

Pseudoscientific beliefs and practices in the COVID-19 pandemic: A narrative review of unwanted experiments attributed to social media-based misinformation afflicting the public health

Crenças e práticas pseudocientíficas na pandemia do COVID-19: uma revisão narrativa de experimentos indesejados atribuídos à desinformação da mídia social que afeta a saúde pública

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Abstract

Background: On January 30, 2020, India reported its first coronavirus disease 2019 (COVID-19) positive case that led to the national lockdown, health surveillance, and travel restrictions. The Government of India (GoI) is advising personal hygiene practices as prophylaxis, however, remains poorly understood by the people. Too, believing in social media-based misinformation leading to pseudoscientific practices suggesting all from giving up non-vegetarian food to eating garlic is afflicting. This review sheds light on pseudoscientific beliefs and practices of the Indian public to prevent COVID-19. **Methods:** This narrative review gathered scientific evidence to describe the facts against pseudoscientific beliefs and practices in the COVID-19 pandemic. We examined available evidence from relevant research articles to present the facts about pseudoscientific practices. In particular, regarding the use of complementary and alternative medicine and its practice to prevent COVID-19, we searched the high-quality literature in PubMed, PubMed Central, and Cochrane Library databases for the determined outcomes. **Results:** Based on scientific shreds of evidence, it is apparent that social media-based misinformation and its pseudoscientific practices severely affecting the public health in the COVID-19 pandemic. The public must look into the facts rigorously before performing pseudoscientific practices and need to follow GoI instructions perpetually. The findings of this review suggest a high level of public awareness of evidence-based prophylactic measures. **Conclusion:** There is an urgent need for public health promotion initiatives to bring up awareness of the COVID-19 spread and its preventive hygiene practices. The dissemination of health awareness to the public across the nation is warranted.

Keywords: COVID-19 pandemic. Indian public. Social media-based misinformation. Pseudoscientific beliefs and practices. Public health threat.

Resumo

Antecedentes: em 30 de janeiro de 2020, a Índia relatou seu primeiro caso positivo da doença de coronavírus 2019 (COVID-19) que levou ao bloqueio nacional, vigilância em saúde e restrições de viagem. O governo da Índia (GI) está aconselhando práticas de higiene pessoal, pois a profilaxia continua sendo pouco compreendida pelo povo. Também, acreditar na desinformação baseada nas mídias sociais, levando a práticas pseudocientíficas, sugerindo tudo, desde desistir de alimentos não vegetarianos até comer alho, é aflitivo. Esta revisão lança luz sobre crenças e práticas pseudocientíficas do público indiano para prevenir o COVID-19. **Métodos:** Esta revisão narrativa reuniu evidências científicas para descrever os fatos contra crenças e práticas pseudocientíficas na pandemia do COVID-19. Examinamos as evidências disponíveis de artigos de pesquisa relevantes para apresentar os fatos sobre práticas pseudocientíficas. Em particular, com relação ao uso de medicina complementar e alternativa e sua prática para prevenir o COVID-19, pesquisamos a literatura de alta qualidade nos bancos de dados PubMed, PubMed Central e Cochrane Library para os resultados determinados. **Resultados:** Com base em fragmentos científicos de evidência, é aparente que a desinformação baseada nas mídias sociais e suas práticas pseudocientíficas afetam gravemente a saúde pública na pandemia do COVID-19. O público deve analisar os fatos rigorosamente antes de executar práticas pseudocientíficas e precisa seguir as instruções do GI perpetuamente. Os resultados desta revisão sugerem um alto nível de conscientização pública sobre medidas profiláticas baseadas em evidências. **Conclusão:** Há uma necessidade urgente de iniciativas de promoção da saúde pública para conscientizar sobre a disseminação do COVID-19 e suas práticas preventivas de higiene. A disseminação da conscientização da saúde ao público em todo o país é justificada.

Palavras-chave: Pandemia de COVID-19. Público indiano. Desinformação baseada em mídias sociais. Crenças e práticas pseudocientíficas. Ameaça à saúde pública.

