

Scoping review on lessons learnt on the promotion and use of drugs and traditional medicine in Africa during COVID-19

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ABSTRACT

Scientific evidence on the safety and efficacy of pharmaceutical drugs, substances and herbal medicines is important in medical advertising and promotion. Following guidelines for conducting a scoping review, we systematically searched PubMed, SCOPUS and Web of Science to identify in peer reviewed articles medications that were promoted and used widely in Africa during the COVID-19 pandemic. We also searched for information about how safety concerns about untested/or not properly tested drugs were communicated to the public during the pandemic. Of the 2043 articles identified, 41 papers were eligible for inclusion. Most studies were clinical trials ($n = 11$), systematic reviews ($n = 9$), quantitative studies ($n = 9$) the rest were qualitative studies, reviews and reports. We found that following global trends, several drugs, traditional and herbal treatments were used and repurposed for the treatment of respiratory symptoms of COVID-19 in Africa. The results highlighted the value of some herbal medicines for treatment during the COVID-19 pandemic, as well as the risks posed by the unregulated sharing of advice and recommendations on treatments in Africa, and globally.

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Introduction

During the COVID-19 pandemic, there was an increase in the use of scientifically untested or unverified treatment procedures and medicines for the management of the symptoms (Chavda et al., 2022). Global interconnectedness encouraged information sharing on possible drugs and treatments that could curb infection (Tsiotas & Tselios, 2022). In 2020, in the first months of the pandemic little was known clinically about the management of symptoms and, as a result, misinformation was shared about treatments and cures causing fear and potential harm to the public (Malik et al., 2020). Web-based information and social media became a source of information and a platform for public opinions, perceptions, and attitudes about COVID-19. The internet became a central source of information, including on the promotion and advertising of repurposed

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drugs to treat COVID-19 (Malik et al., 2020; Tsao et al., 2021). Information was shared online on the search for treatments using existing drug regimens for other conditions (Agoni & Soliman, 2021; Baracaldo-Santamaría et al., 2022) which sometimes resulted in the premature sharing of advice on use, before efficacy against COVID-19 was known.

In 2020, WHO Member States passed Resolution WHA73.1 in a Joint Statement on the COVID-19 response, recognising that managing misinformation provided via media and social media channels was a critical part of controlling the COVID-19 pandemic (World Health Organisation, 2020a, 2022b). The Resolution further urged Member States to provide reliable COVID-19 content, and take measures to counter mis- and disinformation by disseminating accurate information, based on science and evidence (World Health Organisation, 2020a, 2022b).

Globally, many repurposed drugs were advertised and marketed online ready for the public without prescriptions or evidence of their efficacy (Borges do Nascimento et al., 2022). There was insufficient knowledge about the safety of drugs that were approved for use for other conditions for example flu and malaria, for the treatment of the new disease (Alam et al., 2020; Perwitasari et al., 2021). People were encouraged, via social media, to try different formulations as they were exposed to misinformation (Borges do Nascimento et al., 2022; World Health Organisation, 2022b). A systematic review highlighting self-medication practices to prevent or manage COVID-19 symptoms found that the most frequently used medications were antibiotics, chloroquine or hydroxychloroquine, vitamins or supplements, ivermectin, and ibuprofen (Quincho-Lopez et al., 2021). Plant-based medicine use in parts of Africa was attributed to people searching for medicines which were effective, affordable and accessible in local health service settings (Lone & Ahmad, 2020).

We conducted a scoping review of literature on the different drugs and treatment substances that were promoted and used in Africa during the COVID-19 pandemic 2020–2022 to distil lessons on information sharing for future pandemics. We aimed to fill a knowledge gap by investigating how safety concerns, particularly for drugs lacking proper testing, were communicated to the public. This focus highlights the critical importance of transparent and ethically sound communication in public health emergencies. By analyzing experiences during the COVID-19 pandemic in Africa, we intend to offer insights to inform better practice in drug promotion, information sharing, and communication strategies during health crises. The outcomes of this research have the potential to improve preparedness and response strategies for future pandemics.

Materials and methods

We undertook a scoping review following the guidelines and methods of Arksey and O'Malley (2005). Scoping reviews are conducted to explore the breadth or depth of the literature, summarize the evidence and inform future research (Peters et al., 2020; Tricco et al., 2016). The framework of phenomenon of interest, concept and context were used in this scoping review to identify key concepts to use in our search: COVID-19, SARS-CoV-2 medications, treatment, traditional medicine, promotion, advertisement and publicity, and Africa were also included.

