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IMPACT OF SOUTH INDIAN CUISINE AND THEIR TRADITIONAL MEDICINE IN PREVENTION OF COVID INFECTION – A REVIEW

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ABSTRACT

COVID is highly infectious respiratory disease originated from the Hunan seafood market at Wuhan, China. It starts spread tremendously. Most common symptoms are fever, dry cough, tiredness and less common symptoms such as aches and pains, sore throat, diarrhoea, conjunctivitis, headache, loss of taste or smell, a rash on skin, or discolouration of fingers or toes. It causes mortality in old people. Therefore, we should pay close attention to the severity of respiratory virus infection. Treatment with quinine improves health status initially and it has been withdrawal due to its side effects. General preventive measures such as washing hands often, stay home, avoid contact with others, maintaining social distance, eat healthy food, drink plenty of fluids etc. are recommended to protect us against covid. Researchers are trying to discover vaccine. But we have few traditional medicine to prevent and treat corona virus disease which acts against that virus and improves innate immunity.

KEYWORDS: Corona virus, Traditional food, Kabasura kudineer, Unavae marundhu, Medicinal plants, Rasam.

INTRODUCTION

COVID-19 is the disease caused by the new corona virus (SARSCOV-2) that emerged in China in December 2019. It affects geriatric population to a higher extent than youth population. Most infected people will develop mild to moderate illness and recover without hospitalization. The symptoms include cough, fever or chills, shortness of breath or difficulty breathing, muscle or body aches, sore throat, new loss of taste or smell, headache, new fatigue, nausea or vomiting and congestion or runny nose. COVID-19 can be severe, and

some cases have caused death. The new corona virus can be spread from person to person. It is diagnosed with a laboratory test. There is no corona virus vaccine as on October 2020. Prevention involves frequent hand-washing, coughing into the bend of your elbow, staying home when you are sick and wearing a cloth face covering if unable to maintain physical distancing.[1]

SARS-CoV-2, have a single stranded, enveloped positive sense RNA (ssRNA), belongs to Corona viruses (CoVs) family, known since 1960s. The virus can infect humans and animals, causing respiratory, hepatic, gastrointestinal and neurologic diseases.[2] The name coronavirus is due to spikes like projections on its surface under electron microscope that gives crown like appearance. After emergence of novel corona virus (CoVs), different novel CoVs were discovered. International Committee on Taxonomy of Viruses (ICTV) has classified these CoVs groups into various general such as Alpha, Beta, Gamma and Delta corona viruses.[3] Several human corona viruses (alpha-CoVs HCoVs-NL63, beta-CoVs HCoVs-OC43, HCoVs-229E, HCoVs-HKU1, Middle East respiratory syndrome coronavirus (MERS-CoV), severe acute respiratory syndrome coronavirus (SARS-CoV) and acute respiratory distress syndrome (ARDS)) has been identified. Periodically new corona viruses appear due to their large genetic diversity, rapid mutation rate, high prevalence and wide distribution.

Researchers worldwide are actively engaging in research activities to search for preventive and therapeutic interventions against COVID-19. Our aim was to describe the planning of randomized controlled trials (RCTs) in terms of timing related to the course of the COVID-19 epidemic and research question evaluated.[2]

Tamilnadu ranks first in testing highest number of patients. The first novel covid was identified in a resident of Kancheepuram, after he had returned to India from Oman and undergone treatment in the Rajiv Gandhi Government General Hospital (RGGGH) in Chennai. The spread of covid affects the economic conditions drastically. Many lost job and their economic status lowered. This affects the people mental status. The interaction between innate and adaptive immune systems and neurotransmitters emerged as a mechanism underpinning mood disorders, psychosis, and anxiety disorders.[3] In addition to the immunological mechanisms, fear of illness, uncertainty of the future, stigma, traumatic memories of severe illness, and social isolation experienced by patients during the COVID-

19 are significant psychological stressors that may interact in defining psychopathological outcome.[4] But their food habits and the spices used in the food help in prevention or fight against corona virus.