INTRODUCTION

At the end of 2019 and the beginning of 2020, global public health is confronting a potential threat. The unexpected outbreak of a novel coronavirus (2019-nCoV), emerged from Wuhan, Hubei Province, the People's Republic of China in December 2019¹. Officially, the International Committee on Taxonomy of Viruses (ICTV) named 2019-nCoV as coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), spreading rapidly across the globe². This situation prompted the World Health Organization (WHO) to declare a Public Health Emergency of International Concern (PHEIC)³. At the global level, developed and developing nations

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Conflict of interest: The authors declare no conflict of interest.

Received: 2020 Jul 5; Revised: 2020 Jul 16; Accepted: 2020 Jul 21

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confronting difficulties to tackle the COVID-19 pandemic and its increasingly challenging morbidity and mortality. At present, neither vaccine to prevent nor effective antiviral drugs to cure COVID-19⁴. India reported its first COVID-19 positive case in Kerala on January 30, 2020⁵. Within a short period, the number of positive cases reported across the country, and fatalities gradually increased⁶. Owing to this panic situation, people believing in pseudoscience to prevent COVID-19 suggesting all from giving up non-vegetarian food to eating garlic is afflicting.

The COVID-19 prevention strategies of India

The Government of India (GoI) is taking tremendous efforts to control the COVID-19 transmission at the national level. The GoI has implemented policies on lockdown, health surveillance, and travel restrictions to the affected areas⁷. The GoI is raising awareness on COVID-19 and its preventive measures such as routine hand sanitization, good respiratory hygiene practice with face masks, social distancing, immunity-boosting diet intake, and healthy active lifestyle⁸. Nevertheless, the COVID-19 preventive measures are not well understood by the people, involving pseudoscientific practices.

Pseudoscientific beliefs and practices

There is a great proverb, "Prevention is better than cure" used concerning health and disease. In India, the COVID-19 prophylaxis has been misunderstood by the people, practicing pseudoscience in the pandemic. Here, we highlight some pseudoscientific beliefs of the Indian public and their practices to prevent COVID-19. Also, we discuss scientific evidence-based facts against social media-based misinformation leading to pseudoscientific practices.

Self-prescribed use of complementary and alternative medicine

In India, Ayurveda, Yoga and naturopathy, Unani, Siddha, and Homeopathy (AYUSH) systems-based complementary and alternative medicine (CAM) traditionally used to treat several ailments. But, at present, there is no scientific evidence on CAM that can prevent or cure COVID-19⁹.

On January 29, 2020, through the Press Information Bureau, India's CAM research apex body, the Ministry of AYUSH released an advisory recommended the use of Homeopathic for the prevention and Unani medicines for symptomatic management of CoV infection¹⁰. On March 6, 2020, a further advisory of the AYUSH ministry recommended a three-point holistic approach comprised of preventive and prophylactic medications in the symptomatic management of COVID-19 like ailments and its conventional care, followed after consultation with qualified AYUSH practitioners (Table 1). Also, advised AYUSH-specific measures of yoga and pranayama practices under the guidance of qualified yoga instructors and medicinal plants *Ocimum sanctum*, *Tinospora cordifolia*, *Zingiber officinale*, and *Curcuma longa* to manage similar symptoms. This advisory recalled the

WHO's expert group recommendation of the Ebola virus (EBV) outbreak in 2014, stating that "it is ethical to offer unproven interventions with as yet unknown efficacy and adverse effects, as a potential treatment or prevention" keeping in view no vaccine or antivirals were available.

This advisory has cited relatively few reviews and research studies of biological and pharmacological activities claiming that these CAM-based interventions will help to boost the immunity and manage the respiratory illness¹¹. However, cited literature depicts limited direct evidence and lacks high-quality clinical intervention trials of Homeopathy and Siddha remedies. Since the outbreak, Homeopathy and Siddha practitioners claiming the use of both system remedies in the COVID-19 therapy. In particular, Homeopathic remedy *Arsenicum album* 30 (*Ars-Alb-30*) and multi-herbal Siddha concoctions *Nilavembu Kudineer* (NVK) and *Kaba Sura Kudineer* (KSK) have been recommended as COVID-19 preventive medicine, stimulated our interest to focus on its virucidal efficacy.

