Indian Journal of History of Science (2026) 61:168–179
https://doi.org/10.1007/s43539-026-00223-5

ARTICLE

The concept of heat in Ayurveda: Health, fever, and COVID-19 in Varanasi and Kolkata

Ashawari Chaudhuri[1]

Received: 29 September 2024 / Accepted: 23 June 2026 / Published online: 29 July 2026
© Indian National Science Academy 2026

Abstract
Philosophers of medicine have studied the relation between environmental and bodily heat, especially during fever, since antiquity. The inexplicable conditions that made the body warm during fever have perplexed physicians until the nineteenth century, when germ theory became an accepted form of knowledge that explained causes and symptoms of fever. In most forms of traditional medicine, bodily heat has a deeper meaning that is often embedded within a larger chain of associations among elements, humors, and other body processes. The article first explains the concept of heat in Ayurveda and how it is relational and multilayered. It then explains the significance of the concept in the context of COVID-19. Finally, it reflects on the politico-social histories of two cities—Kolkata and Varanasi—to show how Ayurveda has acquired different significance and meaning in these cities over the past two centuries. Ayurveda is polyvalent. As scholars have recently shown, rather than being folded into biomedical assertions, Ayurveda often uses its theories and knowledge to rework, interpret, and even subvert biomedicine. The paper adds to this by showing how the histories of two cities are critical in that process and ultimately determine the meaning of Ayurveda.

Keywords Heat · Ayurveda · Fever · COVID-19 · Varanasi · Kolkata

1 Introduction

The relation between the environment, body, and heat has piqued the curiosity of philosophers, natural historians, and physicians since ancient times. From Caraka and Galen's writings in the second century CE to theories of thermoregulation in the nineteenth century, the history of medicine shows not only concern about what heat *did,* but also a continuous effort to understand what it *was,* especially in the context of fever. The colourless, odourless, formless phenomenon that could afflict a body severely, sometimes even causing death, perplexed ancient and medieval philosophers of medicine alike. Without the presence of any instrument to measure heat, they considered preternatural and occult interventions as primary causes of fever until well into the eighteenth century. While early medical practitioners struggled to find a conceptual vocabulary for fever, during the Enlightenment, it came to be recognized as a part of a universal human experience. A century later, during Imperialism, it became a marker of difference between people and places where "fevers" were considered dangerous epidemic diseases, and "fever", a confusing physiological state (Hamlin, 2014). These early associations of fear and adversity with body heat during fever continue to persist in biomedicine. As germ theory emerged in biomedicine that explained fever as a symptom of other diseases, the fear of death slowly dissipated, but elevated temperature still raises concern among people. Although body heat is often discussed in the context of thermoregulation in biomedicine, its analysis is largely limited to measuring body temperature. Unlike in biomedicine, the concept of heat in most forms of "traditional" or alternative medicine goes beyond measurement.[1] Heat is a complex, relational, processual phenomenon that guides diagnosis and treatment.

This article traces the meaning of heat in Ayurveda. As many recent writings have shown, "Ayurveda" is not a single, monolithic practice or concept. Even though it is most widely understood as herbal medicine, with *tridoṣa* forming the basis of diagnosis and treatment, several theories of

✉ Ashawari Chaudhuri
ashawari@gmail.com

[1] Cornell University, Ithaca, USA

[1] "Traditional" is always a contested term. As we have seen in Chee et al., (2024) Traditional Chinese Medicine was a category constructed in the 20th Century for political ends.

disease have emerged at different moments in its history.[2] The model of 'affinity' to diagnose and treat diseases, for instance, which is based on the notion of 'relating to oneself' or 'wholesomeness-to-oneself', or the suitableness of place, diet, or season that is acquired and not inherent (but that is specific to each person), was mentioned by Caraka and followed by several physicians along with the 'humoral colligation' model of disease (Wujastyk, 1998, p. 60). Not only does Ayurveda have complex and layered theories of disease that are discussed in various texts, but it also has a powerful polyvalence "whether in the economy of health and illness, the politics of culture, or the theoretical projects of the academy" (Langford, 2002, p. 9). Like bodies of medical knowledge that have emerged out of complex historical processes, Ayurveda too has become an integral part of modern Asia as "innovative, lucrative industries" and a transnational phenomenon (Kloos & Blaikie, 2022; Wujastyk et al., 2008), and this commodification has led to the creation of "brand Ayurveda" that has spread in India and beyond (Viale & Vicol, 2023). As scholars have argued, Ayurveda is not a cultural artifact opposed to biomedicine; rather, modern biomedical knowledge and practice are made sense of, negotiated, or even subverted by Ayurveda (Banerjee, 2007, 2020; Berger, 2013; Langford, 2002). The article takes this argument as a starting point to then show that within the larger phenomenon of Ayurveda reworking biomedicine through practice, the politico-social histories of specific Indian cities have animated different relations between the two, especially in the context of COVID-19.