The key concepts were combined to form the key search terms that were used for all databases. Three electronic databases were searched for peer reviewed articles: PubMed, SCOPUS and Web of Science. The search terms included the Boolean term (COVID-19 OR 'SARS COV2') AND (medications OR medicine OR treatment OR drugs) AND (promotion OR advertisement) AND Africa. A further search was undertaken with Google Scholar. The literature search and selection of studies were done by following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The PRISMA flow diagram is shown in Figure 1. Articles were all exported to EndNote to create a backup reference library and record the number of duplicate records for the PRISMA flowchart (Figure 1).

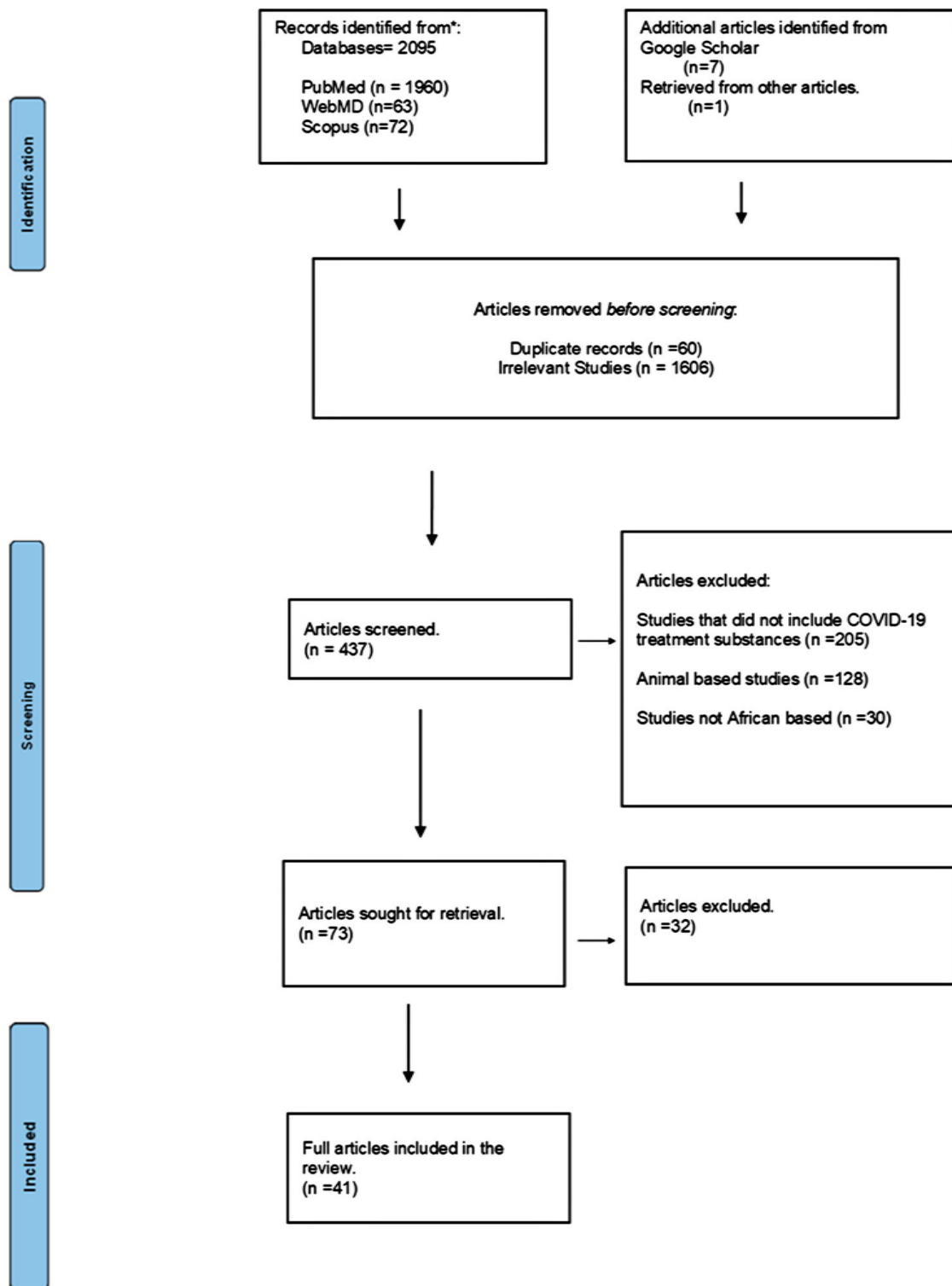


Figure 1. PRISMA Flow chart of the flow process.