Ars-Alb-30, referred to as the white oxide of metallic element arsenic, prepared by separating arsenic from iron, cobalt, and nickel after baking the minerals at high temperatures and then the powder is crushed and diluted with milk sugar. *Ars-Alb-30* is useful in the treatment of severe acute and chronic ailments, including colds, sore throats, influenza, fevers, bronchitis, herpes simplex, chickenpox, measles, mumps, and allergies¹². In Siddha, a variety of febrile episodes treated using NVK and KSK. Generally, multi-herbal ingredients formulated to meet the desired therapeutic effects which cannot be harbored by phytochemicals of an individual herb¹³. NVK is a combination of 9 herbs includes *Andrographis paniculata*, *Vetiveria zizanioides*, *Plectranthus vettiveroides*, *Zingiber officinale*, *Piper nigrum*, *Cyperus rotundus*, *Santalum album*, *Trichosanthes cucumerina*, and *Mollugo cerviana* in equal proportion. Among all, *A. paniculata* (referred to as *nilavembu* in Siddha) is the primary ingredient, hence derived its name in prefix^{14,15}. KSK is a combination of 15 herbs viz. *A. paniculata*, *Clerodendron serratum*, dried ginger, *Piper longum*, *Syzygium aromaticum*, the root of *Justicia beddomei*, *Tragia involucrate*, *Tinospora cordifolia*, *Anisochilus carnosus*, *C. rotundus*, *Costus speciosus*, *Anacyclus pyrethrum*, *Sida acuta*, *Hygrophilla auriculata*, and *Terminalia chebula*¹⁶.

In Tamil Nadu, NVK and KSK managed febrile episodes of previous outbreaks caused by dengue virus (DENV), chikungunya virus (CHIKV), and swine flu^{17,18}. Hence, our main interest was to look at the literature pertinent to antiviral efficacy and the use of all three remedies in the management of symptomatic-illness verifying clinical intervention in human trials. NVK, and KSK both are multi-herbal compositions, it is, therefore, irrational to do a literature search on the individual herb or its chief active ingredient of these concoctions. Hence, we excluded studies that explored the efficacy of a single herb or its specific bioactive constituent alone or in other combinations, except NVK and KSK.

Table 1. AYUSH approach to manage the COVID-19 pandemic

Approach	Ayurveda	Unani	Siddha	Homeopathy
Preventive and prophylactic remedies	Samshamani Vati	Decoction of Behidana, Unnab, and Sapistan	Nilavembu Kudineer	Arsenicum album 30
Symptomatic management of COVID-19 like illnesses	AYUSH 64 Agastya Hareetaki, Anuthaila/Sesame oil	-	Nilavembu Kudineer/ Kaba Sura Kudineer Adathodai Manapagu	Arsenicum album 30, Bryonia alba, Rhus toxicodendron, Belladonna, Gelsemium, Eupatorium perfoliatum
Add on interventions to the conventional care	AYUSH 64 Agastya Hareetaki,	-	Vishasura Kudineer Kaba Sura Kudineer	Remedies mentioned earlier for the symptomatic management of COVID-19 like illnesses

METHODS

We performed a literature search using the terms: "Arsenicum album 30," "Nilavembu Kudineer," and "Kaba Sura Kudineer," in PubMed, PubMed Central, and Cochrane Library databases, up to May 2020. We searched the literature between May 6 and 9, 2020. We excluded other electronic databases, including the search engine of Google Scholar. In total, 31 records retrieved for Ars-Alb-30, includes n=10 from PubMed, n=14 from PubMed Central, and n=7 from the Cochrane Library. Overall, 10 records retrieved for NVK, includes n=3 from PubMed, n=7 from PubMed Central, and no results found in the Cochrane Library database. Surprisingly, no results found on KSK in all three databases. Literature retrieved for each remedy from all three databases combined into a single file and duplicate citations removed after careful screening of the title, author's name, journal's name, publication year or date, volume, issue, and page numbers. The inclusion criteria restricted to original research articles and clinical trials, and any types of reviews excluded. Studies and clinical trials involving the antiviral efficacy of all three remedies and their use in the management of symptomatic-illness were thoroughly scrutinized by manually reviewing the title, abstract, and full-text and considered eligible for inclusion. We excluded

