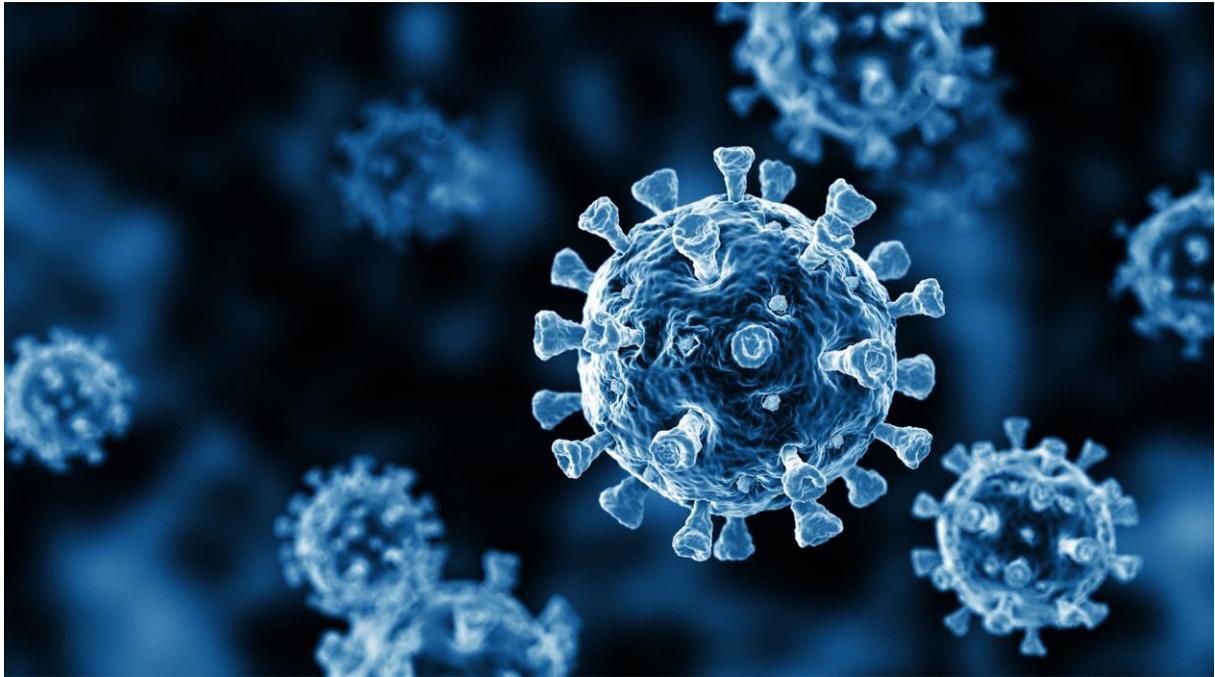


MEDIA INFLUENCE ON COVID-19 VACCINE HESITANCY AND UPTAKE IN AFRICA: A RAPID SYSTEMATIC REVIEW



Authors: Andrew G. Mtewa, Nora Ndege, Joanes Atela, Uzma Alam, Samson Kinyanjui

Abstract

Since early 2021, several COVID-19 vaccines have been manufactured and approved by the United States Food and Drug Administration (FDA) and other regulatory and approval bodies. But the COVID-19 pandemic continues to drive down the socio-economic wellbeing and health systems of African nations. The media has been critically important in disseminating information that impacts decisions by individuals to take the vaccine or not. This review seeks to document the influence of media on COVID-19 vaccine hesitancy and uptake in Africa in different populations and to identify the most influential media platforms in Africa on COVID-19 vaccination. This review is informed by a tele-convening of stakeholders held in April 2021 to provide evidence of the impact of media on vaccine uptake to guide African governments. The Cochrane protocol was used to conduct a rapid review of literature published from December 2019 to the 5 August 2021. A comprehensive search of PubMed, the Cochrane COVID-19 Study Register and other databases yielded 975 studies (culled to 753 after eliminating duplicates.) Further screening of titles and abstracts yielded 83 studies which were further reduced to 14 after full article review. The literature survey found that vaccine uptake and hesitancy are strongly influenced by access to media outlets and the framing of messages and content. Not surprisingly, social media has a huge impact on relaying and shaping perceptions, but is associated with few checks or control on accuracy or authenticity. Conventional mass media, such as television and radio, has more control of messaging, but are skewed in certain instances. This lack of information control provides a pathway for spreading misinformation, especially about the impacts of vaccines on human health, and has the potential to cause vaccine apathy. African states are trying to address this issue through cyberlaws, establishing entities to review information being broadcast through media outlets and dialog with the media on positive messaging. However, there is a serious lack of empirical research on the relationship between media and vaccine uptake in Africa. This must be addressed urgently through discussion and studies to inform relevant policies.

Keywords

Vaccine hesitancy, vaccine uptake, COVID-19 vaccine, social media, media, misinformation, disinformation

Background

The COVID-19 pandemic has continued to trigger crisis in both humanity and in various economies[1, 2]. This has triggered the accelerated development of vaccines to prevent further spread of infections and induce herd immunity in the long term[3]. While non-pharmaceutical control measures such as social distancing, regular hand washing and mask-wearing have been shown to curb the spread of the disease effectively [4], vaccination ensures long-term prevention and control of the pandemic. It is considered to be the most successful public health intervention for communicable, infectious diseases.