Inclusion criteria

We considered articles that:

- highlighted drug promotion advertising during COVID-19
- described the medication or substances that were used in self-medication during the pandemic.
- full text English articles published during the COVID-19 pandemic
- articles that were published in the last three years.
- drugs used by humans.

Exclusion criteria

The search excluded articles:

- focusing on drugs or drug promotion research that is not COVID-19 related,
- drug testing on animals,
- not focused on countries in Africa.

Study selection

A total of 2095 articles was identified through the three electronic database searches. An additional 7 articles were identified through Google Scholar. 1606 studies were removed after duplicates and articles which were not relevant to the topic, were identified, 2043 articles were screened further (abstracts) by the first author to determine applicability. Four hundred and thirty seven articles remained, and these were screened according to inclusion and exclusion criteria. After this screening, 73 articles were considered for full text screening using the same criteria to identify a final list of papers meeting the study criteria. RSC and BN screened the 73 articles. Thirty two were excluded because 10 of the articles focused on drug promotion that was not COVID-19 related, three covered animal-testing studies, nine did not include information on drugs used for COVID-19, and nine more articles were not about Africa. One paper was excluded because it could not be accessed (see the PRISMA diagram in [Figure 1](#)).

Data analysis

Using a Microsoft Excel sheet, 41 eligible articles were retrieved and charted. Data charting was done by the first author (RSC) on to a table and recorded the key information of the source, such as author, journal, study description, findings relevant to the review question/s and topics related to study objectives: published information on medications that were promoted and used widely in Africa during the COVID-19 pandemic; and information shared with the public on safety concerns about untested/or not properly tested drugs. This information was shared among the co-authors and discussed during de-brief meetings where differences and discrepancies were resolved until a consensus was reached.

Results

Characteristics of the studies

The 41 articles were published between 2020 and 2022 during the COVID-19 pandemic. Eleven studies were conducted in South Africa, and six in Nigeria. Nine systematic reviews, four reviews, two commentaries, two reports and one study each from Burkina Faso, Ethiopia, Ivory Coast, Cameroon, Uganda, Tanzania and the Gambia.

Results were grouped into three main themes according to the key messages that were coming out of the papers. The themes were (a) drugs used and promoted during COVID-19 pandemic; (b) drugs repurposed for COVID-19 treatment; and (c) traditional and herbal medicines used during COVID-19.

Drugs used and promoted during COVID-19 pandemic

Following global trends on the use of repurposed drugs, several drugs were reported to be used in Africa to treat symptoms and curb the spread of COVID-19. For example, in Nigeria, a

cross-sectional survey using an internet-based questionnaire to investigate infection control and drug use among adults revealed that herbal remedies, supplements, ivermectin and antibiotics were used by participants to treat COVID-19 symptoms, in addition the high uptake of antibiotics was reported as a cause of concern among the population (Ogunyemi et al., 2022).

In Africa, as elsewhere in the world, both chloroquine and hydroxychloroquine were initially suggested as plausible drugs that could cure COVID-19 (Rouamba et al., 2021) and promotion of these substances led to extensive self-medication and fatal overdoses (Abena et al., 2020). Gnegel et al. (2020) reported that chloroquine and hydroxychloroquine were advertised and promoted in informal and patent markets in Cameroon and Democratic Republic of Congo, despite limited evidence of their effectiveness. In the context of the demand for drugs such as chloroquine because of COVID-19, Dagrou and Chimhutu (2022) undertook a study in Ivory Coast that looked at the informal drug markets in general, and found that they were flooded with falsified medical products during the pandemic, that were cheap, convenient and accessible despite the public health threat of self-medication and diagnosis.

In South Africa, Schellack et al. (2022) investigated links between social media feeds and the utilization of three re-purposed medicines; hydroxychloroquine, ivermectin and colchicine. They noted that the spike in ivermectin (a drug used in both veterinary and human medicine) use was closely correlated to social media conversations about this drug which were at their peak in 2021. They noted that social media interest increased with the involvement of local politicians in South Africa encouraging the use of the drug (Table 1).

