Mitigating and managing COVID-19: Promises and propositions from Traditional Health Care Practices in India and China

Sanjeev Rastogi, Raj Kamal Yadav, and Deep Narayan Pandey

***Abstract*—Whole world is currently facing the ongoing COVID-19 pandemic. The pandemic has affected global economy, culture, societal structure, values and human psyche in an unprecedented deterrence.**

This review done through published researches in the relevant area proposes that it is highly imperative for traditional and modern health sciences to come together against COVID-19. Evidences collected through practical experience, published research and classical health care wisdom spread through Chinese and Indian traditional health care texts set a point for integrative health care needs to manage COVID-19.

Evidences are also suggestive of the supportive role of Ayurveda and TCM in COVID-19 mitigation and management. These systems should therefore be fully explored for their potential as supportive care in on-going pandemic.

Keywords: Ayurveda; COVID-19; TCM; Pandemic

I. Introduction

Now in the 2nd year of ongoing COVID-19 induced health crisis, and a failure to find a convincing cure, this is pertinent to think of fighting it collectively in the spirit of *vasudhaiva kutumbakam* (whole world as a family), the ancient Indian dictum preaching the need of togetherness in the world [1]. Having affected over 170 million pepole across the world including over 3.5 million lives lost [2], nothing more compelling comes in sight to prompt us thinking collectively and putting all our health care wisdom in the forefront. This review is presented as a call for all health care systems inclusive of integrative, complementary or traditional approaches to act honestly, proactively and collectively to cut across all domains of knowledge to address the challenge posed by COVID-19 [3]. This clarion call, besides having its objectives of sharing knowledge and experience of traditional medicines for the treatment of COVID-19 and to provide evidence for the prevention and treatment of COVID-19, also aim for developing a more cohesive, collative and unified action plan drawn through the principles of collective learning in a historical perspective, utilising all disciplines and branches of knowledge directly or indirectly involved with the mitigation of the catastrophe. Coming together of all health care sciences without getting distinguished for their places of origin or practice makes a greater and never before sense this time.

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Seeing the continued presence of COVID-19 after 12 months since its initial outbreak, this is very much in the sight that defying the common understanding about viral diseases, SARS-CoV-2, the causative of COVID -19 is neither self-limiting nor is easily controllable. Several epidemiological studies conducted since the outbreak of the disease and WHO status reports are indicative of highly virulent and contagious nature of the SARS-CoV-2 virus supported by the possibility of its asymptomatic and pre-symptomatic modes of transmission [4,5]. As primary measures to prevent cross infections, the individual and community based strategies inclusive of personal hygiene and social distancing are already under implementation [6]. Lockdowns disallowing any kind of movement outside home, have been adopted as the ultimate measures to check the cross infections by isolating the infection sources and barring the people to come in contact with asymptomatic and pre symptomatic careers [7]. There have been definitive benefits of such measures in terms of mitigating the speed of spread and hence buying time to become prepared for a long battle through more dependable armours [8]. From the epidemiological data obtained from Wuhan, there have been the mathematical projections speculating a 2nd resurge of the disease after some time the lockdowns are lifted [9].

Since SARS-CoV-2 is a new pathogen, not much is known about its definitive treatment. Because conventional antiviral therapy fails to operate in the COVID-19 pathogenesis, many re-purposive drug trials evaluating the role of various molecules on the basis of their prospective effectiveness either on similar pathogens or on the basis of molecular structure of SARS-CoV-2 in order to prevent its entry in the host cell are underway [10]. Although there had also been debates over whether to prescribe available therapies, such as quinine-based antimalarial drugs or test the available drugs through randomized clinical trials (RCTs) first [11], this is largely agreed that in context of a pandemic with no approved medications in sight, there should be an optimal trade-off between learning and doing. This means the clinical trials and empirical re-appropriative therapies should go hand in hand with a close monitoring of the situation to allow a quick learning. Adaptive clinical trials comparing to classical RCTs seems to be more suitable in this context.