redundant papers relevant to other biological activities and medicinal properties.

RESULTS

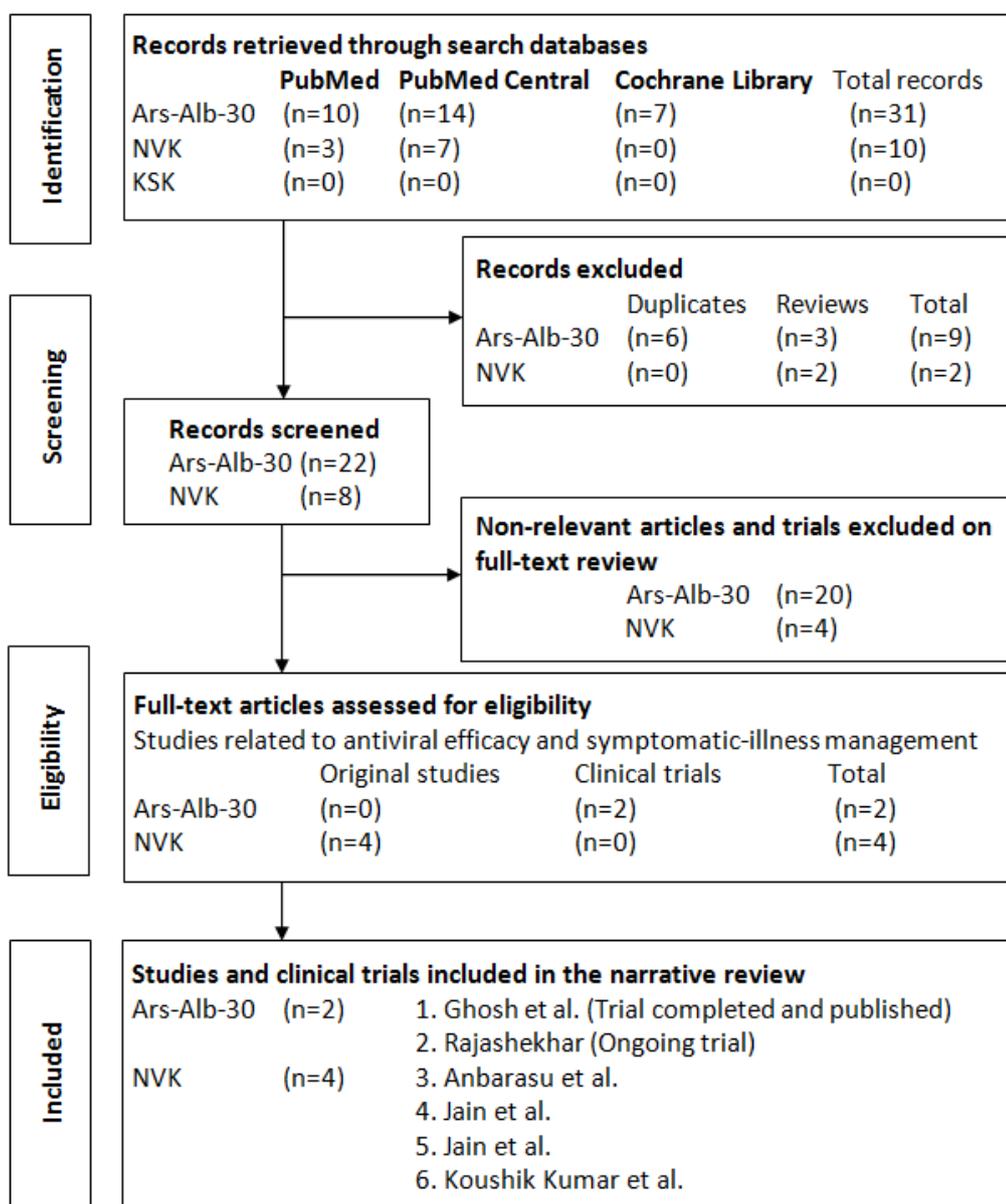
Table 2 summarizes the outcome of the literature search. Notably, we found only two clinical trials involving humans (one published¹⁹ and one ongoing²⁰) on Ars-Alb-30. We excluded a trial and non-relevant studies of Ars-Alb-30 against the arsenic toxicity. In contrast, we did not find any clinical intervention trials, and only four (one in vivo²¹, two in vitro^{22,23}, and one in silico docking²⁴) studies found on NVK (Figure 1). Practically, the Siddha system prescribes NVK as a crude decoction (crude powder of nine herbs equally mixed, boiled in water, and reduced one-fourth of the volume to concentrate, and consumed within three hours)^{15,25}. Surprisingly, one of the in vitro study tested aqueous extracts of NVK showed no antiviral activity against CHIKV infection²². But, in vivo and in vitro studies have shown biological efficacy of NVK using solvent (ethanolic) extraction seemed largely unresponsive for clinical evidence.