SPREAD OF CORONA VIRUS TO HUMANS

The first spread of infection began in Wuhan, a city in the Hubei province of China. Reports of the first COVID-19 cases started in December 2019. Although health officials are still tracing the exact source of this new corona virus, early hypotheses thought it may be linked to a seafood market in Wuhan, China. Some people who visited the market developed viral pneumonia caused by the new corona virus. The disease is most contagious when a person's symptoms are at their peak. However it is possible that the spread of the virus can happen from asymptomatic patients. A new study suggests that 10% of infections are from people exhibiting no symptoms. The virus that causes COVID-19 is mainly transmitted through droplets generated when an infected person coughs, sneezes, or exhales. These droplets are too heavy to hang in the air, and quickly fall on floors or surfaces. The incubation period from exposure to symptoms is generally 7–14 days; the shortest is 1 day, the longest is up to 20 days. Infection can be occurs by breathing in the virus if you are within close proximity of someone who has COVID-19, or by touching a contaminated surface and then your eyes, nose or mouth.

India is the second largest country in the world by population, with a population of at least 1.3 billion, and the caseload of a million means that only about 0.07% of the country's population has been infected with the corona virus. Around 8-9 lakh people were infected by corona virus disease and 1.5 lakhs people died. While almost all recovered elderly people and asthmatic cases were in high risk. India is far better placed than most other countries in the world in this crisis. Death rate in India is less compared to other countries who have been infected. Mass spread of corona virus was prevented in India by lockdown and maintenance of social distance well in time. India has an opportunity to not only mitigate the recession risk, but actually put the economy on track for faster growth.[3]

PREVIOUS OUTBREAKS OF CORONAVIRUS

The recent outbreak of COVID-19 in several countries is similar to the previous outbreaks of SARS and Middle East respiratory syndrome (MERS) that emerged in 2003 and 2012 in China and Saudi Arabia, respectively.[4-6] Coronavirus is responsible for both SARS and COVID-19 diseases; they affect the respiratory tract and cause major disease outbreaks

worldwide. SARS is caused by SARS-CoV, whereas SARS-CoV-2 causes COVID-19. So far, there is no particular treatment available to treat SARS or COVID-19. In the current search for a COVID-19 cure, there is some evidence that point to SARS-CoV-2 being similar to human coronavirus HKU1 and 229E strains.[7,8] Even though they are new coronavirus family members. These reports suggest that humans do not have immunity to this virus, allowing its easy and rapid spread among human populations through contact with an infected person. SARS-CoV-2 is more transmissible than SARS-CoV. The two possible reasons could be (i) the viral load (quantity of virus) tends to be relatively higher in COVID-19-positive patients, especially in the nose and throat immediately after they develop symptoms, and (ii) the binding affinity of SARS-CoV-2 to host cell receptors is higher than that of SARS-CoV.[9,10]

Based on disease severity, Covid infected patients are classified in to three categories.

Category A: Patients who are asymptomatic / mildly symptomatic with fever and upper respiratory tract symptoms or influenza like diseases.

Category B: Symptomatic patients with pneumonia without severe disease with respiratory rate 15-30/min and oxygen saturation >94% at room air.

Category C: Symptomatic patients with severe pneumonia without severe disease with >30/min or oxygen saturation <94% at room air and requiring oxygen to maintain saturation ≥ 94% or acute respiratory distress syndrome (ARDS) or septic shock.[9]

COMPLICATIONS OF COVID-19

Most common symptoms are fever, dry cough, tiredness and less common symptoms such as aches and pains, sore throat, diarrhoea, conjunctivitis, headache, loss of taste or smell, a rash on skin, or discolouration of fingers or toes.