The world is currently focused on acquiring and administering a variety of COVID-19 vaccines. Given the varying types, efficacy, development pathways and costs of these vaccines, the role of media in shaping people's perceptions and attitudes is increasingly important [5]. Participants in an expert tele-convening held in April 2021 concluded that

perceptions about vaccines are mainly dependent on the types and ways in which information is relayed to populations, especially by the media. For purposes of this report, “vaccine hesitancy” is defined as delay in the uptake or the refusal of vaccines, despite the availability of vaccination services [6]. It is a serious risk to the people who refuse vaccination as well as the wider community because of the potential for viral strain mutation. According to the World Health Organization (WHO), vaccine hesitancy is a severe threat to global health [7].

As elsewhere, vaccine hesitancy is a critical issue in Africa, and can be linked to the influence of media. In Africa, only about 1% of the population of about 1.3 billion has been fully vaccinated. This is significantly lower than rates in high-income countries, where more than 50% of the population has been vaccinated. There is concern that vaccine-related information is driving both genuine questions about the benefits and safety of vaccination and polluted content.

The media plays a major role in providing real-time information on disease outbreaks, and influences public understanding of and behaviour in public health emergencies [8]. One role of the media is to promote transparent conversation around public health including about pandemic outbreaks, transmission, impact and remedies. Many factors drive vaccine hesitancy and uptake.

Media, which for the purposes of this study is the “intervention”, helps distribute information to both the general public and to targeted groups[9]. For example, information about COVID-19 and preventive measures is broadcasted to the mass public. But some community radio stations may broadcast information relevant to only a specific community. For example, information promoting the use of plastic face shields may be relevant in urban areas where the shields are available, but not in a remote village where availability is limited to cloth face masks. The channel of communication and message content is crucial to the effectiveness of the intervention. Some audiences may find social media communications more accessible than radio outlets; some may find aggressive messaging more effective than soft messaging. Varied outlets including radio, flyers, TV programmes, community performances, posters, phone messaging and public speakers can be used to channel the intervention to various groups of audiences.

Interventions may work differently according to the interests of specific audiences. In 2017, Glanz et al [10] showed that using web-based social media helped increase early child vaccine acceptance in Colorado. Of course, counter-information against immunisation appears on the same channels [11]. Notwithstanding this, studies [12-15] show that intervention messages can still be effective using these compromised channels.

This systematic review seeks to document the influence of the media on COVID-19 vaccine uptake in Africa and to identify the most common and effective media platforms used on the African continent for information on COVID-19 vaccination.

Methodology

Policy makers and researchers across the African continent were consulted to determine the following study criteria.

Inclusion

The review was conducted of adult African citizens aged 18 years and older of either sex from any country and skin complexion regardless of educational background, and was limited to studies published in English from December 2019 to 5 August, 2021. It identified media misinformation on COVID-19 vaccines, measuring primary outcomes in terms of COVID-19 vaccine hesitancy, uptake, and lack of information. Case control cross-sectional studies, primary studies, case studies, before-and-after studies, other cross-sectional studies, case studies, non-controlled studies and non-randomised studies were included.

Exclusion

Studies not retrievable in English, randomised controlled trials and duplicate studies were excluded from the review.

Information Sources

Comprehensive search of published, peer-reviewed studies was conducted from the PubMed, Cochrane COVID-19 Study Register and LOVE databases. All the studies included use surveys to collect data with questionnaires distributed electronically and/or administered face-to-face.

Search strategy

Keywords (listed above) were used to search for relevant literature. Search strategies used in this work to obtain all articles in this work are provided as additional files at the end of the manuscript.

Study records

Data management

Citations for all articles identified were pooled into Endnote software to de-duplicate and import into the Rayyan platform (<http://rayyan.qcri.org>), an integrated web application for systematic reviews.

Selection process

The Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) 2015 checklist [16] was followed and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram [17] was used for article selection and screening. Two authors separately screened titles and abstracts against eligibility criteria and relevance; those for which eligibility was unclear based on the abstract underwent full-text screening. Disagreements were resolved through discussion and consensus.

Data collection process

Data extraction and synthesis for this rapid systematic review were narrative and manual. Since this study reviewed the condition of vaccine uptake and hesitancy, with the African continent as the context and the African population that is eligible for COVID-19 vaccination as the target population, the Condition, Context and Population (CoCoPop) framework [18, 19] was adopted.

The primary outcome of the study is a list of various media sources that disseminate COVID-19 vaccination messages such as radio and TV stations, flyers, social media platforms (Twitter, WhatsApp, LinkedIn, Facebook, Telegram, Instagram, etc), the content of messages being broadcast on the various media platforms including direct messages to the population and policy-related information, the proportion of the population that is eligible for vaccination, and the number of those eligible who are vaccinated and unvaccinated. The secondary outcome is a policy framework to inform discussion on vaccine uptake and hesitancy.