Table 2. Included studies from all three databases

Remedies	Study	Year	Study type and design	Outcome	Total number of clinical trial interventions involving humans
Ars-Alb-30	Ghosh et al. ¹⁹	2018	Prospective, double-blind, randomized, placebo-controlled clinical trial in children (Trial registration: CTRI/2017/02/007939)	Ars-Alb-30 could not produce differentiable effect from placebo in preventing febrile episodes following Diphtheria-Pertussis-Tetanus (DPT) Hepatitis B and Polio vaccination	2
	Rajashekhar ²⁰	2019	Randomized, controlled clinical trial (Trial registration: CTRI/2019/11/022029)	Role of Ayurveda and Homeopathy in Common Cold (Ongoing)	

Remedies	Study	Year	Study type and design	Outcome	Total number of clinical trial interventions involving humans
NVK	Anbarasu et al. ²¹	2011	In vivo (Rats and mice)	Ethanollic extract of NVK choornam possess antipyretic, anti-inflammatory, and analgesic properties, supports the efficacy in CHIKV fever	-
	Jain et al. ²²	2018	In vitro (Cell lines)	Five types of bioassays evaluated the antiviral activity of several Siddha formulations including NVK, exhibited no antiviral activity against CHIKV	
	Jain et al. ²³	2019	In vitro (Organ-specific cell lines)	Ethanollic extract of NVK has shown possible mode of action during CHIKV and DENV infection in vitro	
	Koushik Kumar et al. ²⁴	2015	In silico docking	Six bioactive molecules from NVK can act as potential lead compounds against CHIKV infection	

Figure 1. Flowchart depicting the search, screening, and article selection process



DISCUSSION

This review is the first of its kind to examine available literature for Homeopathy (Ars-Alb-30) and Siddha remedies (NVK and KSK), practiced by the Indian public to prevent COVID-19. We focused on original studies and clinical trials related to the antiviral efficacy of these remedies and its use in the management of symptomatic-illness.

Nonetheless, the retrieved literature limited by a scarcity of high-quality scientific evidence and clinical intervention trials on NVK and KSK, suggests a lack of adequate validation against viral diseases and, therefore, a need for extensive research on efficacy testing of these concoctions in preclinical, *in vitro*, and clinical settings. Taken together, preclinical data, *in vitro* experimental evidence, and well-designed extensive case-control clinical trial intervention outcome must be linked together to understand the efficacy of these remedies.