Serious symptoms which require immediate medical attention such as difficulty breathing or shortness of breath, chest pain or pressure, loss of speech or movement.[10]

In addition to the direct effect on the lungs, the heart is another critical target organ that requires more attention. The virus affects the myocardium as well as the conduction system. This is why some patients experience arrhythmias and other conductive changes. Continuous ECG, myocardial enzymes, and BNP need to be monitored among those patients.

Preliminary studies show that BNP and hypersensitive cardiac troponin are associated with the progress to critical illness. The long duration of the disease and delayed treatment will increase the possibility of secondary sepsis cardiomyopathy after mixed infection. It is observed that most COVID-19 patients died of increased hypersensitive troponin and BNP. In some cases, elevated levels of hypersensitive troponin can be seen in all stages of the disease.[11-13]

Corona viruses, large single stranded RNA viruses like SARS and MERS were associated with adverse outcomes during pregnancy. Pregnant women getting COVID infection may results in deterioration of the maternal condition, especially in the third trimester. There is increase in preterm deliveries. In a study, SARS VoV2 in pregnancy 46% had preterm labour between 32-36 weeks. Though pregnancy is also a susceptible condition in acquire COVID-19, the mild to moderate nature of the clinical presentation is reassuming.[14]

COVID 19 PANDEMIC IN INDIA

South India as a whole is managing the pandemic more deftly than the north. In Tamil Nadu cases have risen sharply, yet mortality is relatively under control. In Andhra Pradesh, under 100 have lost lives and Karnataka – another strong Covid fighter – is reporting under 50 fatalities with over 2,000 cases. In overall healthcare performance, a 2019 World Bank Niti Aayog report shows Kerala and TN rank highest, while UP, Rajasthan and Bihar are at the bottom.

The south India model of governance has always delivered better healthcare and education is well known but what else does north India lack, which puts it at a disadvantage? South India is blessed with two features the north could well emulate: one, stable political competition between parties and two, an assertive citizenry.[15-20]

Indian medicinal plants might help relieve symptoms and has immunomodulatory action.

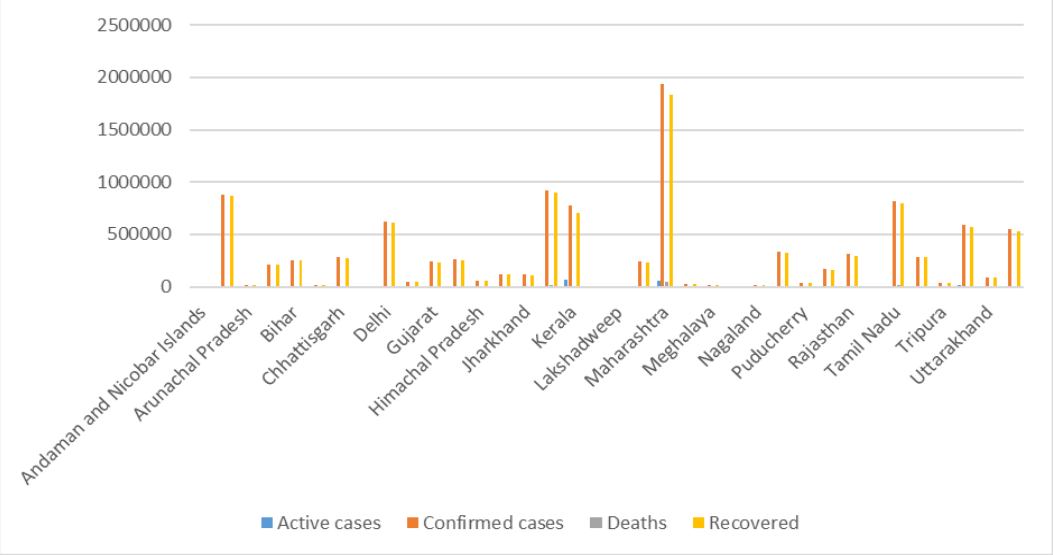


Figure: Bar diagram shows the no. of cases active, death, recovery from March till December.