The other promising approach to get over the COVID-19 is to develop a vaccine against SARS-CoV-2. This is highly gratifying that almost 35 premier institutions across

the world are engaged in an unprecedented speed and spirit to develop the vaccine against the deadly virus. There have been many models of such vaccine development ranging from re-purposive trials of old vaccines to vaccine development using recombinant technology. Many of such vaccines are already in the pre-clinical phase of trial and are soon expected to be open for human trial. A few of them have already been rolled out to be used in emergency [12]. Challenges of combating with COVID-19 however are not going to end by making a vaccine available against the deadly virus. Protection of the global community against a pandemic will require a global immunisation program not leaving any one behind. Regional and global political and economic imbalances may play detrimental to the success of any such program.

II. Contextualising the Traditional Medicine in present scenario

It is in this context, when we see whole world busy in mobilising all its health care and economic resources towards the containment and mitigation of the pandemic, surprisingly nothing serious is learned from the perspectives of traditional and complementary health care for its role in managing the on-going pandemic.

Traditional medicine, as defined by the World Health Organization, is the sum total of the knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the preven- tion, diagnosis, improvement, or treatment of physical and mental illness [13]. WHO global report on traditional and complementary medicine 2019 recognises the Traditional and complementary medicine (T&CM) as an important and often underestimated health resource although having many applications related to prevention and management of many clinical conditions. This report reviews the global progress in T&CM over the past two decades and is based on contributions from 179 WHO Member States having a regulatory frame work for the practice of T&CM thus showing its pan world presence. The report recognises that T&CM can make a significant contribution to the goal of Universal Health Coverage (UHC) by being included in the provision of essential health services. This is surprising that despite T & CM health care available in over 88% of its member states, WHO could not recommend any role for such practices in mitigation of the on-going pandemic. As a result, a large workforce comprising of human and knowledge capital pertaining to T&CM remained deprived from playing assertively during the pandemic.

III. Resourcing the Traditional Health Care Knowledge: The Brief from China Story

India and China being biggest home for traditional health care knowledge and usage [14], were expected to play decisively in terms of taking the leads in defining the role of T & CM in the on-going pandemic. China utilised its TCM skills during Wuhan crisis and treated over 60,000 confirmed COVID-19 patients on an integrative model duly utilising the TCM interventions [15]. It was done through mobilisation of TCM health care workers to Hubei province [16]. In praise of China response to the outbreak, WHO-China Joint Mission report on Coronavirus Disease 2019 (COVID-19) albeit failed mention about inclusivity of TCM in its holistic approaches [17]. Following the policy of inclusivity, especially within its health care resources and opportunities, China officially included TCM in its National Guideline on diagnosis and treatment of COVID-19 [18]. This is extremely important to note that during the crisis in Wuhan, specific TCM wards and hospitals were set up which paved a way for effective use of Chinese traditional medicines in conjunction with western medicine [19]. Chinese statesmanship in keeping its traditional health care wisdom at forefront in the state of national medical emergency is not a folly as it can be traced for its scientific rationales. Lian Hua Qing Wen (LH), one common TCM formulation used traditionally to treat influenza for its broad-spectrum antiviral effects on a series of influenza viruses and also for its immune regulatory effects [20] also found significantly inhibiting the SARS-COV-2 replication in vitro [21]. LH was one among many traditional Chinese formulations employed in treating COVID-19 cases as is shown through the retrospective analysis of clinical records of SARS-CoV-2 infected patients at Wuhan Ninth Hospital and CR & WISCO General Hospital. It was found that LH combination with conventional medical therapy could significantly relieve cardinal symptoms and reduce the course of the COVID-19 [22]. These findings indicate that LH protects against the virus attack, making its use a novel strategy for controlling the COVID-19 disease. Chinese efforts to fight with SARS-CoV-2 with scientific temperament and with due recognition of its own health care science are praiseworthy. At least 303 clinical trials including 50 trials using TCM are currently underway in China aiming to evaluate the efficacy and safety of such treatments for COVID-19 patients. In 14 TCM trials, commercially available TCM products such as Tan Re Qing Injection and Lian Hua Qing Wen (LH) are under study [23]. There are more studies on Huang Qin (Scutellariae Radix), Fa Ban Xia (Pinelliae Rhizoma preparatum), Chai Hu (Bupleuri Radix), and Ma Huang (Ephedrae Herba) for their effects upon various stages of COVID-19 [24]. The results of these Chinese initiatives are expected to have far reaching effects beyond the management of current crisis. These would certainly be placing TCM at a dependable position and will make a way for development of inclusive health care policies across the world.