Limitations

This is a rapid review and did not include meta-analyses. Literature search, screening and reviews were systematic to increase the validity of the outcomes.

Results and discussion

The three databases yielded 14 studies that were included in the narrative synthesis of literature. Figure 1 shows a breakdown of the search and screening process.



PRISMA 2009 Flow Diagram

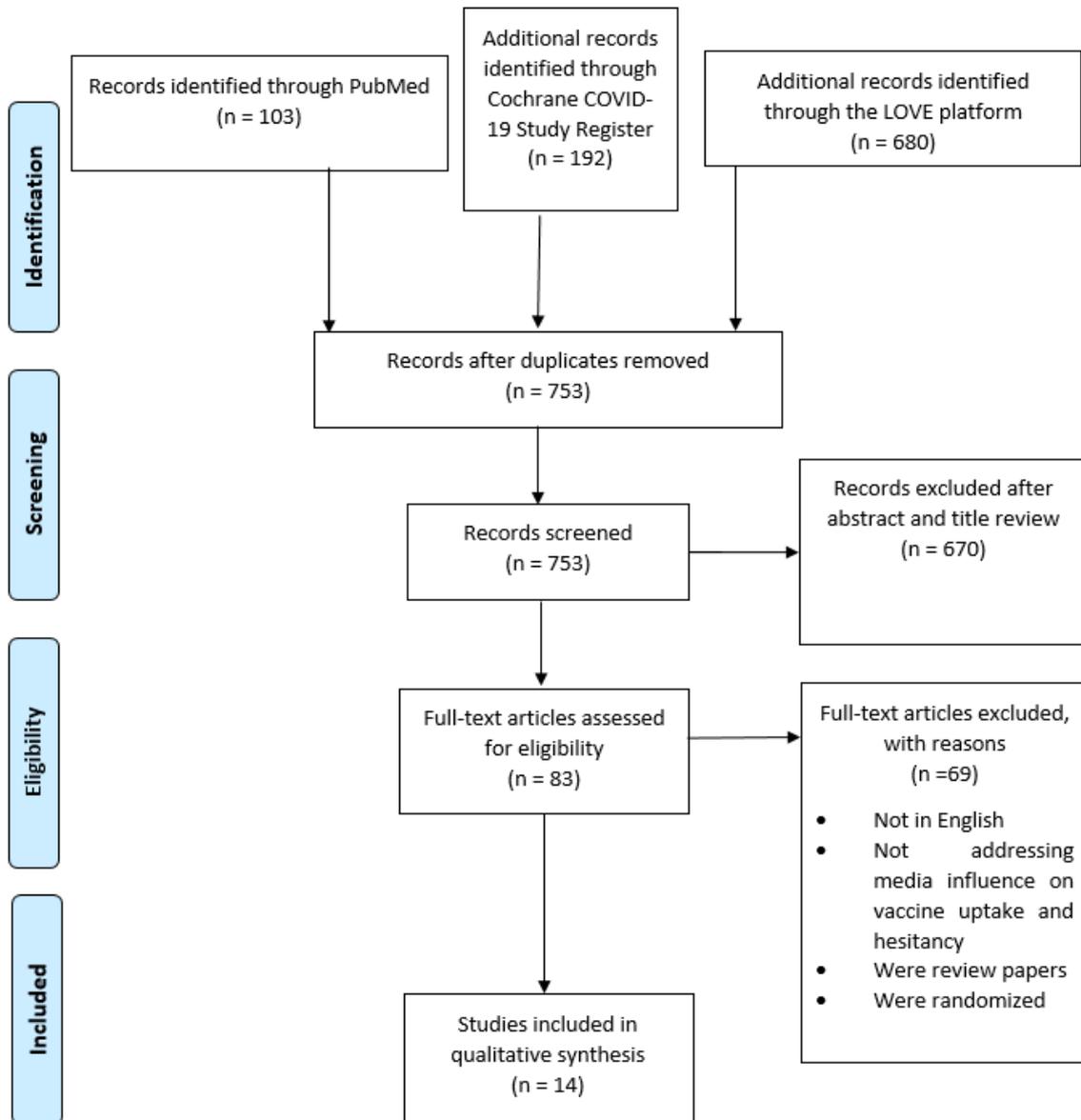


Figure 1: PRISMA diagram showing the search and screening process

Influence of media on vaccine hesitancy globally

The 14 studies [20-34] showed that vaccine hesitancy is a challenge in African, and a number of studies reported similar challenges in non-African countries [21, 22, 35]. For example, in Bangladesh, Belsti *et al* (2021) [22] reported vaccine hesitancy that was mostly orchestrated by media misinformation about the safety of vaccines. In contrast, people in Ecuador and Malaysia were submitted to tailored media messages and were willing to

receive vaccines in high numbers. Other researchers also reported hesitancy in Russia and Colombia, particularly when the media was widely reporting on rare but serious concerns about thrombosis associated with the Astra Zeneca vaccine [20]. Obregon et al (2021) reported that in Eastern Europe and South Asia, hesitancy was not as significantly widespread as in some other LIC regions of the world because most media content was framed by scientific evidence, thus increasing confidence in vaccines [36]. The intensive subjection of a population to a particular message theme over a period of time influences decision-making and behavioural changes [37]. Guntuku and others (2021), reported that private Twitter messages reveal that some African-American populations are prone to COVID-19 hesitancy associated with an unfortunate history that created mistrust [35]. This observation has the potential to inform the design of messages and encouragement of health seeking behaviour targeted at specific communities. Information that is tailored to specific audiences have the power to influence individual decisions whether those individuals take the vaccine or not.