Drugs repurposed for COVID-19 treatment

As noted above, following global trends, various drugs and treatments such as chloroquine, hydroxychloroquine and ivermectin, as well as remdesivir and ritonavir were recommended for treating and curbing the spread of the virus in Africa (Arjun et al., 2022). Several clinical trials recommended ivermectin for the prevention of transmission in Egypt (Azeez et al., 2021; Babalola et al., 2011), shortening the length of hospital stays and as a prophylactic chemotherapy in clinical trial data sets from Ethiopia, Tanzania and Uganda (Abd-Elsalam et al., 2021; Sardana & Mathachan, 2022) and reduction of patients' symptoms in Egypt and Nigeria (Aref et al., 2021; Oyefabi et al., 2022). In South Africa, while ivermectin was publicised on social media as a possible drug for the treatment of COVID-19, it was not registered for human use; it was a veterinary and agricultural product (Schellack et al., 2021) and further clinical trials were needed to assess its effectiveness in decreasing mortality in South Africa (Lorente et al., 2022; Marques et al., 2024), although that did not prevent misuse. Other substances such as azithromycin, zinc and vitamins were seen to be effective in reducing mild and moderate symptoms of COVID-19 in clinical trials done in Nigeria (Okogbenin et al., 2021). Clinical trials investigated the effectiveness of dexamethasone in treating asymptomatic COVID-19 patients in Egypt (Amponsah et al., 2022; Rashad et al., 2021) but recommended further tests on the drug to assess reductions in mortality in Ethiopia and more widely in sub-Saharan Africa (Abdela et al., 2021; Brotherton et al., 2020; Rashad et al., 2021; Ssekandi et al., 2021) and the effectiveness of targeting other variants of SARS COV 2 in South Africa (Fadaka et al., 2022). Remdesivir and dexamethasone were shown to reduce time in intensive care for patients in South Africa, showing a reduction in recovery time (Jo et al., 2020).

Safety concerns on the use of repurposed drugs such as ivermectin (Dicks et al., 2022) were a major issue in Africa mainly because of relatively weak monitoring systems on the use of off-label drugs and their adverse effects (Abena et al., 2020; Gathiram et al., 2021). It was noted by Rouamba et al. (2021) and Brotherton et al. (2020) that scientific data still needed to be generated for African settings, cautioning that harm could be caused when recommending the incorporation of repurposed drugs such as dexamethasone, chloroquine, hydroxychloroquine and azithromycin into treatment guidelines for COVID-19 associated symptoms in Africa

**Table 1.** Drugs used and promoted during COVID-19.

Author	Date of Publication	Journal Title	Title	Country	Drugs/Substances mentioned	Methodological Approach
C. Agoni et al	2021	Current Pharmaceutical Biotechnology	The Binding of Remdesivir to SARS-CoV-2 RNA-Dependent RNA Polymerase May Pave The Way Towards the Design of Potential Drugs for COVID-19 Treatment	South Africa	Remdesivir	Clinical trial
S. Abd-Elsalam et al	2021	J Med Virol	Clinical study evaluating the efficacy of ivermectin in COVID-19 treatment: A randomized controlled study	Egypt	Ivermectin	Clinical trial
A. Dargrou and V. Chimhutu	2022	Inquiry	I Buy Medicines From the Streets Because I Am Poor: A Qualitative Account on why the Informal Market for Medicines Thrive in Ivory Coast	Ivory Coast	Chloroquine, tramadol, antibiotics	Qualitative study
G. Gnegel et al	2020	The American journal of tropical medicine and hygiene	Identification of Falsified Chloroquine Tablets in Africa at the Time of the COVID-19 Pandemic	Cameroon	Chloroquine	Qualitative Study
A. O. Ogunyemi et al.	2022	Pan Afr Med J	An internet-based cross-sectional study on infection control practices and drug use for COVID-19 prevention in Nigerian adults	Nigeria	Antibiotics, ivermectin, antimalarials, herbal based home remedies containing natural spices turmeric, ginger, garlic	Cross sectional survey
N. Schellack et al.	2022	Antibiotics	Social Media and COVID-19 Perceptions and Public Deceptions of Ivermectin, Colchicine and Hydroxychloroquine: Lessons for Future Pandemics	South Africa	Ivermectin, colchicine and hydroxychloroquine	Quantitative Study

(Brotherton et al., 2020; Rouamba et al., 2021). Brotherton et al. (2020) went on to observe, in their review focused on African dexamethasone trials, that the results of clinical trials done in a high-income country may not apply where the population and the context of care might be vastly different (Table 2).