IV. Indian Traditional Health Care response

India as the second largest facilitator of traditional health care practices in the world was expected to respond competitively on the COVID-19 front. However, despite having an official pluralistic health care policy, and with a large emphasis on mainstreaming of AYUSH (an acronym for Ayurveda; Yoga and Naturopathy; Unani; Siddha and Sowa Rigpa and Homeopathy) through its National Health Policy 2017 [25], an integrative strategy is yet to take off to address the on-going COVID-19 crisis. The steps taken are minuscule comparing to the scale of COVID-19, whose impact in India

is increasing, making it the 2rd worst hit country in the world. The measures prompted currently in India against COVID-19 from traditional health care perspectives comprise of issuance of an advisory for self-care amid COVID-19 crisis [26], a call from AYUSH practitioners and institutions regarding possible solutions to restrain the spread of the COVID-19 pandemic [27], stop and prevent unsubstantiated claims for COVID-19 treatment [28] and expedition of manufacturing of ASU immunity boosting healthcare products and sanitizers [29]. Training of resources for COVID-19 management for AYUSH practitioners are also envisaged in presumption that they could be called upon to volunteer in the extended fight against COVID-19 [30]. Ayurveda fraternity has however promptly proposed the lessons from the current pandemic in order to prepare for the future [31]. In the context of COVID-19 and Ayurveda, few quick takeaways have also been proposed for Indian health care policy makers [32]. With on-going researches on repurposing of Ayurvedic drugs in COVID-19, cautions are also raised for rational interpretation of observations and also for robust study designs in order to minimise the bias in interpretations [33] Ayurveda prospects during Covid-19 pandemic and after it is over have also been speculated [34].

Recently an Interdisciplinary AYUSH research and development taskforce in the ministry of AYUSH for initiating, monitoring and coordinating the Research & Development activities in the AYUSH sector related to SARS-CoV-2 virus and COVID -19 disease has also been initiated. This taskforce in collaboration with Indian Council of Medical Research (ICMR), has initiated COVID-19 clinical trials using three individual herbs namely *Ashwagandha* (Withania somnifera), *Yashtimadhu*(Glyceriza glabra), *Giloya* (Tinospora cardifolia) and one poly herbal formulation named AYUSH-64 [35].

There had been propositions from Ayurveda regarding the possible staging of COVID-19 on the basis of ayurvedic fundamentals and the recommendations to intervene from prophylaxis to treatment [36]. Unfortunately such pragmatic suggestions could not draw much attention of the authorities for making any meaningful impact. Overall, Indian traditional health care response to the situation is yet to take off to intervene decisively and learn precisely from the situation. This requires serious reconsideration, particularly when Ayurveda is proclaimed as one among the world's oldest surviving and practiced medical system, having a legacy reaching far back to 5 millennia. Advocates of evidence-based health care practices criticise Ayurveda for its dearth of quality evidences and consequently are reluctant allowing it to intervene in the situation like COVID-19 no matter what it may cost.

V. RATIONALIZING THE TRADITIONAL HEALTH CARE IN COVID-19 IN THE BACKDROP OF SCIENTIFIC RESEARCH AND ANCIENT KNOWLEDGE

TCM in China has been explored in COVID-19 not for its proven effectiveness against SARS-CoV-2 but on the grounds of the clinical records where TCM formulations were found effective in treating influenza and similar viral conditions causing respiratory tract diseases. It is on the basis of previous clinical experiences that further mechanistic explorations were warranted which led the way to RCTs for generation of dependable evidences of efficacy in SARS-CoV-2 infection. Ayurveda in terms of its ancient and contemporary scientific literature and practice in India is as rich as TCM is in China and hence deserved similar exploration as is done in China.