Influence of media on vaccine hesitancy in Africa

Media platforms used to access COVID-19 vaccine information in Africa

Television, radio, newspapers, magazines, medical journals, books, pamphlets and popular social media outlets such as Twitter, Facebook, Youtube and Whatsapp [2, 22, 26, 38] were reported to have influenced COVID-19 vaccine hesitancy and uptake. In a study conducted in Zimbabwe and South Africa [25], 513 respondents indicated that their top sources of COVID-19 information were social media (88), television (67), radio (53), health workers (51), workmates (39), newspapers (38), Ministry of Health outlets (31), and community leaders (8). In South-eastern Ethiopia [22], 33.7% used conventional mass media as their primary source of COVID-19 information, while 31.8% used social media and 1.7% and 32.9% used newspaper and other internet browsers, respectively. While conventional media outlets were reasonably controlled in their messaging, social media was not [26]. Consequently, social media was found to be more prone to sharing unverified, false and inaccurate information [22]. This type of content on social media has led some people to confusion and panic and contributed to vaccine hesitancy [23].

Media influence on vaccine uptake and hesitancy in Africa

The influence of media on vaccine hesitancy and uptake has been reported in many African countries to varying degrees. In Sierra Leone, the availability of media outlets and the framing of COVID-19 vaccine messaging contributed to a 32.4% willingness of people to take the vaccine, as shown in a survey of 2,146 people [32]. Messaging clearly explained the benefits and potential side effects of the vaccine, increasing trust. A study by Masele (2021) in Ethiopia found a correlation between higher COVID-19 vaccination rates and access to media, underscoring that even optimal messaging is only effective if media is available and accessible [29]. Vaccine acceptance is strengthened by a sense of responsibility to the collective effort to end the pandemic and “return to normal” [25]. These findings suggest that African states should ensure broad messaging through various means to reach the most remote areas.

Concerns about misinformation and lack of information on COVID-19 treatment and vaccines have been reported in several African locations [39]. Despite some positive reports

on acceptance, some studies report hesitancy influenced by the media and showed clear links to media access -- particularly social media, which has almost no contextual controls of message content [26]. These studies also make reference to the framing of the content, which tend to be alarmist by emphasizing and exaggerating potential side effects, lacking focus on accurate and helpful information frequently, including on the benefits of the vaccines, and generating outright fake information [23, 29, 30].

In Nigeria, hesitancy amongst health care providers in all geopolitical zones of the country was attributed by health providers mostly to intensive coverage of potential adverse events of COVID-19 vaccines, inciting fear in many people [20, 31]. Obidile et al (2021) [36] also reported that to health care workers above the age of 18 years, most of the media content about COVID-19 and associated vaccines was negative and amplified by conspiracy theories on social media. Zewude and Habtegiorgis [34] reported only a 46.1% COVID-19 vaccine acceptance rate among school teachers, university instructors and bank employees in Southern Ethiopia; a population in Akaki Kality, a suburb of Addis Ababa, by Dereje et al (2021)[30], reported 51.8% respondents with negative and/or poor knowledge about COVID-19 and its vaccine, and 19.1% hesitancy. All those who registered hesitancy relied on social media as their source of information. Also in Ethiopia, another study found that women and the elderly were more willing to take the vaccine and that those who are hesitant about the COVID-19 vaccine depend on social media as their primary source of information[22]. Some of the reasons for hesitancy are media-influenced doubts on safety (37%), effectiveness (20.7%) and lack of adequate information (12.7%).[34]

COVID-19 vaccine acceptance was reported to be 20.2% among health workers in Harare, Zimbabwe [25]; low acceptance was also reported in some populations in other parts of Zimbabwe and parts of South Africa[24] mostly due to inaccurate information that was circulating through various social media platforms. In Cameroon, Dinga et al (2021) [23, 27] reported 84.6% COVID-19 vaccine hesitancy from 2,512 respondents, similar to reports by Tawat (2021)[27] attributing hesitancy mostly to uncontrolled false information circulating on social media. In Tunisia, Zamit et al (2021) also reported 51.9% hesitancy towards COVID-19 vaccines due to the proliferation of misinformation and fake news particularly through social media [33]. The same study reported that 66.9% of respondents used social media as their primary source of information about COVID-19 and its vaccines. Kanyike et al (2021) [26] reported 37.3% COVID-19 vaccine acceptance among 600 Ugandan medical student respondents[26], mostly attributed to inaccurate information in social media, with male students more accepting. In this study, 90.6% of the respondents indicated that they use social media platforms to access information about COVID-19 and its vaccines. Another study [20] reported vaccine hesitancy influenced by the media in Burkina Faso, Sierra Leone, Rwanda and Mozambique.

