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Home remedial treatments for COVID-19 in Sirajganj district, Bangladesh

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Abstract

COVID-19, the latest pandemic to hit the world is caused by a coronavirus SARS-CoV-2 and follows similar but not so widespread outbreaks by Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) corona viruses. This latest outbreak, which started in Wuhan, China at the tail end of December 2019, has already caused (as of February 20, 2022) 424,434,253 infections and 5,903,704 deaths worldwide. In Bangladesh, the corresponding numbers are 1,933,291 infections and 28,965 deaths. No fully effective drugs have been discovered thus far for tackling this coronavirus, or so for that matter, any of the seven coronaviruses affecting human beings. A number of vaccines have been developed in the Western countries, Russia and China, and have gained approval for administration only very recently. That still leaves several major questions to be answered, namely how can developing countries get proper access to the vaccine (s) and store them and administer them in a correct manner taking into account that richer nations have bought up most of the vaccine stock available, whether new mutations of SARS-CoV-2 like delta and omicron variants may partly or fully invalidate the vaccine(s), and last but not the least, to vaccinate with two doses of the vaccine(s) along with 1-2 booster doses somewhere around 80% of the world population of nearly 8 billion, which scientists say is necessary to develop herd immunity. As a result people in countries like Bangladesh have resorted to their personal home remedial measures against COVID-19 and claims of success are heard quite often. We report here some home remedial measures used in Sirajganj district of Bangladesh and note that over the last two years COVID-19 has been in existence, these home remedies are beginning to coalesce into a distinct form unique for COVID-19 treatment. We also report that quite valid scientific support can be found behind these home remedies despite the fact that these remedies have been formulated and used by mostly rural people of the country.

Keywords: COVID-19, SARS-CoV-2, coronavirus, home remedy, Bangladesh

Introduction

COVID-19, the latest pandemic to hit the world is caused by a coronavirus SARS-CoV-2 and follows similar but not so widespread outbreaks by Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) corona viruses. This latest outbreak, which started in Wuhan, China at the tail end of December 2019, has already caused (as of February 20, 2022) 424,434,253 infe and 5,903,704 deaths worldwide. In Bangladesh, the corresponding numbers are 1,933,291 infections and 28,965 deaths. So far, seven coronaviruses (all of them zoonotic) have been found to affect human beings, namely HCoV-229E, HCoV-OC43, HCoV-HKU1, HCoV-NL63, MERS-COV, SARS-CoV, and the most recently discovered, SARS-COV-2 ^[1]. Any fully effective antiviral drug(s) remain to be discovered for SARS-CoV-2; some candidate drugs are tested as therapy for this latest virus. These drugs include remdesivir, lopinavir, ritonavir, favipiravir, and some flavonoid compounds like luteolin, myricetin, and apigenin ^[2].

World Health Organization (WHO) has recommended the use of two drugs. Baricitinib (a class of Janus kinase inhibitor drugs) has been recommended for severe or critically ill COVID-19 patients. WHO has also conditionally recommended the use of a monoclonal antibody drug, sotrovimab, for treating mild or moderate COVID-19 in patients, who are at high risk of hospitalization? Molnupiravir is another oral drug developed by Merck and Ridgeback for treatment of COVID-19 in non-hospitalized patients. In one study, the drug was found to reduce the risk of hospitalization and deaths in non-vaccinated patients ^[3].

Regarding vaccines against SARS-CoV-2, a recent review mentions of over 100 potential

vaccine candidates utilizing multiple approach modes, with 19 vaccines in clinical trials [4].

Regarding vaccines against SARS-CoV-2, a recent review mentions of over 100 potential vaccine candidates utilizing multiple approach modes, with 19 vaccines in clinical trials [4]. Several vaccines have been approved on an 'emergency' basis in the Western world, those vaccines being developed by Pfizer-BioNTech, Moderna, Johnson & Johnson, and Astrogenca-Oxford. Sputnik V is the first registered vaccine in Russia, while another vaccine has been developed by China's Sinovac. Most of these vaccines need two doses to be administered to obtain effective immunities. A number of questions still remain about the vaccines since they have been developed following quick trials.