There are many formulations in Ayurveda which are routinely recommended in similar clinical conditions. Factually, reverse pharmacology is a novel approach of developing newer chemical entities on the basis of leads primarily available in ancient traditional medical texts and is shown through the clinical practice. Any such lead may become a source of further exploration in terms of mechanics or repurposing. Many plants and formulations in India have so far been explored for their antiviral potentials using such leads.

Many plants used in Ayurveda are found to be active in vitro against variety of human pathogenic viruses and their near congeners. In several cases the active compounds are isolated and characterized from primary plant sources. Compounds like andrographolide, curcumin and glycyrrhizic acid as well as extracts of *Azadirachta indica* have shown activity against several viruses in general and merit their investigation in cases of SARS-CoV-2 virus infection [37]. Star anise (*Illicium verum*/ chakraphul), a common spice used in Indian culinary is widely known for its antiviral effects. It is also the source of the precursor molecule, shikimic acid, which is used in making antiviral medications for influenza A and influenza B [38]. In one study *Ficus religiosa L*. (Pipal) extract is found to have antiviral activities against respiratory viruses such as human respiratory syncytial virus (RSV) and human rhinovirus (HRV). *F. religiosa L*. methanol bark extract likely inhibits late steps of replicative cycle. Partial virus inactivation and interference with virus attachment were both found to contribute to the anti-RSV activity. Replication of both viruses was inhibited in viral yield reduction assays [39].

Partially purified methanolic extract of *Cissus quadrangularis* (Hadjoda) have been explored for antiviral activity and its phytochemical characterisation. It's in vitro antiviral activity against HSV type1 and 2, and Vero cells at non-cytotoxic concentration were determined [40].

Many compound herbal formulations have also been tested for their antiviral effects. Nilavembu kudineer (NVK) is one Siddha formulation used traditionally in acute fever. Its antiviral activity was tested against chikungunya virus (CHIKV) and dengue virus (DENV). It was observed that NVK provides protection against CHIKV and DENV-2 during active infection as well can help to prevent virus infection in the cells and it mainly depends on the cellular availability of drugs for maximum protection against both the infections [41].

Azadirachta indica, *Carica papaya*, *Hippophae rhamnoides* and *Cissampelos pareira* extracts were also found effective and demonstrated improvement in clinical symptoms and direct inhibitory effect on dengue virus [42]. A cross examination of herbs and minerals used in TCM formulations used against SARS-CoV-2 for their resemblance with Ayurvedic medicinal plants was able to identify many plants common to both TCM and Ayurveda. A few among these plants common to two systems and having a potential against SARS-CoV-2 are-Soma, Yashtimadhu, Apricot, Godanti, Dalchini, Shunthi, Suran, Dried unripe Orange fruit and dried orange [19].

There are many newer propositions worth exploring for their generic anti-viral and specific anti SARS-CoV-2. Copper is long known for its anti-microbial effects. Recent findings suggest that solid-state Cu_2O disrupts host cell recognition by denaturing protein structures on viral surfaces, leading to the inactivation of viruses regardless of the presence of a viral envelope. This mechanism of denaturing the protein structures on viral surface seems to be a most promising area for intervening in SARS-CoV-2 pathogenesis where the pathogen surface proteins are recognised by the host ACE2 receptors and thereby initiating the pathogenesis [43]. Interestingly copper has long been used as an essential component in many Ayurveda formulations, of which many are used in microbial pathogenesis [38]. Drinking water kept overnight in copper vessel is also a routine health keeping practice in India deriving its source through Ayurveda [44].

Lauric acid, which is a natural constituent of the coconut oil fatty acids, is also known for its anti-viral effects [45]. Coconut oil is the natural ingredient in many Siddha formulations prevalent in southern part of India. Trials on antiviral effects of virgin coconut oil (VCO) in SARS-CoV-2 cases are underway globally [46] and are expected to throw light upon its clinical use in pandemic.