Other causes of vaccine hesitancy include fear of potential side effects amplified by media outlets, particularly social media [22] where fake news and exaggerations contribute to the narrative. Tawat [27] reported that information poverty, due to low levels of digital literacy, limited access to the internet and some internet paywalls, was one reason that vaccine hesitancy is rampant in Cameroon.

At the beginning of the pandemic and the roll out of the vaccines, information was scarce for everyone, including scientists, due to the novelty of the disease. Even responsible journalists had to scramble to identify accurate information to disseminate. The unfolding of events in

the case of COVID-19 underscores the influence of media on vital life decisions [40, 41]. Cumulatively, these studies reveal information that both frightened people and provided them with information to inform their decisions on the vaccination. Social media users must take seriously their responsibility as sources of critical, sometimes life-and-death public information and self-regulate their messaging accordingly so as not to mislead fellow citizens[24].

What are African Governments Doing?

Anti-vaccine information generates greater user engagement than pro-vaccine engagement [42]. To address COVID-19 vaccine apathy, African governments are designing approaches to shape social norms around vaccination by reducing negative perceptions of target groups through various media outlets [2]. Countries can take many approaches to address vaccine hesitancy and increase uptake, including the development of policy frameworks that recognise the role of the COVID-19 in building economic strength [38], and emphasis on the fact that immunised citizens are more likely to avoid or experience lessened effects of the disease, and therefore be productive in their work. Countries are addressing COVID-19 vaccine risk misconceptions through varied media outlets that are accessible to different communities through carefully tailored, understandable messaging [28, 31, 38]. Local and cross-country partnerships among stakeholders including the media, scientists and policy makers are essential to ensure the flow of accurate public information. Governments must establish science policy engagement to help shape future pandemic response plans. Media framing and construct must be carefully examined to ensure that information is correct, effective, and uses appropriately emotive language and illustrations[24].

People may get confused, scared and/or overwhelmed by data channelled to them by the media on a daily basis. The media must reshape messaging accordingly to provide clear explanations and context. This is essential to avoid apathy. To combat the proliferation of fake news and misinformation in electronic media outlets, Dzinamarira et al [24] suggest that governments develop and enforce regulations and policies that make it harder to share false claims and information.

Government-issued vs. Uncontrolled Information

The consensus of studies indicates that conventional state-controlled media outlets, referred to by Kanyike et al (2021)[26] as “censored information”, tends to promote vaccine uptake, while other sources of information, which is generally not controlled or censored, often promotes misinformation. In general, television and radio stations, newspapers, medical journals, books and government monitored pamphlets [24, 26] were some of the sources that were easily checked and guided, whereas social media outlets such as Facebook, Twitter, Whatsapp, Instagram and Youtube were not controlled for accuracy. It is also noteworthy that governments themselves use social media platforms, but in contrast to general content, its messages tend to be well controlled and checked. This effect was demonstrated by Masele [29] in a study of 415 respondents in Wolaita Sodo, Ethiopia, in which people who accessed mainstream conventional media as a primary source of COVID-19 information were much more likely to accept the COVID-19 vaccine than those who accessed social media for similar purposes.

Conclusions and Recommendations

The review indicates clearly that the media plays an important role in COVID-19 vaccine hesitancy in some parts of Africa. But existing research is limited to small populations of only a few countries. More research on effective communications about COVID-19 vaccines for African countries is urgently needed to address this pandemic in the short-term and other public health emergencies ongoing. A communication and media environment that is conducive to clear and accurate information must be created to facilitate the circulation of information on media platforms[23]. Sound regulations and policies to help control the distribution of misinformation must be devised and enforced [24] to protect vulnerable people. In addition to increasing digital literacy and reducing information poverty, African governments must develop creative approaches to improve fact-checking on social media [27]. More research is needed into how social media on the continent can be used effectively to promote accurate and positive messages, especially on social media platforms.

Acknowledgements

This rapid review was executed under the auspices of the Science Engagement to Support Evidence Informed Policy Responses to COVID-19 in Africa project supported of the UK Foreign Commonwealth Development Office (FCDO). The Africa Academy of Sciences through the Africa Excellence in Science Alliance for Accelerating Excellence in Science in Africa (AESA) led the project with the support from partners. The Africa Research and Impact Network coordinated the tele-convenings and rapid reviews with the support of the Africa Institute for Policy Research and Cochrane Network. The Developing Excellence in Leadership, Training and Science (DELTAS) Africa experts were central in providing expert guidance during the tele convenings and reviews. Over 500 policy and research experts drawn upon from Africa and beyond were instrumental in shaping the review priorities and questions, especially during the tele-convenings.

Contributions of authors

The rapid review was led by the main author with inputs and collaboration in writing from the other four authors.

Declarations of interest

This is an objective rapid review of evidence and thus no interests to declare.