In our *in silico* studies, we have observed that javanicins, javanicolides, various phytochemicals from *Solanum surattense* Burm.f. (Solanaceae), *Vigna radiata* (L.) Wilczek and *Vigna mungo* (L.) Hepper (Fabaceae), *Cassia occidentalis* L. (Fabaceae), and *Lens culinaris* L. (Fabaceae) have predicted high binding affinities for the main protease of SARS-CoV-2 [5-10]. However, such *in silico* studies by us and others [11-14] have not translated into active therapeutics for COVID-19 thus far.

Home remedies can be described as common remedial treatment prevalent among different groups of population, society or even countries. They are often the first resort for simple sicknesses and the last resort for the terminally ill patients. It is not surprising that although COVID-19 is a new disease, because of lack of proper treatment in Bangladesh, social ostracism, and both non-affordability and limited availability of treatment of this viral disease, people have quickly reverted to home remedies [15, 16]. The objective of this study was to survey home remedial measures against COVID-19 in Sirajganj district of Bangladesh.

Methods

Preliminary information that a person has contracted COVID-19 was made known to us by our COVID-19 network in various areas of Bangladesh. The present survey was conducted near the end of 2020. Informed Consent was initially collected from both patient and at least one near relative. All medical information about COVID-19 patients were collected from patients and close relatives of the patients over cell phone. It was made clear to patients and families that apart from gender, age and the name of their village, nothing else will be divulged, which may lead to identification of patient (s). Patients and caretakers/relatives were mainly questioned as to (I) whether the patient have been tested for COVID-19 positivity using PCR-based tests, and (II) nature of medications including both conventional (allopathic) and home remedies that they have taken during their sickness phase till they have tested COVID-19 negative (PCR-test again) [17]. A map of Bangladesh is given in Figure 1 showing the location of Sirajganj district.

Results and Discussion

Sirajganj district comprises an area of 2497.92 square kilometers and is located in between 24°01' and 24°47' north latitudes and in between 89°15' and 89°59' east longitudes. Of the three patients from whom data was collected, all were males.

Patient 1

Age 22 years, male.

Symptoms

Dry cough, fatigue, slight fever, anosmia (loss of smell).

Conventional medicines

None.

Home remedies

Lime water. Juice from three slices of lemon [*Citrus limon* (L.) Osbeck (Rutaceae)] was added to one glass of lukewarm water and taken orally in the morning on an empty stomach.

Black coffee (without sugar). Taken orally 3-4 times per 24 hours in the morning, evening and night.

Patient 2

Age 22 years, male.

Symptoms

Dry cough, fatigue, slight fever, anosmia (loss of smell), sore throat, and mild diarrhea.

Conventional medicines

Azithromycin (500 mg) twice daily on a full stomach after lunch and dinner for 5 days; zinc tablet as supplement for 1 month; vitamin D supplement once a week after meal.

Home remedies

Lemon tea. A few drops of lemon juice was added to water previously boiled for 8-9 minutes, to which was added half teaspoon of black tea and half teaspoon of sugar. The tea was prepared and taken orally twice daily in the morning and evening after meals.

Gargling with salt water. A pinch of salt was added to warm water and the water used for gargling. The procedure was done thrice daily in the morning, evening, and night (before going to sleep).

Plenty of citrus fruits (sweet orange or *Citrus sinensis* (L.) Osbeck, Rutaceae family).

Patient 3

Age 52 years, male.

Symptoms

Low-grade fever, dry cough, anosmia, shortness of breath, mild diarrhea.

Conventional medicines

Azithromycin (500 mg) twice daily after lunch and dinner for 5 days; zinc, iron, calcium, and vitamin C tablets as supplements. Fexofenadine, 120 mg, thrice daily. Butamirate citrate syrup.

Home remedies

Herbal water. To 250 ml water was added two small pieces of ginger, *Zingiber officinale* Roscoe (Zingiberaceae) rhizome; 2-3 pieces of clove (*Syzygium aromaticum* (L.) Merr. & LM Perry, Myrtaceae family; a small piece of bark of *Cinnamomum verum* J. Presl., Lauraceae family; and one dry fruit (with seeds) of *Elettaria cardamomum* (L.) Maton, Zingiberaceae family. The mixture was boiled for 9-10 minutes and then strained with a strainer. The strained mixture was taken orally 6-7 times daily.

Plenty of citrus fruits (sweet orange or *Citrus sinensis* (L.) Osbeck, Rutaceae family).