INDIAN MEDICINAL PLANTS

"South Indian medicinal herbs are a promising field for the treatment of various illnesses. We hope that by identifying certain phyto compounds, can isolate and administer them alone or mix them with other compounds to alleviate the infection."

Traditional south Indian medicine is used by millions of people worldwide and has been proven to help reduce the effects of other flu-like illnesses, like Covid-19.

The researchers hope that by repurposing drugs already known to be safe for humans, treatment options for Covid-19 could be speeded up.

The researchers list several medicinal plants that could be used as potential therapeutic agents against Covid-19.

This studies examine the structural biology of the virus, the probable mechanism of action inside the host cell, genomic comparison between Covid-19 and SARS (also a coronavirus), comparison of the symptoms among Covid-19, SARS, MERS and common flu, current treatment, ongoing clinical trials and South Indian traditional medicinal plants that can be developed as drugs specifically targeting Covid-19.[21-22]

NATURAL SOUTH INDIAN TRADITIONAL MEDICINE FOR THE CONTROL OF VIRUS

Spread of infection while epidemic can be controlled with persuasive antiviral herbal interference. India has prosperous and unique collection of plants an estimated 45,000 species of plants have been used in traditional medicine systems. Tamilnadu is one of the mainly botanized zones of south India. The medicinal properties of plants were analysed with various types of researchers in Tamilnadu. It is for the documentation and provides wide information concerning the medicinal plant from traditional healers to protect the fact of plant usage. Traditional plants used in India in relation to 4000 years getting on. Herbal plants have been used by all cultures throughout history. A mainstream of global population in developing and squat earning countries relies for primary health care using traditional medicine. An extensive assortment of pharmaceutical attention has been expressed in plants widely. Plant based vaccines are being evaluated in clinical trials for influenza, hepatitis B etc., People have been used medicinal plants to cure severe disease habitually and also Indian medicinal plants have been examined for antiviral properties. Only some reported on plants from Tamilnadu in spite of the plants used by many tribal people throughout for the management of viral infections. More than 85% of individuals in developing countries use these medicines for health concern. It is stressed necessitate for further investigation and incorporation towards modern plant based medicines.[22-24]