Sources of Support

The lead authors received weekly comments and reviews from the members of the project team led by AESA with support from ARIN, AFIDEP, Cochrane Network, and wider stakeholders involved in the tele convening. The DELTAS leads provided expert guidance and reviews and quality assurance of the process and output

References

1. Nna, E.O., et al., *COVID 19 Vaccine Hesitancy: A Protocol for Systematic Review and Meta-Analysis*. 2021.
2. Dzinamarira, T., et al., *COVID-19 vaccine roll-out in South Africa and Zimbabwe: urgent need to address community preparedness, fears and hesitancy*. 2021. **9**(3): p. 250.
3. Corrêa Filho, H.R. and A.A. Ribeiro, *Vacinas contra a Covid-19: a doença e as vacinas como armas na opressão colonial*. 2021, SciELO Public Health.
4. Chou, W.-Y.S. and A.J.H.c. Budenz, *Considering emotion in COVID-19 vaccine communication: addressing vaccine hesitancy and fostering vaccine confidence*. 2020. **35**(14): p. 1718-1722.
5. Steffens, M.S., et al., *Using social media for vaccination promotion: Practices and challenges*. DIGITAL HEALTH, 2020. **6**: p. 2055207620970785.
6. Marti, M., et al., *Assessments of global drivers of vaccine hesitancy in 2014—Looking beyond safety concerns*. 2017. **12**(3): p. e0172310.
7. WHO, *Ten threats to global health in 2019*. 2019, the world Health Organization: Geneva. p. <https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019>.
8. Hou, Z., et al., *Assessing COVID-19 Vaccine Hesitancy, Confidence, and Public Engagement: A Global Social Listening Study*. 2021. **23**(6): p. e27632.
9. Moreno, M.A. and J. D'Angelo, *Social Media Intervention Design: Applying an Affordances Framework*. Journal of medical Internet research, 2019. **21**(3): p. e11014-e11014.
10. Glanz, J.M., et al., *Web-based Social Media Intervention to Increase Vaccine Acceptance: A Randomized Controlled Trial*. Pediatrics, 2017: p. e20171117.
11. Wilson, S.L. and C. Wiysonge, *Social media and vaccine hesitancy*. BMJ Global Health, 2020. **5**(10): p. e004206.
12. Yousuf, H., et al., *A media intervention applying debunking versus non-debunking content to combat vaccine misinformation in elderly in the Netherlands: A digital randomised trial*. EClinicalMedicine, 2021. **35**.
13. Feemster, K.A., *Building vaccine acceptance through communication and advocacy*. Human Vaccines & Immunotherapeutics, 2020. **16**(5): p. 1004-1006.
14. Chou, W.-Y.S. and A. Budenz, *Considering Emotion in COVID-19 Vaccine Communication: Addressing Vaccine Hesitancy and Fostering Vaccine Confidence*. Health Communication, 2020. **35**(14): p. 1718-1722.
15. Puri, N., et al., *Social media and vaccine hesitancy: new updates for the era of COVID-19 and globalized infectious diseases*. Human Vaccines & Immunotherapeutics, 2020. **16**(11): p. 2586-2593.
16. Moher, D., et al., *Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement*. Systematic Reviews, 2015. **4**(1): p. 1.
17. Moher, D., et al., *Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement*. BMJ, 2009. **339**: p. b2535.
18. Munn, Z., et al., *What kind of systematic review should I conduct? A proposed typology and guidance for systematic reviewers in the medical and health sciences*. BMC medical research methodology, 2018. **18**(1): p. 5-5.
19. Munn, Z., et al., *Methodological guidance for systematic reviews of observational epidemiological studies reporting prevalence and cumulative incidence data*. 2015. **13**(3): p. 147-153.
20. Arce, J.S.S., et al., *COVID-19 vaccine acceptance and hesitancy in low and middle income countries, and implications for messaging*. 2021.
21. Ammina, K., et al., *The Barrier to Vaccination Is Not Vaccine Hesitancy: Patterns of COVID-19 Vaccine Acceptance over the Course of the Pandemic in 23 Countries*. 2021.
22. Belsti, Y., et al., *Willingness of Ethiopian Population to Receive COVID-19 Vaccine*. 2021. **14**: p. 1233-1243.