Our literature search revealed that there is a lack of clinical trial intervention studies for KSK. Besides, there are significant discrepancies in the expert opinion about KSK. A recent report from the Director of the National Institute of Siddha stated that KSK is not for boosting immunity and recommended preventive measures such as hand sanitization and physical distancing²⁶. Conversely, another Siddha practitioner claims KSK will boost the immunity level by acting as an immunomodulator. However, not everyone needed to consume it, except those affected with the disease can take as a preventive measure. Further stated, people are under the misconception that taking the remedy and roaming will keep them immunized against the virus and recommended stay home as the mandatory remedy²⁷. Moreover, there are attractive online advertisements by herbal drug sellers stating that KSK will fight against viral fevers and manage the pandemic symptoms. The public is adhering to online claims, without consultation and prescription from practitioners, obtaining KSK and Ars-Alb-30 from AYUSH pharmacists and Government homeopathy wings^{26,27}. People have a strong belief that KSK would prevent COVID-19. However, Siddha specialists cautioned against its non-prescription use²⁶.

To control the dissemination of misleading information, on April 01, 2020, the AYUSH ministry ordered to stop and prevent publicity on AUS&H-related claims for COVID-19 treatment²⁸. Further advisory recommended self-care and preventive measures of Ayurveda to protect respiratory health by enhancing immunity. Also, it highlighted that the recommended measures not intended for the COVID-19 cure²⁹. Based on this claim, the public needs to follow the Gol recommendations, and these remedies used only under the supervision of qualified AYUSH practitioners. The public should adopt the preventive measures instructed by the state government. People must be aware that CAM-derived medical product and their practices are not part of standard medical care. Herbal supplements may be deleterious when taken by themselves, with other substances, or in excessive doses³⁰. Our views and opinions expressed above based on scientific evidence that not meant

to criticize or defame or distrust the belief of any CAM systems and its remedies or its related policies of the Government or any individual practices.

There are a few limitations to the literature search. We searched only three significant healthcare and medicine databases (PubMed, PubMed Central, and Cochrane Library), which may omit some relevant studies published in non-indexed journals, owing to its unavailability in selected databases. However, our search strategy was methodical that precisely looked for high-quality scientific evidence and clinical trials relevant to these remedies. Hence, acknowledging these limitations never influence the outcome of the literature search and do not nullify the evidence presented here.

Social media-based misinformation

Garlic intake

Misleading information from social media insisted that drinking a bowl of boiled garlic water or eating garlic fights COVID-19³¹. With this in mind, people involved in panic buying of garlic to use it as a remedy³². WHO opposed the misleading claim and published myths and facts stated, there is no current evidence on garlic that can prevent COVID-19³³. Garlic (*Allium sativum* L.) has been the natural herb used as a culinary spice worldwide. Garlic is known for its pungent taste and sulfur-containing chemical constituents with various medical and biological properties, including antimicrobial activity³⁴. So far, there is no much information exists on the antiviral property of garlic³⁵. In complementary medicine, garlic is useful in treating the common cold. An interventional review of Lissiman et al. analyzed clinical trials outcome of garlic in the prevention and treatment of common cold suggests weak evidence³⁶. This review published in the Cochrane Database Systematic Reviews, 2014, analyzed randomized controlled trials comparing garlic with placebo, no treatment, or standard treatment. Of the eight trials found in CENTRAL, MEDLINE, EMBASE, and AMED databases, only one met the inclusion criteria. This single trial suggested garlic may prevent occurrences of the common cold. This review also emphasized adverse effects observed in eight trials and literature of non-randomized trials and case reports stating the association of garlic in the causation of bad breath and body odor, allergic reactions, minor respiratory and skin symptoms. High-dose intake of garlic as a dietary supplement may have serious complications, especially increase the risk of bleeding due to its potential interaction with antithrombotic drugs^{36,37}. The evidence also showed that a patient who took oral ingestion of raw garlic in larger doses in the weeks before gynecological surgery suffered from severe postoperative bleeding³⁸. The people's misconception is that the usages of herbs are safe and free from side effects. Indeed, the intake of some substances for long-term in combination or alone in overdoses may cause side effects. There is a notable saying of Paracelsus "The dose makes the poison," paraphrased that, "All

things are poison and nothing is without poison; only the dose makes a thing, not a poison.”