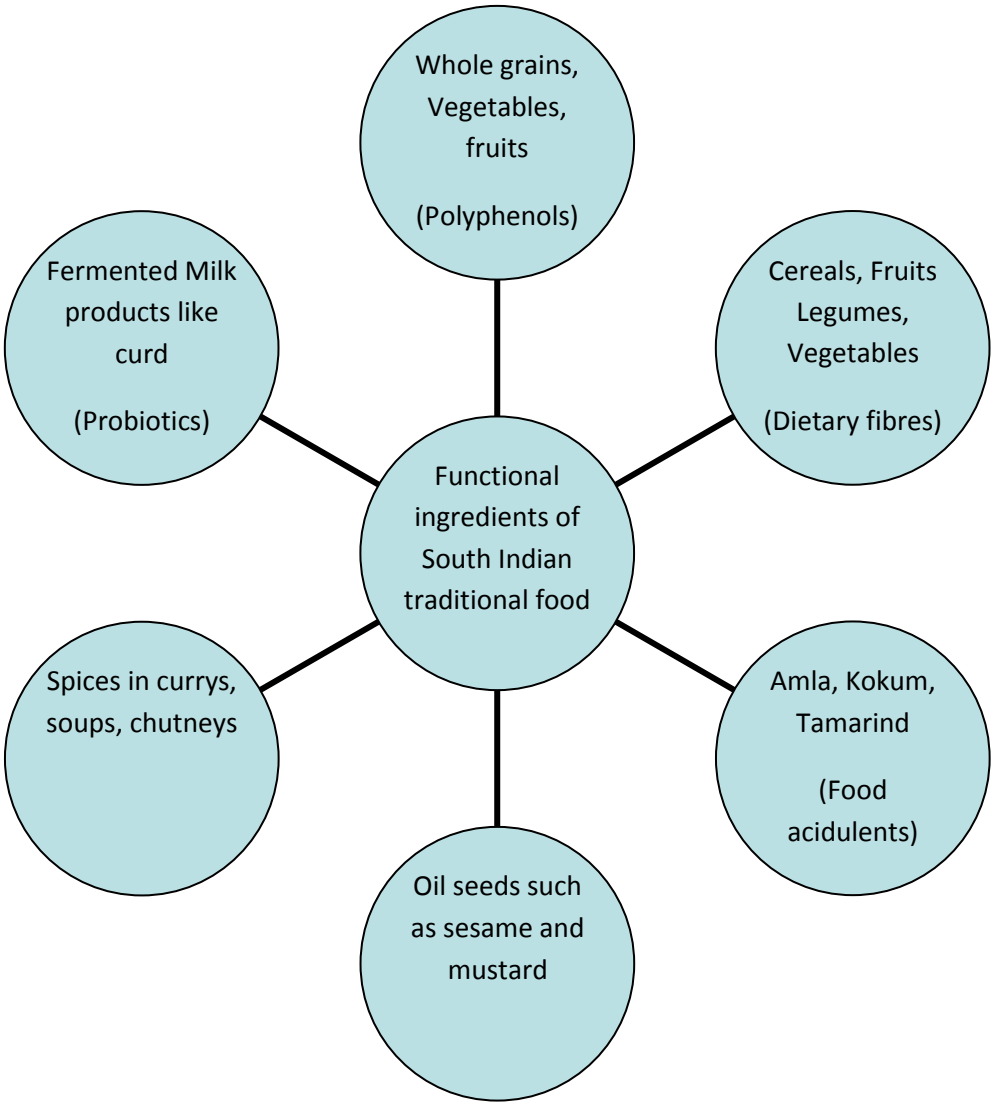
LIST OF SOUTH INDIAN MEDICINAL PLANTS INHIBITS SEVERAL TYPES OF VIRUSES.

Indian Medicinal plants (South)	Virus	Effectiveness
Azadirachta indica	Dengue virus	Leaf extract (Aqueous) inhibits DEN-2 *in vivo*[25]
Hippophae rhamnoides	Dengue virus	Leaf extract has significant anti-dengue activity[26]
Andrographis paniculata Nilavembu kudineer (NVK)	Dengue virus Chikungunya virus (CHIKV)	NVK provides protection against DENV and CHIKV[27]
Glycine max (black)	Human adenovirus (type 1)	Inhibits human ADV-1 in dose dependant manner[28]
Ficus religiosa	Human rhino virus (HRV) & Respiratory syncytial virus (RSV)	Bark extract endowed with antivirus activity against HRV & RSV[29]
Sesbania grandiflora	Herpes simplex virus	Extract possess strong antiviral against HSV[30]
Carissa edulis	Herpes simplex virus	Exhibits anti HSV-1&2 *in-*

		vitro and *in-vivo* strongly[31]
Achyranthus aspera	Herpes simplex virus	Inhibits earlier stages of HSV multiplications[32]
Guazuma ulmifolia Lam	Polio virus	Extracts inhibits polio replications[33]
Punica granatum L	Human herpes virus-3	Phytochemical extract exhibits potential anti viral activity[34]
Phyllanthus amarus	Human immuno deficiency virus	Inhibits HIV replication[35]
	Hepatitis B virus	Plant extract had lost HBV antigen surface[36]
Avicennia marina	Hepatitis B virus	Inhibits HBV antigen[37]
Terminalia bellerica	HIV-1 Pseudo viruses	Plant extract against HIV-1[38]
Canthium coromandelicum	HIV	Leaf extract control HIV infections[39]
Moringa oleifera	HIV	Leaves used to inhibit viral replication[40]
Moringa oleifera	Epstein bar virus (EBV)	Leaves and seeds inhibits activity against EBV activation[41]

