ETHNOMEDICINE APPROACHES ON COVID-19

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ABSTRACT

The year 2020 was welcomed by the novel Covid-19 pandemic, which has disrupted the world's systems; and more importantly, posed devastating threats to lives around the globe. The ease with which SARS-CoV-2 is transferred and its infectivity before the onset of symptoms has called for urgency in the development of therapeutic and prophylactic measures to curb the outbreak. This review identifies the role of the outbreak on public health and various approaches undertaken to address the pandemic, while laying emphasis on the significant roles of Ethno-medicine and its promising prospects in restoring and preserving global health. Various studies have revealed that several active ingredients in medicinal plants have exhibited great potentials in inhibiting the replication of the virus. In the on-going search for safe, efficient and affordable therapy and prophylaxis to Covid-19, employing bioactive compounds from plant and animal sources in the production of medicines, vaccines and disinfectants will be a wise investment. Nevertheless, further research, purification of these extracts and experimental verification should be carried out to test their efficacy on Covid-19 patients.

Keywords: Covid 19, ethnomedicine, SARS-CoV-2, public health, phytotherapy,
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Introduction

2020 began with a devastating pandemic known as coronavirus disease 2019 (COVID-19), as named by the WHO on the 11th of February (Wuhan City, 2020; Ahmad *et al.,* 2020). The outbreak was brought about by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (Wuhan City, 2020). Coronaviruses have a total of 39 species and are grouped as Riboviria (Gorbalenya *et al*., 2020).

The SARS-CoV-2 is a zoonotic virus of the subgenus Sarbecovirus, family Coronaviridae with an over 90% similarity in sequence homology to a bat coronavirus (Chan *et al*., 2020a). It was identified in China when patients' lung wash was subjected to tissue culture and standard molecular assays. It is also a single stranded enveloped RNA (Chen, *et al.,* 2020). Among its four essential proteins the more important ones are nucleo-capsid protein (N); which aids structural development and the spike protein (S); which aids attachment to cell of its carrier. (Siu *et al*., 2008; Walls *et al*., 2020). Once penetration into the human cell has occurred, RNA replication follows and this is very crucial for the virus to thrive within its host (Vellingiri *et al*., 2020).

Impacts of Covid-19 on Public Health and the Health Care System

COVID-19 is undoubtedly the deadliest pandemic that the globe has witnessed since its emergence (American Society for Microbiology, 2020). The Coronavirus outbreak began in Wuhan, Hubei, China; and in July 2020, over 17 million confirmed cases of COVID-19 and more than 600 thousand deaths world-wide has been reported by the WHO (Murphey *et al.,* 2020; WHO, 2020a). SARS-CoV-2 is known to be most contagious when people are symptomatic (2 to 14 days after exposure), although it can be transmitted before symptoms begin to show. Symptoms of the disease and further complications are cough, fever, sneezing and shortness of breath, pneumonia, throat pain and acute respiratory distress syndrome respectively (Ahmad *et al*., 2020).

Infection rate figures vary over the world; recorded deaths are considerably lower in Africa than in other places, leading some to suggest that the continent may yet be saved from the worst due to its young population, warm weather, also the frequency with which BCG vaccinations are administered (Medinilla *et al.,*2020; Pilling 2020). Notwithstanding, the duration and strength of natural immunity against SARS-CoV-2 is unknown. Thus, it is essential to understand the risk in population where limited health systems can mean limited surveillance and delayed detection and response (Bower, 2020). The present number of health experts and facilities are not sufficient to manage the growing figure of infected people (Balachandar *et al*., 2020).

At the population level, there are a number of effects that living in a community at risk, can have on emotional well-being, mental health, and behaviour. All people are likely to have increased anxiety around contracting the virus, and by extension, concern for their families and community members. At the collective level, these understandable concerns can lead to a more damaging sense of fear if not managed well, which limit outbreak control measures (Eaton, 2020).

Ethno-Medicine

The relevance of ethno-medicine (the study of traditional medicine based on bioactive compounds) has never been as great as it is now Cuerrier and Mathez-Stiefel 2013). Dietary therapy and herbal medicine have been utilized in the prevention and treatment of diseases, as several herbs have shown antiviral potencies (Huang *et al*., 2014). One herbal plant can consist of various phytochemical properties that acts independently or synergizes with other chemicals to yield required therapeutic results (Parasuraman *et al*., 2014).

According to the WHO in 2008, roughly 80% of people in developing countries employ ethno-medicine in addressing their health needs (Cuerrier and Mathez-Stiefel, 2013). In the course of outbreaks, time is an essential factor for drug development. Thus, natural products are suitable and effective options since they are safe and can be instantly evaluated for combating diseases in patients (Khan *et al*., 2020). In 2009, the WHO resolved to emphasize the preservation of ethnomedicine, create standards to ensure its effective use, integrate it into health systems, establish systems for its accreditation, strengthen interaction between conventional and ethnomedicine providers and establish trainings for health professionals, students and researchers (Cuerrier and Mathez-Stiefel 2013).

As a result of their utilization in herbal therapy, several plant molecules have been studied and eventually modified as drugs (Li-Weber, 2009; Fabricant and Farnsworth, 2001). Such ethno-medical studies can provide worthy recommendations for improved health policies, both in rural and urban areas (Cuerrier and Mathez-Stiefel, 2013). Extracts of plants have been used as therapeutic and prophylactic options against viral respiratory infections (Atanasov *et al*., 2015). The essence of this is to stimulate and strengthen the immune system against virus-caused inflammation (Khan *et al*., 2020).