Traditional medicines used for prevention and treatment of COVID-19

Preventive and treatment practices used against COVID-19 drew on traditional medicine and indigenous curative measures and initiatives (Olaopa, 2020). Adunimay and Ojo (2022) reported in a systematic review that some African states such as Tanzania, Equatorial Guinea, Guinea-Bissau, and Togo actively engaged with researchers to see if traditional medicines could treat COVID-19. Adeleye et al. (2021) reviewed the literature on ethnomedicinal herbs available in Africa and observed that some traditional herbs could be used to develop drugs for the prevention, treatment and management of COVID-19. These authors also reported that research carried out on certain herbs such as *Artemisia afra* found in East Africa and Madagascar had shown that those herbs could be used to prevent infection with SARS-CoV2 as well as for the treatment of respiratory diseases, including COVID-19.

McHome et al. (2021) reported that in Tanzania, women brewed homemade medicinal drinks made of common spices and herbs such as ginger, cinnamon, garlic, lemon, and leaves of plants such as lemongrass and eucalyptus and *Kashwagara* (local mint plants). People also used the steam from a bowl of boiled herbal concoction or spices and inhaled steam with their heads covered with a cloth (McHome et al., 2021). In Nigeria, the *Uda* seeds or Negro/Selim pepper and the *Uziza* seeds were consumed extensively to treat respiratory system diseases during the COVID-19 pandemic (Onebunne et al., 2020). Odebunmi et al. (2022) undertook an ethnobotanical survey in Nigeria which indicated a high usage of medicinal remedies to prevent and treat COVID-19 and related respiratory infections, particularly colds and flu.

Alternative treatments such as traditional Chinese medicine were also reported as being used in South Africa (Hu, 2022). Hu (2022) undertook a qualitative methods study during the pandemic in Gauteng Province, South Africa, and found that COVID-19 patients explored the use of traditional Chinese herbal medicines and found them beneficial. The traditional Chinese medicine was used as an inexpensive way to treat COVID-19.

However, caution against indiscriminate use of medicinal plants for the treatment of COVID-19 has been highlighted by Akindele et al. (2020), Verma et al. (2020), Dzobo et al. (2021) and Omokhua-Uyi and Van Staden (2021). The above authors advised that there was a need for further pharmacological and toxicological studies to determine the efficacy and safety profile of these plant products. Omokhua-Uyi and Van Staden (2021) observed that natural products may have had great potential against COVID-19 but without detailed clinical trials, their potency against the virus and their safe use could not be established (Table 3).

The World Health Organisation raised safety concerns about the use of traditional medicine when the President of Madagascar proclaimed that a herbal drink derived from anti-malarial plants was useful in the treatment of COVID-19 in 2020 (World Health Organisation, 2020b). Several African governments such as Guinea, Equatorial Guinea, Guinea-Bissau, Liberia and Tanzania purchased large quantities of this herbal drink (Omokhua-Uyi & Van Staden, 2021). While the drink was applauded by the Madagascar government for being helpful in relieving symptoms of COVID-19, there was no scientific proof that it was an effective treatment. A concern was raised that people who consumed this drink may become susceptible to malaria as they may develop resistance to the drug artemisinin that contains these herbs (Omokhua-Uyi & Van Staden, 2021).

Several studies highlight safety concerns for the users of herbal substances (Gathiram et al., 2021; Ogunyemi et al., 2022; Omokhua-Uyi & Van Staden, 2021; Rouamba et al., 2021; Yang, 2020). Gnegel et al. (2020) and Dagrou and Chimhutu (2022) recommended the establishment of appropriate drug screening technologies and regulatory frameworks in low and middle income countries (LMICs) because of concerns about the proliferation of fake and illegal drugs in Africa's informal