SPICES IN SOUTH INDIAN TRADITIONAL FUNCTIONAL FOOD

Traditional South Indian foods provide a perfect combination of proteins from legumes and coconut, carbohydrates from rice, fats both visible and invisible from curry and fried savory items, vitamins and minerals from sprouted grams, and vegetables which contain functional components such as β-carotene, Vitamins C and E, thiamine, tocopherol, and antioxidant compounds.[42]



Summary of the multiple health effects of spices used in South Indian traditional food

1. Turmeric, asafoetida, and garlic have antimicrobial activities
2. Fenugreek, garlic, onion, and turmeric have antidiabetic activities
3. Garlic, onion, fenugreek, turmeric, and chili pepper have cholesterol-lowering activities
4. Turmeric, garlic, onion, chili pepper, and fenugreek have anti-lithogenic activities
5. Turmeric, garlic, and ginger have anticancer activities
6. Turmeric, clove, garlic, onion, and chili pepper have antioxidant activities
7. Turmeric, chili pepper, and garlic have anti-inflammatory activities.

The South Indian traditional foods are based on *Siddha* system of medicine, which in natural way aims in achieving physical and mental wellness and practising over more than 3000yrs.

FUNCTIONAL INGREDIENTS OF SOUTH INDIAN TRADITIONAL FOOD

Spices play very important role in digestive function, and the Indian tradition has a long history of use of spice in food as medicines to prevent and treat diseases. In the recent years, the scientific community has taken interest in understanding the values of traditionally used Indian spices because of their wide array of medicinal properties. Spices, which are used to enhance the flavour of a dish, form a vital part of South Indian traditional food preparation. The most commonly used spices in South Indian traditional foods are black pepper, coriander, black mustard, cumin, garlic, tamarind, turmeric, chili pepper, curry leaves, asafoetida, etc. Most of these spices are digestive stimulants; other uses like antiviral, anti microbial and antioxidant properties. Particularly three components such as turmeric and black pepper has anti-viral properties and black mustard which has anti-inflammatory and helps in painful lung conditions which is a symptom of covid infection. So, it may be useful in reducing death rate due to lung failure in covid infected patients. Because of the uses of these spices in their daily food, the death rate is low in spite of the higher and densely populated state in India compared to other state.[43]

DISCUSSION

The novel coronavirus originated from the Hunan seafood market at Wuhan, China where bats, snakes, raccoon dogs, palm civets, and other animals are sold, and rapidly spread up to 109 countries. The zoonotic source of SARS-CoV-2 is not confirmed, however, sequence-based analysis suggested bats as the key reservoir. DNA recombination was found to be involved at spike glycoprotein which assorted SARS-CoV (CoVZXC21 or CoVZC45) with the RBD of another Beta CoV, thus could be the reason for cross-species transmission and rapid infection. Corona virus seems to be deadly for elderly, and the people who have the history of lung diseases, Diabetes and Hypertension. Few Studies conclude that SARS-CoV-2-specific memory T cells will likely prove critical for long-term immune protection against COVID-19. Though Tamilnadu ranked highest covid infection cases among south India, the mortality rate is lower when compared to other states. This is probably due to the food habits and the spices used in their food which is followed from ancient times which has medicinal values particularly rasam which contains both turmeric powder and black pepper which has anti-viral properties and immunomodulatory action. The traditional siddha system of medicine followed in southern states of India also plays an important role in treatment of covid-19.

CONCLUSION

For more than thousands of years our people used to follow the concept of "Food as medicine". Nowadays change in lifestyle and cultural habits making us move far away from our ancestral food habits, and considering junk food as a practice to fit in to the elite societal norms leads to an imbalance in metabolism disrupting the immune system and the concept "Unavae marundhu" (popular proverb in Tamil) now changed and there is an increased consumption of medicine than nutritious food. Hence forth there is a high risk of developing covid infection. So it is necessary to go back to our roots and switch to our traditional food habits.

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