Drinking warm water

Drinking warm water for every 15 minutes or drinking lukewarm water with lemon prevents COVID-19 is another fake news evolved from social media³⁹. No evidence drinking warm water alone or with lemon will prevent the infection^{40,41}. A recent report by Chin et al. investigated the stability of SARS-CoV-2 in different environmental conditions viz. temperature, different surfaces, virucidal effects of disinfectants, and pH⁴². This study incubated the virus for 14-days and tested for its infectivity. The findings revealed that SARS-CoV-2 is highly stable at 4°C, but sensitive to heat. Subsequently, increasing the incubation temperature to 70°C, the time for virus inactivation reduced to 5 minutes. Also, found SARS-CoV-2 is very stable in a broad range of pH 3–10 at room temperature. The intake of lemon juice with a pH 2.5 reaches the stomach with an acidic pH between 1.5 and 3.5, does not alter the stomach condition. Besides, proton-pump helps to maintain pH in the stomach⁴¹. This evidence thus further supports that drinking warm water alone or with lemon is ineffective against COVID-19. Frequently drinking warm water may soothe a sore throat, and stay hydrated is good health advice^{39,40}. Misinterpretations that drinking warm water will flush out the SARS-CoV-2 to the esophagus, where the stomach acid kills it⁴³. CoVs are enveloped viruses (EVs) that infect the gastrointestinal (GI) in an asymptomatic manner^{44,45}. Generally, EVs cannot withstand the harsh conditions of the GI tract and readily disinfected with soap or solvents and very sensitive to heat and dryness. It is interesting to note that CoVs are exceptional that can withstand the GI tract⁴⁴.

Alcohol use

An unusual rumor from social media claimed, intake of alcohol defends from the deadly CoV⁴⁶. This misleading information surfaced after the perception that hand sanitizers contain alcohol to kill the virus. Alcohol-based hand sanitizers (ABHS) have 60% to 95% of isopropanol, ethanol, n-propanol, or in combination. Among these, ethanol is an efficient antimicrobial agent with immediate effect, then handwashing with soap. ABHS is more efficient in preventing the spread of bacteria-based and viral-based diseases, such as seasonal flu and H1N1⁴⁷. A study of Siddharta et al. reported the virucidal activity of ABHS (WHO formulations I: ethanol-based, and II: isopropanol-based) against the EBV, Zika virus (ZKV), SARS-CoV, and Middle East respiratory syndrome coronavirus (MERS-CoV)⁴⁸. This study recommended the usage of ABHS during outbreak-associated viral infections. Still, no evidence for the internal use or ingestion of alcohol prevents COVID-19. WHO has suggested that alcohol consumption should always be in moderation and harmful if consumed in excessive⁴⁹. Also, the intake of alcohol weakens the immune system⁵⁰. WHO cautioned the people who are not habitual to alcohol should not start drinking to prevent COVID-19⁴⁹.

Avoidance of non-vegetarian food

A false understanding of the public about eating eggs and chicken spread COVID-19 is disappointing⁵¹. So far, the source of the COVID-19 outbreak suspected to be animal-borne from Wuhan's live-animal market, and the exact cause is unknown. In 2007, a scientific review of Cheng et al. predicted the re-emergence of SARS-CoV⁵². This review hinted about the SARS-CoV-like viruses existing in horseshoe bats as larger reservoirs, simultaneously, southern China's culture of eating exotic animals is more dangerous. Despite this report alarmed the possible emergence of novel pathogenic strains from animals and handling laboratories, the negligence has led to this outbreak. Very few CoV strains are zoonotic origin, but several strains are not zoonotic⁵³. There is no scientific evidence of eating eggs and chicken, causes COVID-19. The Food Safety and Standards Authority of India (FSSAI) clarified that poultry products are safe to consume⁵⁴. WHO also confirmed that eating hygienically well-cooked chicken is harmless, and the intake of raw or undercooked animal products should be avoided^{55,56}. Due to this erroneous belief, the Indian poultry industry got a drastic hit⁵⁷. In Tamil Nadu, the isolated COVID-19 patients are given a special diet include eggs⁵⁸.