23. Dinga, J.N., L.K. Sinda, and V.P.K. Titanji, *Assessment of Vaccine Hesitancy to a COVID-19 Vaccine in Cameroonian Adults and Its Global Implication*. 2021. **9**(2): p. 1-14.
24. Dzinamarira, T., et al., *COVID-19 Vaccine Roll-Out in South Africa and Zimbabwe: Urgent Need to Address Community Preparedness, Fears and Hesitancy*. 2021. **9**(3): p. 1-10.
25. Hilda Tsanzirayi, B., et al., *COVID 19 Vaccine Perception and Confidence Among Health Care Workers – An Analytic Cross Sectional Study, City of Harare, Zimbabwe, 2021*. 2021.
26. Kanyike, A., et al., *Acceptability of the Coronavirus Disease-2019 Vaccine Among Medical Students in Uganda: a Cross Sectional Study*. 2021.
27. Mahama, T., *Fake News and COVID-19 Vaccine Hesitancy: A Study of Practices and Sociopolitical Implications in Cameroon*. 2021.
28. Makerere, U., *Using community influencer groups to address COVID-19 misinformation and potential vaccine hesitancy in Uganda*. 2021.
29. Mesele, M., *COVID-19 Vaccination Acceptance and Its Associated Factors in Sodo Town, Wolaita Zone, Southern Ethiopia: cross-Sectional Study*. 2021. **14**: p. 2361-2367.
30. Nebiyu, D., et al., *COVID-19 Vaccine hesitancy in Addis Ababa, Ethiopia: A mixed-methods study*. 2021.
31. Obidile Valentine, C., et al., *Enablers and perceived risks of Covid-19 vaccine uptake among health care providers in Nigeria*. 2021. **1**(3).
32. Sheku, M., et al., *COVID-19 Vaccine Acceptability: A Cross-Sectional Mixed Methods Study in Sierra Leone*. 2021.
33. Zammit, N., et al., *Understanding hesitancy towards vaccination against SARS-COV2 among Health professionals in Tunisia*. 2021.
34. Zewude B, H.T., *Willingness to Take COVID-19 Vaccine Among People Most at Risk of Exposure in Southern Ethiopia*. 2021. **12**: p. 37-47.
35. Guntuku, S.C., et al., *Twitter discourse reveals geographical and temporal variation in concerns about COVID-19 vaccines in the United States*. 2021. **39**(30): p. 4034-4038.
36. Obregon, R., et al., *Vaccine Hesitancy and Demand for Immunization in Eastern Europe and Central Asia: Implications for the Region and Beyond*. 2020. **25**(10): p. 808-815.
37. Jonkman, J.G., et al., *Buffering negative news: Individual-level effects of company visibility, tone, and pre-existing attitudes on corporate reputation*. 2020. **23**(2): p. 272-296.
38. Wirsiy, F.S., et al., *Acceptability of COVID-19 Vaccine in Africa*. 2021. **10**(1): p. 134-138.
39. Kouzy, R., et al., *Coronavirus goes viral: quantifying the COVID-19 misinformation epidemic on twitter*. *Cureus*. 2020. **7255**.
40. Power, D.J. and G.J.J.o.d.s. Phillips-Wren, *Impact of social media and Web 2.0 on decision-making*. 2011. **20**(3): p. 249-261.
41. Morphitou, R.N. and M. Demetriou. *The impact of Social Media on Students' Decision Making Process on Selecting a University*. in *10th Annual International Conference on Mediterranean Studies*. 2017.
42. Broniatowski, D.A., et al., *Weaponized health communication: Twitter bots and Russian trolls amplify the vaccine debate*. 2018. **108**(10): p. 1378-1384.

Additional file 1: Search strategy from other databases

Three databases were used in the search strategy with search terms framed as follows:

From PubMed database

Search: Coronavirus[mh:noexp] OR coronavirus*[tiab] OR corona virus*[tiab] OR COVID-19[mh] OR covid-19[tiab] OR covid19[tiab] OR covid 2019[tiab] OR SARS-Cov-2[mh] OR SARS-CoV-2[tiab] OR SARS-CoV2[tiab] OR SARSCoV2[tiab] OR SARsCov-2[tiab] OR SARS-coronavirus*[tiab] OR severe acute respiratory syndrome coronavirus 2[nm] OR severe acute respiratory synzcdrome coronavirus 2[tiab] OR 2019-nCov[tiab] OR 2019nCov[tiab] OR nCov2019[tiab] OR nCOV-2019[tiab] OR hCOV*[tiab] OR n-cov[tiab] OR ncov*[tiab] AND Search: Social media[mh] OR social medium[tiab] OR communications media[mh] OR media[tiab] OR social networking[mh] OR social network*[tiab] OR communication[mh] OR communication*[tiab] OR fake news[tiab] OR misinformation[mh] OR misinformation[tiab] OR blogging[mh] OR blog*[tiab] OR messag*[tiab] OR messenger[tiab] OR youtube[tiab] OR facebook[tiab] OR Instagram[tiab] pinterest[tiab] OR tweet*[tiab] OR twitter[tiab] OR snapchat[tiab] OR web 2.0[tiab] OR whatsapp[tiab] OR weChat[tiab] OR reddit[tiab] OR linkedIn[tiab] OR "linked in"[tiab] OR Viber[tiab] OR vimeo[tiab] OR quora[tiab] OR television[mh] OR television*[tiab] OR radio[mh] OR radio[tiab] OR newspaper*[tiab] OR magazine*[tiab] OR information dissemination[tiab] OR information sharing[tiab] OR information dissemination[tiab] OR disinformation[tiab] OR telegram[tiab] OR discussion forum*[tiab] AND Search: (Africa[mh] OR Africa*[tiab] OR Algeria*[tiab] OR Angola*[tiab] OR Benin[tiab] OR Botswana[tiab] OR Mofswana[tiab] or Batswana[tiab] OR Burkina Faso[tiab] OR Burkinabé[tiab] OR Burundi[tiab] OR Cameroon*[tiab] OR Canary Islands[tiab] OR Cape Verd*[tiab] OR Central African Republic[tiab] OR Chad[tiab] OR Comoros[tiab] OR Comorian*[tiab] OR Congo*[tiab] OR Democratic Republic of Congo[tiab])