**Table 2.** Drugs repurposed for COVID-19 treatment.

Author	Date of Publication	Journal Title	Title	Country	Drugs/Substances mentioned	Methodological Approach
E. A. Eboireme et al	2020	Pan African Medical Journal	Any and every cure for COVID-19 : An imminent epidemic of alternative remedies amidst the pandemic?	Ghana, Madagascar and Nigeria		Commentary
B. Arjun et al,	2022	Current Drug Safety	Assessment of COVID-19 Treatment Advised in Different Ethnic Populations	Africa		Quantitative Study
T. A. Azeez et al	2021	Indian Journal of Pharmacology	Chemoprophylaxis against COVID-19 among health-care workers using Ivermectin in low- and middle-income countries: A systematic review and meta-analysis	Africa	Ivermectin	Systematic review
P. M. Abena et al	2020	Am J Trop Med Hyg	Chloroquine and Hydroxychloroquine for the Prevention or Treatment of COVID-19 in Africa: Caution for Inappropriate Off-label Use in Healthcare Settings	Africa	Chloroquine and hydroxychloroquine	Commentary
S. A. Okogbenin et al	2021	Niger Postgrad Med J	Clinical characteristics, treatment modalities and outcome of coronavirus disease 2019 patients treated at thisday dome isolation and treatment centre, federal capital territory Abuja, Nigeria	Nigeria	Azithromycin, zinc and vitamins	Quantitative Study
S. G. Abdela et al	2021	American Journal of Tropical Medicine and Hygiene	Clinical profile and treatment of covid-19 patients: Experiences from an Ethiopian treatment center	Ethiopia		Clinical trial
Z. F. Aref et al.	2021	Int J Nanomedicine	Clinical, Biochemical and Molecular Evaluations of Ivermectin Mucoadhesive Nanosuspension Nasal Spray in Reducing Upper Respiratory Symptoms of Mild COVID-19	Egypt	Ivermectin	Clinical trial
A. Oyefabi et al.	2022	West Afr J Med	Comparison of the Ivermectin and Lopinavir/Ritonavir Treatment Outcomes among COVID-19 Mild to Moderate Cases in Kaduna State	Nigeria	Lopinavir/Ritonavir and ivermectin	Clinical trial
A. O. Fadaka et al.	2022	J Biomol Struct Dyn	Computational insight of dexamethasone against potential targets of SARS-CoV-2	South Africa	Dexamethasone	Clinical trial
A. Magala et al.	2021	J Multidiscip Healthc	Corticosteroids Use in Pregnant Women with COVID-19: Recommendations from Available Evidence	Uganda		Clinical trial
Y. Jo et al.	2020	medRxiv	Cost-effectiveness of remdesivir and dexamethasone for COVID-19 treatment in South Africa	South Africa	Remdesivir and dexamethasone	Quantitative Study

L. M. T. Dicks et al.	2022	Probiotics Antimicrob Proteins	Could the COVID-19-Driven Increased Use of Ivermectin Lead to Incidents of Imbalanced Gut Microbiota and Dysbiosis?	South Africa	Ivermectin	Review
P. Gathiram et al. H. Brotherton et al.	2021 2020	J Reprod Immunol Lancet Glob Health	Covid-19 pandemic: Perspectives on management Dexamethasone for COVID-19: data needed from randomised clinical trials in Africa	South Africa The Gambia	Dexamethasone	Brief report Clinical trial-The Gambia
S. K. Amponsah et al.	2022	Frontiers in Pharmacology	Efficacy and safety profile of corticosteroids and non-steroidal anti-inflammatory drugs in COVID-19 management: A narrative review	Egypt	Dexamethasone	Review
K. Sardana et al.	2022	Journal of Cosmetic Dermatology	Is there any prophylactic role for ivermectin in COVID-19 – A literature summary	Africa	Ivermectin	Systematic Review
L. L. Marques et al.	2022	Braz J Biol	Ivermectin as a possible treatment for COVID-19: a review of the 2022 protocols	Africa	Ivermectin	Systematic Review
V. P. F. Lorente et al.	2022	South African Medical Journal	Ivermectin exposures reported to the Poisons Information Helpline in South Africa during the COVID-19 pandemic	South Africa	Ivermectin	Quantitative Study
N. Schellack et al.	2021	SA Pharmaceutical Journal	Ivermectin in the treatment of COVID-19-friend or foe?	South Africa	Ivermectin	Quantitative Study
O. E. Babalola et al.	2022	Qjm	Ivermectin shows clinical benefits in mild to moderate COVID19: a randomized controlled double-blind, dose-response study in Lagos	Nigeria	Ivermectin	Clinical trial
T. Rouamba et al.	2021	Ther Clin Risk Manag	Safety of Chloroquine or Hydroxychloroquine Plus Azithromycin for the Treatment of COVID-19 Patients in Burkina Faso: An Observational Prospective Cohort Study	Burkina Faso	Chloroquine, hydroxychloroquine and azithromycin	Quantitative Study
A. Rashad et al.	2021	Sci Rep	Short term survival of critically ill COVID-19 Egyptian patients on assisted ventilation treated by either Dexamethasone or Tocilizumab	Egypt	Dexamethasone Tocilizumab	Clinical trial
S. E. Sattui et al.	2020	Expert Review of Clinical Immunology	Swinging the pendulum: lessons learned from public discourse concerning hydroxychloroquine and COVID-19	Africa	Hydroxychloroquine	Systematic Review