Beliefs in folklore practices

Covering houses with neem and mango leaves

In India, neem (*Azadirachta indica*), mango (*Mangifera indica*), and turmeric (*Curcuma longa*) regarded as divine since ancient times. Holistically, leaves of mango and neem tied in front of houses and streets during the Hindu festive seasons of South India. Apart from holy reasons, neem possesses antibacterial, antiviral, and antifungal properties. Treatment of chickenpox infection and skin diseases include neem incubated water bath and bedding covered with leaves. Neem sticks applied as a toothbrush by villagers. As well, mango leaves believed to maintain good oral health⁵⁹. Turmeric is an antimicrobial agent and widely-used to treat several ailments. Due to the belief that these plants protect from germs and various diseases, people externally covering houses and face with leaves, spilling turmeric water in the surroundings to prevent COVID-19^{60,61}. Even so, these practices do not have any effect because none of these plants have tested against SARS-CoV-260. It is significant to note that WHO has formulated two ABHS found to be effective against the EBV, ZKV, SARS-CoV, and MERS-CoV^{48,62}. There is no such evidence on herbal-based hand sanitizers and its effect on CoVs. ABHS is strongly protective against EVs, including CoVs⁶³. WHO recommended ABHS will offer protection against the SARS-CoV-2.

RECOMMENDATIONS

In India, self-hygienic habits like hand sanitization and wearing face masks are not routine practices. Sneezing or coughing without protective measures and spitting in public places

shows poor unhygienic habits that prove a lack of awareness and a civic sense among the people. Traveling and residing in congested areas with poor hygienic and sanitary conditions is usual. Hence, there is an urgent need to get people aware of the risk of unhygienic practices. Regular publicity of evidence-based hygienic practices and public health awareness-raising programs in the traditional or mainstream media, newspapers, and magazines will be helpful to understand the COVID-19 related facts. In the context of public health, proverbs on prevention exemplified in:

"A disease known is half cured."

"A danger foreseen is half avoided."

"Forewarned is forearmed."

The COVID-19 pandemic has taught several lessons on hygienic measures, need to be followed perpetually. Especially, routine hand sanitization, practicing good respiratory hygiene using face masks, immunity-boosting diet intake, periodical health check-up, social distancing, travel restrictions to affected regions, self-will to stay home during lockdown periods are mandatory prophylactic measures that prevent COVID-19. Several reasons assumed to decrease the COVID-19 fatality rate of India. The presumptions are:

- Inherently, the Indian public is more immune to various environments, including pollution and harsh climates.
- The childhood vaccination of Bacillus Calmette-Guerin (BCG) offering immunity.
- Dietary habits.

CONCLUSION

To conclude, this review depicts evidence-based facts and make the public aware of, what should be done, and do not in the COVID-19 pandemic.

To the best of our knowledge, at present, public awareness on hand sanitization, remaining indoors to avoid social contacts, and maintain social distancing are reliable prophylactic measures that prevent COVID-19. Besides, public health promotion activities will enable to slow down the COVID-19 spread in India.

ACKNOWLEDGMENTS

The authors would like to extend their gratitude to the Chairman Dr. S. A. Jacob Raja, the Managing Director Mrs. Sabina Jacob, Rajas Medical Institutions and Principal Dr. Anisha Cynthia Sathiasekar, Rajas Dental College & Hospital for the constant support for research.

DISCLOSURE

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any institute or government.

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Como citar este artigo/How to cite this article:

Senthilkumar CS, Balakrishnan N. Pseudoscientific beliefs and practices in the COVID-19 pandemic: A narrative review of unwanted experiments attributed to social media-based misinformation afflicting the public health. *J Health Biol Sci*. 2020 J; 8(1):1-9.