The improvement in producing antiviral drugs is of great concern with regards to research in medicine. Medicinal plants provide essential substances for important antiviral medicine production (Moghadamtousi *et al*., 2015). Their antiviral effects have played great roles in interrupting viral replication (Akram et al., 2018). Therefore, more findings on the efficacy of these herbs can enhance their utilization in medicine for the purpose of disease treatment or prevention (Vellingiri *et al.,*2015).

Phyto-therapies/ Ethnomedicine Approaches on Covid-19

The occurrence of COVID-19 calls for rapid production of antiviral treatment agents to curb the infection (Mitjà & Clotet, 2020). For viral prevention and treatment, these agents have to be harmless, enough and affordable (Yang *et al*., 2020). In China, many infected patients were treated with the use of traditional medicine (Yang *et al.,2020*). Several medicinal plants have been reported for exhibiting anti-coronaviral activity (Khan *et al.,* 2020).

Plants like Vitex trifolia, Sphaeranthus indicus, turmeric (curcumin) has decreased inflammation involved in respiratory disorders in coronavirus infections (Alam *et al*., 2002; Vimalanathan *et al*., 2009; Haq *et al*., 2020). Virus inhibitory potential was also observed in Strobilanthes Cusia (against RNA genome formation), Punica granatum, *G.*

glabra (glycyrrhizin against viral replication, adsorption and penetration) and A. annua (Khan *et al*., 1991; Olivieri *et al*., 1996; Hussain *et al.,*2018; Khan *et al*., 2019). Scientists can exploit these agents in a bid to combat the current pandemic (Haq *et al*., 2020).

It was also reported that food plants can help boost the immunity in order to prevent Covid 19 infection (Fan *et al*., 2020). Curcumin (a very active phytochemical in turmeric) has been reported to change the outlook of viral surface proteins, thus hindering the viral entry into the susceptible host; and also has the potential to curtail pulmonary oedema and fibrosis-associated pathways in the course of COVID-19 infections (Anand *et al*., 2007; Utomo & Meiyanto, 2020). Black pepper extracts have been known to be effective against respiratory tract infectious diseases and could lower the probability of COVID-19 and start a quick recovery in the occurrence of an infection. Thus, herbs can be included in daily diet in order to prevent the disease's occurrence (Fan *et al*., 2020).

Further, likely therapeutic choices for COVID-19 were seen in Indian herbs, particularly Nilavembu Kudineer Chooranam (NKC) combination plants, as a result of its reported lethal activity on viral particles and its ability to supress some immune triggers (Kavinilavan *et al*., 2017; Lakshmi *et al*., 2020). These plants revealed great affinity towards the target site of receptor molecules. Therefore, it is possible that Indian herbs could possess antiviral potentials against the current COVID-19 infection (Adeoye *et al*., 2020; Oliveira *et al*., 2020).

In Madagascar, a herbal medicine "COVID-Organics" is being used in the treatment of COVID-19. This plant therapy has enjoyed acceptance in some Africa countries (Etyang, 2020). Interestingly, it was also reported that 'Tan Re Quing' (an injection formulated in China and which had as part of its essential ingredients, ursodeoxycholic acidfrom bear bile) was recommended by the Chinese government as a treatment option for severe COVID-19 cases; as ursodeoxycholic acid can act against inflammation and soothe the immune system (Fobar, 2020).

Current Measures Adopted to Combat the Pandemic

Several countries were seen to react quickly, issuing travel bans and quarantine, hand washing and social distancing measures to stop the virus from getting a hold on the continent (World Bank 2020; Ahmad *et al.,*2020). The early detection of covid19 using Paper-based test, Molecular Assays and prevention with RNA vaccines were also notably in these approaches (Vellingiri *et al.,* 2020). Vaccine development for coronaviruses faces many challenges. There is the probability of a re-emergence of viral outbreaks due to the possibility of recombination, mutation, and infection of cells. Second, some of the encoded by these viruses are still undefined; it is thus, essential to know the mode of action and role of these proteins in viral replication and pathogenesis. Also, having proper knowledge of the immune-pathological reaction of the host will substantially reduce the likelihood of diseases (Ahmad *et al.,* 2020).

Thus, the assessment of bioactive agents that can treat COVID-19 calls for enough research to achieve a reliable and safe outcome. It is essential that these findings be done quickly to identify efficient plant therapies especially with addressing the current outbreak (Vellingiri *et al.,*2020). This will aid the exploitation of natural therapies as COVID-19 interventions. While on the search for an effective phyto therapy and prophylaxis against SARS-COV-2, Panyod and co-authors have suggested the following ethno-medicinal prevention approaches: (1) consuming foods and herbs to hinder infection and boost the immune system (2) coating masks with plant extracts to prevent inhalation of viral particles (3) using extracts as air disinfectants and (4) sanitizing surfaces with herbs (Panyod *et al*., 2020).These are viable areas for future studies.

Conclusion

The world is witnessing an unfamiliar disruption of its entire system as COVID 19 has taken its toll on the health of millions around the globe. In a bid to restore order by seeking therapy and prophylaxis against this viral outbreak, ethno-medicine is a very promising approach as it has proven to be safe, accessible and have negligible side effects (if any) on the human body. Thus, investments and research should be geared to exploiting and purifying plant and animal extracts to develop viable drugs, vaccines and disinfectants against COVID 19 infection.

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