid-19 pandemic has challenged governments and public health bodies around the globe in developing effective communication strategies to ensure acceptance, uptake, and adherence to public health measures. This scoping review has provided an analysis and synthesis of data derived from 40 empirical studies focused specifically on communication inequalities in the context of the Covid-19 pandemic, including various explorations of communication interventions targeted at traditionally underserved groups and/or those disproportionately affected by the pandemic.

With respect to the first review aim (i.e., the nature of communication inequalities and affected groups), the results largely corroborated the findings from earlier pandemics (e.g., Lin et al., 2014; Vaughan & Tinker, 2009) by confirming the role of sociodemographic, cultural/religious, and economic factors in facilitating/jeopardising the public's capacity to access and act upon crucial public health messaging. The studies focussing on communication outcomes such as information seeking, exposure to different communication channels, and trust in information sources (e.g., Cheng et al., 2021; H. Wang et al., 2021; X. Wang et al., 2020; Yu et al., 2021) also confirmed age, education, and gender as important social determinants of communication inequalities. Overall, the breadth of research focusing on the messaging needs and preferences of those disproportionately affected by the pandemic is encouraging as it reflects a commitment to tackle communication as well as broader inequalities in the context of Covid-19. At the same time, however, the sheer volume of Covid-19 specific research which uncovered and/or explored communication inequalities along racial, ethnic, economic, geographic, and educational lines (dozens of publications in less than two years) highlights serious inadequacies if not outright failures in our attempts to reach and provide much needed health information for those most at risk of Covid-19. It is important to emphasize that unmet information needs arose mostly from: (1) language barriers and insufficient or inadequate translation into community/migrant languages, (2) lack of information reflecting the lived experience of individuals and/or consideration of their specific circumstances or vulnerability; and (3) hard-to-access or ineffective communication channels; findings which are consistent with previous literature on pandemic communication. While a small number of studies stood in contrast to these points, finding no or little difference between different demographic groups (i.e. van Scoy et al. (2021), a study that was conducted in the US in the early stages of the pandemic), it is not unreasonable to suggest that this was because messaging was already so flawed, it made little difference between groups.

The second aim of this review was to identify and analyse strategies that have been implemented to reach, engage, and communicate with disadvantaged groups in the context of Covid-19. It was encouraging to see that recommendations from the literature –particularly, lessons learnt on the importance of community partnerships, trusted messengers and the co-creation of health and risk messages– had been taken on board in multiple studies. Interestingly, while engaging community leaders and members in the tailoring and delivery of health communications has been considered “desirable practice for decades” (Ryan et al., 2021: 30; see also Vaughan & Tinker, 2009), limited empirical evidence was available prior to Covid-19 on how to best undertake these activities. This scoping paper partially fills this knowledge gap through the synthesis of evidence from eleven case studies of community-health partnerships and real-world implementations of Covid-19 campaigns tailored to local contexts and groups, among them indigenous and faith communities, (foreign) agricultural workers, and people living with disabilities. Incorporation of community voices in risk and health messaging while staying true to the facts, active tackling of Covid-19 myths and misinformation, as well as regular revision of message contents in response to community concerns have all been identified as key contributors to effective Covid-19 communication.

There are however also important limitations related to this body of evidence, most importantly, the fact that impact was evaluated almost exclusively in terms of reach data (e.g., number of website viewings) without giving due consideration to the feasibility or acceptability of the proposed communicative measures[3] or their real-word impact on adherence to Covid-19 measures or improved health outcomes. As to broader limitations that warrant consideration, the review is skewed towards studies from the US and the UK and it may have missed some relevant studies due our search strategy relying on English-only terms without language restrictions rather than on a comprehensive multilingual search strategy[4]. Because of the speed with which new research is emerging, it is likely that further studies on the topic are already available as preprints or journal publications[5]. Another limitation is the exclusion of grey literature which could have filled some of the gaps in impact-related evidence.

The review also raises intriguing questions regarding the nature and extent of message customisation, given that in the reviewed studies message targeting and tailoring[6] often referred to adjustments in solely one or two of the key aspects such as *language selection* (e.g., translation of materials into community or migrant languages without further editing), *accessibility* (in terms of format, processing, and comprehension difficulty), *relevance* of content (e.g., guidance on how self-isolate in nomadic households), *framing* (e.g. messages emphasising individual gains from getting vaccinated vs collective good), *appeal* (e.g., use of religious imagery to convey the risks of disease), *channel* (e.g. ethnic language print), *source and messenger* (e.g. use of race-concordant physicians to deliver messages about the importance of mask-wearing) and *trust-building* (e.g. messages promoting mutual respect and solidarity). Interestingly, in some studies (Despres et al., 2020; Torres et al.,

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[3] (with the exception of Alsan et al., 2021; Brewer et al., 2020; Wieland et al., 2021)

[4] The search returned only English-language publications.

[5] A search conducted on 8 April 2022 on OSF preprints (https://osf.io/preprints/) - which aggregates search results from over thirty preprint providers - returned two manuscripts which are potentially relevant for this review.

[6] We recognise that targeting usually draws on audience segmentation to develop and use group-specific messages, while tailoring fits messages to individual characteristics and preferences. This distinction, however, was not present in many of the papers reviewed in this study, most probably due to the different disciplinary backgrounds the authors drew on.

2021), communications recognising racism, economic hardship, historical trauma and/or the disproportionate impact of Covid-19 on certain groups (e.g., Latinx or Black communities in the US) were considered a key if not primary form of message targeting, even though evidence around the effectiveness of such a strategy is scarce and inconclusive (see e.g., Alsan et al., 2021).

Going forward, studies are needed that consider all the above aspects of message customisation comprehensively, while also putting in place robust evaluation methods that can capture real-word effects (for example, in the form of increased adherence to public health measures or improved health outcomes in the communities concerned). Another gap in the literature relates to communication with individuals with special needs or disabilities and those who were required to shield throughout the crisis due to their age and/or underlying health conditions. Similarly, while much of the pandemic's frontline work fell on women, migrants, ethnic and racial minorities, and low-paid workers (OECD, 2022), relatively little evidence is currently available to understand the communication disadvantages faced specifically by these groups whose jobs could not be done remotely and implied a higher risk of contagion throughout the pandemic. A further gap in the literature relates to the lifting of Covid-19 restrictions and how to best communicate with different segments of the public about the gradual phasing out of public health measures, which in some parts of the world have been in effect for over two years. Covid-19 has also highlighted the need to actively tackle misinformation, something which was recognised in the literature, but largely unaddressed.

As well as bringing about one of the largest changes to social life in living memory, Covid-19 has also created a distinct challenge in relation to health communication, with governments, health authorities and others having to deal with substantial uncertainty and unprecedented volumes of misinformation. This has been compounded amongst those who have been disproportionately impacted by the pandemic. While it remains important that we continue to provide information to people that is both accessible and that resonates with them, the Covid-19 pandemic has also highlighted the need for tailored approaches to tackle misinformation. Several of the studies flagged misinformation as a concern, but very few addressed it specifically. Finally, and while unprecedented in many ways, Covid-19 has shown how little we have learnt (or at least applied) from past pandemics in relation to health communication. There is a pressing need to address this as the pandemic continues to impact lives in the coming years.

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