India also has started doing clinical trials on Ayurvedic drugs for their effects on COVID-19. Clinical Trial Registry of India (CTRI) shows 61% of total of 203 trials registered in the CTRI related to AYUSH interventions [47]. In a prospective, open-label, comparative study, where Ayurvedic formulation was administered as an add-on to Standard of Care (SoC) in patients with mild to moderate symptoms, patients receiving Dasamoolkaduthrayam Kashaya and Guluchyadi Kwatham in addition to the SoC showed a faster recovery from breathlessness with reduced ageusia. Patients on the treatment group could be discharged earlier than those from the control group. Addition of *Dasamoolkaduthrayam Kashaya* and *Guluchyadi Kwatham* to SoC appeared to accelerate recovery of patients hospitalized for COVID 19 infection, in terms of reduction of symptoms and duration of hospital stay [48]. The clinical evidence collated so far about Ayurveda effectiveness in COVID -19 largely comes from case reports and series [49-53] and a few clinical trials [54-55]. Available evidences from Ayurveda are suggestive of preventive, therapeutic and supportive role of individual herbs and their extracts as well as compound formulations in relation to COVID-19.

Therefore with these preliminary evidences, and with rich practice based observational evidences, this is imprudent to restrict an otherwise flourishing health care system like Ayurveda for want of direct evidences of its effectiveness against a pathogen which was unknown to whole world before few months.

It may be a surprise to many that Charak Samhita, one of the most revered text of Ayurveda dating back to 500 BC, has a full length chapter dedicated to epidemics and deals elaborately through various aspects of an epidemic and related societal collapse. The elaborations given in this chapter deal explicitly about various causes of epidemic, possibility of its forecasting, methods to protect oneself during epidemics including methods like improving the community immunity and improving the resilience of the ecosystem. It also explains elaborately about keeping oneself free from disease causing pathogens by means of detoxification (*panchakarma*) methods besides recommendation of general health keeping measures [56]. It is obvious to see that, for the traditional health care systems like Ayurveda and TCM having their own biological foundation about health and disease, it's not the evidences generated in terms of efficacy of plant based chemical moieties against pathogens which makes a sense but it is the whole wisdom applied in toto which may give real impacts. It is not the care alone which matters but its prevention also which matter more. No any other time better than this can clearly demonstrate us this lesson that the causes of sorrow lie within us. There may be certain threshold values for such causes to manifest and once such values are surpassed, miseries are bound to occur. In terms of global ecosystem, epidemics are the results of an imbalance in the ecosystem reaching beyond its resilience capacity. Traditional health care systems including Ayurveda teach us perfectly to live in harmony with nature without taxing it for our greed. The sooner we learn this, better it will be for global society.

VI. Limitations of the Study

Since the onset of COVID-19 pandemic is new, what all is proposed for its management is largely based upon past experiences of respiratory tract related viral and clinical experiences of managing various symptoms related to the new pathogenesis. The entire course of the pathogenesis is still not known and much is yet to understand about host re- lated factors acting mitigatory or promotory to the disease. Our proposals are therefore largely based upon current knowledge added with previously accumulated knowledge in the related area. This account may change as the science progresses and as we become more informed the disease pathogenesis and its management.

VII. Conclusion

Due to the absence of a specific antiviral therapeutics, main preventive strategy for COVID-19 is vaccination and treatment strategy is supportive care, supplemented by the combination of various drugs on empirical basis. There is a strong need to incorporate Traditional health care strategies at community level to ensure healthy living at large. Supportive care from TCM and Ayurveda may extend its additional therapeutic benefits in terms of better immunity and direct or indirect anti-pathogenic effects. Ayurveda from India, as is done by TCM in China should come forward to take a lead in this situation to help making this world a better place to live. No medical system today has any known medicine for COVID- 19, yet interventions are being done globally. The similar strategy must be implemented in Ayurveda. Ignoring the experimentation to generate evidence, on the pre-text of lack of evidence itself, risks this ancient Indian medical heritage being simply written off towards obsolescence without giving it an opportunity. India must address this critical issue plaguing Ayurveda promptly.

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DNP has contributed in review of literature, review of the manuscript, revision and final approval of the manuscript.

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