**Table 3.** Traditional medicines used for prevention and treatment of COVID-19.

Author	Date of Publication	Journal Title	Title	Country	Drugs/Substances mentioned	Methodological Approach
Z. McHome et al.	2021	Int J Environ Res Public Health	Women's Narratives about COVID-19, Preventive Practices and Sources of Information in Northwestern Tanzania	Tanzania	Cinnamon, garlic, lemon, leaves of plants such as lemongrass and eucalyptus and <i>Kashwagara</i> (local mint plants)	Qualitative Study
A. W. Adunimay et al.	2022	Frontiers in Political Science	Western Centric Medicine for Covid-19 and Its Contradictions: Can African Alternate Solutions Be the Cure?	Tanzania, Equatorial Guinea, Guinea Bissau, Togo		Systematic review
A. J. Akindele et al.	2020	Natural Product Communications	COVID-19 Pandemic: A Case for Phytomedicines	Nigeria	docetaxel, lovastatin (<i>Aspergillus</i> , <i>Ranunculus ternatus</i> , <i>Artemisia annua</i> , <i>Colchicum autumnale</i>), adeserpidine (<i>Rauwolfia canescens</i> , <i>Thymus vulgaris</i> , <i>Chondodendron tomentosum</i> , <i>Pausinystalia yohimbe</i>), Veregen, sinecatechins; derived from Green tea – dried leaves of <i>Camellia sinensis</i>	Systematic Review
S. Verma et al.	2020	Frontiers in Pharmacology	Anti-SARS-CoV Natural Products With the Potential to Inhibit SARS-CoV-2 (COVID-19)	South Africa	<i>Adansonia digitata</i> L, <i>Agathosma betulina</i> (P.J.Bergius) Pillans, <i>Aloe excelsa</i> , <i>Aspalathus linearis</i>	Clinical trial
K. Dzobo et.al	2021	Omics	Coronavirus Disease-2019 Treatment Strategies Targeting Interleukin-6 Signalling and Herbal Medicine	South Africa	<i>Cannabis sativa</i> , <i>Isatis indigotica</i> root extracts, <i>Houttuynia cordata</i>	Review
J. I. Onebunne et al	2020	OCHENDO: An African Journal of Innovative Studies	COVID-19 and African environmental/herbal based remedies	Africa	Uda seeds, Uziza seeds	Brief Report
Z. Hu	2022	Altern Ther Health Med	COVID-19 Patients' Views and Experiences of Traditional Chinese Medicine Treatment in South Africa	South Africa	Chinese herbs	Qualitative study

C. A. Odebunmi et al.	2022	Plants (Basel)	Ethnobotanical Survey of Medicinal Plants Used in the Treatment of COVID-19 and Related Respiratory Infections in Ogbomosho South and North Local Government Areas, Oyo State, Nigeria	Nigeria	<i>Zingiber officinale</i> , <i>Citrus limon</i> , <i>Zingiberaceae</i> <i>Annonaceae</i> , <i>Meliaceae</i> , <i>Rubiaceae</i> , <i>Asteraceae</i> ,	Quantitative Study
O. A. Adeleye et al	2021	Futur J Pharm Sci	Ethnomedicinal herbs in African traditional medicine with potential activity for the prevention, treatment, and management of coronavirus disease 2019	Africa	Garlic, oursup, Graviola, Prickly custard apple, Wild wormwood, African wormwood, Neem, Ghana quinine, Yellow dye root, Turmeric, Hairy spurge, Garden spurge, Milkweed, Asthma-plant Bitter kola	Systematic Review
O. R. Olaopa	2020	International Journal of Technological Learning, Innovation and Development	Harnessing African indigenous knowledge for managing the COVID-19 pandemic in Africa	Zambia, Ghana, Nigeria and Togo		Systematic Review
A. G. Omokhua-Uyi	2021	S Afr J Bot	Natural product remedies for COVID-19: A focus on safety	South Africa and Senegal	<i>Theaflavin</i> , <i>Camellia sinensis</i> , <i>Armeniaceae</i> <i>Semen Amarum</i> , <i>Ephedrae Herba</i> , <i>Gypsum Fibrosum</i> , <i>Scutellariae Radix</i> , <i>Attractylodis Rhizoma</i> , <i>Poria Sclerotium</i> , <i>Citri Reticulatae Pericarpium</i> , <i>Pinelliae Praeparatum Cum Zingiberis</i> , <i>Forsythiae Fructus</i> , <i>Magnoliae Officinalis Cortex</i> and <i>Agastachis Herba</i>	Systematic Review
A. F. Attah et al	2021	Frontiers in Pharmacology	Therapeutic Potentials of Antiviral Plants Used in Traditional African Medicine With COVID-19 in Focus: A Nigerian Perspective	Nigeria	Family of plants such as alkaloids, flavonoids, phenolic compounds, terpenes, polysaccharides and polypeptides	Review

markets. These authors go on to state that Africa lacked a strong regulatory framework that prohibited the procurement and dispensing of any unregistered medicine during the pandemic leading to the dispensing of unregulated medicines and an increase in the introduction of falsified versions of medicines posing serious risks to patients. Abena et al. (2020) recommended that in the future, sub-Saharan African countries could be encouraged to consider implementing prescription monitoring schemes to ensure that any off-label CQ/HCQ use is appropriate.