OR Djibouti[tiab] OR Egypt*[tiab] OR Equatorial Guinea[tiab] OR Eritrea[tiab] OR Ethiopia*[tiab] OR Gabon*[tiab] OR Gambia[tiab] OR Ghana[tiab] OR Guinea[tiab] OR Guinea Bissau*[tiab] OR Ivory Coast[tiab] OR Cote d'Ivoire[tiab] OR Ivorian[tiab] OR Jamahiriya[tiab] OR Kenya[tiab] OR Lesotho[tiab] OR Mosotho[tiab] or Basotho[tiab] OR Liberia[tiab] OR Libya*[tiab] OR Libia[tiab] OR Madagascar[tiab] OR Malawi[tiab] OR Mali[tiab] OR Mauritania*[tiab] OR Mauritius[tiab] OR Morocc*[tiab] OR Mozambique[tiab] OR Mocambique[tiab] OR Mozambican[tiab] OR Namibia[tiab] OR Niger*[tiab] OR Nigeria*[tiab] OR Principe[tiab] OR Reunion[tiab] OR Rwanda*[tiab] OR Sao Tome[tiab] OR Senegal*[tiab] OR Seychell*[tiab] OR Sierra Leone*[tiab] OR Somali*[tiab] OR South Africa*[tiab] OR St Helena[tiab] OR Sudan*[tiab] OR Swazi[tiab] OR Swaziland[tiab] OR Eswatini[tiab] OR Tanzania*[tiab] OR Togo[tiab] OR Tunisia*[tiab] OR Uganda*[tiab] OR Western Sahara[tiab] OR Zaire[tiab] OR Zambia*[tiab] OR Zimbabwe*[tiab]) NOT (guinea pig[tiab] OR guinea pigs[tiab] OR aspergillus niger[tiab])

From Cochrane COVID-19 Study Register (<https://covid-19.cochrane.org/>)

media or "social medium" or "social network" or "social networks" or "social networking" or "fake news" or misinformation or disinformation or blog* or messenger or youtube or facebook or instagram or pinterest or tweet* or twitter or snapchat or whatsapp or wechat or reddit or linkedin or viber or vimeo or quora or television or radio or newspaper* or magazine* or telegram or "discussion forum" or "discussion forums" or "web 2" or "information sharing"

AND

Africa or Algeria or Angola or Benin or Botswana or "Burkina Faso" or Burkinabé or Burundi or Cameroon or "Canary Islands" or "Cape Verde" or "Central African Republic" or Chad or Comoros or Congo or Djibouti or Egypt or "Equatorial Guinea" or Eritrea or Ethiopia or Gabon or Gambia or Ghana or Guinea or "Guinea Bissau" or "Ivory Coast" or "Cote d'Ivoire" or Kenya or Lesotho or Liberia or Libya or Madagascar or Malawi or Mali or Mauritania or Mauritius or Morocco or Mozambique or Namibia or Niger or Nigeria or Principe or Reunion or Rwanda or "Sao Tome" or Senegal or Seychelles or "Sierra Leone" or Somali or "St Helena" or Sudan or Swaziland or Eswatini or Tanzania or Togo or Tunisia or Uganda or "Western Sahara" or Zaire or Zambia or Zimbabwe

From LOVE Platform (<https://app.iloveevidence.com/>) (COVID-19 Evidence)

media OR "social medium" OR "social network" OR "social networks" OR "social networking" OR "fake news" OR misinformation OR disinformation OR blog* OR messenger OR youtube OR facebook OR instagram OR pinterest OR tweet* OR twitter OR snapchat OR whatsapp OR wechat OR reddit OR linkedin OR viber OR vimeo OR quora OR television OR radio OR

newspaper* OR magazine* OR telegram OR "discussion forum" OR "discussion forums" OR "web 2" OR "information sharing"

AND

Africa OR Algeria OR Angola OR Benin OR Botswana OR "Burkina Faso" OR Burkinabé OR Burundi OR Cameroon OR "Canary Islands" OR "Cape Verde" OR "Central African Republic" OR Chad OR Comoros OR Congo OR Djibouti OR Egypt OR "Equatorial Guinea" OR Eritrea OR Ethiopia OR Gabon OR Gambia OR Ghana OR Guinea OR "Guinea Bissau" OR "Ivory Coast" OR "Cote d'Ivoire" OR Kenya OR Lesotho OR Liberia OR Libya OR Madagascar OR Malawi OR Mali OR Mauritania OR Mauritius OR Morocco OR Mozambique OR Namibia OR Niger OR Nigeria OR Principe OR Reunion OR Rwanda OR "Sao Tome" OR Senegal OR Seychelles OR "Sierra Leone" OR Somali OR "St Helena" OR Sudan OR Swaziland OR Eswatini OR Tanzania OR Togo OR Tunisia OR Uganda OR "Western Sahara" OR Zaire OR Zambia OR Zimbabwe