Two patients took allopathic medications along with home remedies, so in a sense integrating conventional medications

and home remedies. On the other hand, one patient (Patient 1) totally avoided conventional medicines and relied totally on home remedies. An interesting point about Patient 1 was that he partook of black coffee, which is practically an unknown drink in rural areas of Bangladesh. The other interesting part of the three home remedies was the common presence of citrus fruits. This is a phenomenon that we have seen before in our previous home remedy surveys for COVID-19 in Bangladesh. The use of ginger, clove, cardamom, and cinnamon boiled in water followed by oral consumption of the mixture has also been observed before [17]. It is to be noted that the survey was conducted at a time when neither COVID-19 drugs nor vaccines were available in Bangladesh; any conventional drugs prescribed by doctors for COVID-19 were for symptomatic relief only, leaving both urban and rural patients to depend on home remedies (either self-formulated or gathered from another COVID-19 patient).

What is of interest is that COVID-19 patients in Bangladesh came up with what appears to be effective home remedies, which served to cure the patients. Whether this cure was serendipitous or not depends on further properly conducted scientific experiments and clinical trials on the phytochemicals present in the food items (including spices). However, a literature survey of the phytochemicals present in the food items consumed lends credence to the fact that unknowingly, COVID-19 patients have chosen the correct items. For instance coffee contains chlorogenic acids, which are potent antioxidants and possess strong anti-inflammatory properties, the latter because of their ability to inhibit production of inflammatory mediators [18]. Notably, oxidative stress and inflammation plays a significant role in the pathogenesis of COVID-19 [19].

Citrus fruit juices reportedly contain various flavonoids including flavanone aglycones (hesperetin, naringenin, eriodictyol), flavone aglycones (luteolin, kaempferol, quercetin, apigenin), polymethoxyflavones (nobiletin, tangeretin, quercetogetin), flavanone-*O*-glycosides (eriocitrin, naringin, poncirin), and flavone-*C*-glycosides and flavone-*O*-glycosides (isovitexin, scoparin, rutin) [20]. A number of these flavonoid compounds have shown promising results, at least *in silico*, against SARS-CoV-2 target proteins and its human receptor, human angiotensin converter enzyme 2 (hACE2) or various symptoms of COVID-19 (*in vivo*). Computational studies have indicated that naringenin may inhibit the internalization of the virus, inhibit the cytokine storm occurring during COVID-19, and prevent viral replication (reviewed in [21]). A recent review mentions the name of major flavonoids with potential inhibition activity against SARS-CoV-2. The list includes naringenin, hesperidin, neohesperidin, naringin, apigenin, luteolin, cyanidin, kaempferol, catechin, kaempferol, myricetin, and genistein; almost all the mentioned phytochemicals are present in citrus fruit(s) [22].

Other items taken by COVID-19 patients, besides warm water and citrus fruits, included ginger slices, black tea, and spices like clove, cinnamon and cardamom. The process of black tea preparation includes plucking, withering, rolling, and drying of tea leaves [23]. Black tea is known to contain catechins, theaflavins, and various polyphenolic compounds. The anti-viral activity of polyphenols in the prophylaxis and treatment of COVID-19 has been reviewed [24, 25]. A phytochemical, 6-gingerol present in ginger, has been reported to be a promising compound for treatment of COVID-19 [26]. Ginger is known to exert anti-SARS-CoV-2, anti-inflammatory, and antioxidant effects and modulate

improper effector T cell responses, which cumulatively can benefit COVID-19 patients [27]. Spices also contain essential oils in addition to secondary metabolites like flavonoids, phenolic acids, tannins, and quinones. These secondary metabolites possess anti-inflammatory, antioxidant, and immune-boosting properties, all these properties being useful in the alleviation of COVID-19 [28]. Thus, ginger, spices (Figure 2) and black tea may be agents of choice for COVID-19 treatment and home remedies containing these items as part of the treatment process are quite validated by the scientific evidence.

Bangladesh has a rich tradition of folk medicines, which include home remedies. We had been documenting the phytotherapeutic uses of plants in the country among the folk medicinal practitioners for the last twelve years. In numerous papers, we had documented the therapeutic use of plants, and in nearly all instances those uses could be corroborated by emerging scientific evidences [29-41]. Recognizing the values of traditional medicines, such medicines have been recommended by the World Health Organization for treatment of COVID-19, provided they have the necessary scientific data to back them [42].

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