Discussion

This scoping review provides evidence and valuable insight into the drugs and substances that were used during the pandemic in Africa. Literature on this topic which is novel to Africa was limited mainly because of the global interconnectedness of information on drug promotion shared widely. Access to global information exposed people to information on different remedies and drugs to either treat COVID symptoms or prevent the disease.

Social media promoted the use of untested and unverified substances for treatment during the pandemic, posing safety concerns to the public (Topf & Williams, 2021). The use of repurposed drugs even when promising results on the management of COVID-19 patients were shown, also raised safety concerns, in the absence of clinical trials (Khan et al., 2020; Yimer et al., 2021). Building on the learning from the COVID-19 pandemic, the World Health Organisation has highlighted the need for the use of unproven drugs to be governed by ethical and regulatory guidelines and to the gathering of evidence (World Health Organisation, 2022a).

Use of media, including traditional outlets can be effective channels for distributing accurate and reliable information from authoritative sources such as government health agencies, researchers, medical experts, and international organizations. As a way to control the misinformation spread during the pandemic, different forms of media were used to counteract false narratives and rumours that fuelled infodemics (World Health Organisation, 2020a). Strategies such as researchers directly interacting with health professionals on these platforms discussing evidence-based health-related information, can be developed to mitigate the sharing of misinformation as suggested by Manene et al. (2023).

The recognition of gaps and challenges in drug promotion, usage, and communication during the COVID-19 pandemic in Africa has sparked a renewed emphasis on strengthening equity in pandemic preparedness. The disparities and vulnerabilities exposed during the crisis highlight the need for inclusive and accessible healthcare strategies that consider the diverse socio-economic and regional contexts within the African continent. Strengthening existing health systems is vital to achieve this equity, ensuring that all communities have equal access to reliable information, healthcare resources, and interventions. This includes not only addressing the immediate concerns related to unregulated drug use but also strengthening healthcare infrastructure to withstand future public health challenges.

Locally-driven research and innovation has to be supported especially in assessing the value of traditional medicine, used locally, during pandemics (World Health Organisation, 2020b). This can bridge the gap between traditional knowledge and modern healthcare. Collaboration between local researchers, international experts, and organizations can facilitate the exchange of knowledge, resources, and expertise. This can lead to a more comprehensive understanding of the potential of traditional medicine in pandemic responses.

In our review, we highlighted safety and efficacy concerns regarding medications used and promoted during the pandemic. Due to a limited availability of this literature on Africa, we were unable to highlight major trends in medication use on the continent that were novel or unique to our study.

Conclusions, implications of the study and directions for future research

Insufficient evidence and information on the safety and efficacy of drugs that were advertised in Africa during the COVID-19 pandemic may have exposed the public to the danger of

improper use. Safety concerns about the drugs that were untested or not properly tested were not reliably communicated to the public clearly. Our review has shown that information and/ misinformation is transferred via social media channels very quickly and therefore to prevent re-occurrence of such scenarios in future pandemics, governments and decision makers ought to be equipped with appropriate knowledge and offer timely information to end users as it evolves to counter misinformation on social media and the misuse of medicines that may result.

This research has immediate implications for enhancing public health strategies in Africa, offering insights to improve communication practices, regulatory frameworks, and regional interventions during health emergencies. Practically, refining communication strategies based on how safety concerns were conveyed, tailoring health promotion messaging and interventions to diverse contexts, and strengthening medicine and drug regulations. Future research may involve conducting a global comparative analysis, evaluating health policy implementation and developing innovative communication approaches. The findings contribute to evidence-based practices and health policies that can mitigate risks and enhance public health responses in the face of emerging health crises.

This review of literature has highlighted the value of some herbal medicines for treatment during the COVID-19 pandemic, as well as the risks posed by the unregulated sharing of advice and recommendations on treatments over social media. There is a need for the regulation of unverified traditional medicines and repurposed drugs to protect people in resource-constrained settings who may put their trust in misinformation shared over social media.

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