The article first describes the terms used to conceptualize heat in widely used Ayurvedic texts. It then situates heat in the context of fever, especially during COVID-19. Finally, it focuses on two cities — Varanasi and Kolkata — and the historical contexts that led to very different trajectories of Ayurveda in each. I make two interrelated arguments: first, I show that the concept of heat goes beyond temperature, and that there is agreement among scholars and practitioners that different forms of heat are at the core of understandings of the body, disease, and treatment in Ayurveda; and second, I argue that different political histories of the two cities have determined the significance of Ayurvedic institutions as well as Ayurveda, and they, in turn, have led to multiple interpretations of texts and practices during COVID-19, thus ultimately making Ayurveda more-than-one if not multiple. It is not only the practice that changes with different research and teaching methodologies across these two institutions, but even the interpretation of texts varies heavily depending on who the teacher/practitioner is and the kinds of institutional milieus they are based in.

The research for this article began during the COVID-19 pandemic. The first part of the research consisted of Zoom interviews with Ayurvedic practitioners. Between May–August 2022, I conducted qualitative research at Banaras Hindu University (BHU) in Varanasi and at JB Roy State Ayurvedic Medical College in Kolkata. I conducted around 15 in-depth interviews with professors in these institutes and carried out participant observation. The questions were divided into three categories: meaning of heat in Ayurveda and the ways in which it features in the works of these practitioners; the relevance of heat in the context of COVID-19; and the role of the university, the city, and the nation in shaping trajectories of Ayurveda in the present moment. Participant observation was conducted during OPD sessions with Professor Kuldeep Kumar Pandey and Professor Abichal Bhattacharya. The central themes and explanations were then used to divide the article into sub-categories that ultimately built my argument.

My own experiences of using Ayurvedic remedies over the past few years have added to my embodied understanding of the meanings of heat in Ayurveda. The first section of the article is based on secondary materials that discuss the concept of *agni,* although findings from interviews have also been incorporated. The second and third parts draw on two classical compendiums of Ayurveda —Susruta Samhita and Ashtanga Hridaya — as well as on fieldwork conducted in Varanasi and Kolkata.

2 *Agni*, *pitta*, and the concept of heat in Ayurveda

On a hot, humid afternoon in mid-June in Singapore, I walked into Ega Juice Store for an Ayurvedic consultation about my persistent migraine headaches that had been exacerbated by the weather in the city. Located in the upscale Orchard The Shopping Mall, the store is unassuming yet busy. Unlike most other stores in the mall, where products like apparel and jewelry are impeccably displayed on shelves, the ones at Ega are stacked with boxes of sprouting beans, juices for various doṣa, and black insulated bags filled with products for delivery. The day I had booked an appointment for a consultation, the place seemed busy with staff checking lists and scurrying around with juice boxes. In a small room partitioned from the rest of the store with glass walls, I met with Dr Ratheesh. After patiently listening to my everyday diet and exercise routine, he read my pulse for around ten to fifteen minutes. The very first statement he made was that my headaches were related to the stomach and not necessarily the head. Diagnosing my constitution as predominantly *pitta* or heat-dominated, he

[2] To learn more about different theories of disease in Ayurveda, please read "Models of Disease in Ayurvedic Medicine" by Dominik Wujastyk in Mark Jackson edited *The Routledge History of Disease, 2017, Routledge.*

prescribed a series of foods to avoid or include in my diet. An old habit that I was immediately asked to abandon was drinking different kinds of teas throughout the day. When I inquired about the reason for this, he explained, "it produces heat in the body that clashes with the outside heat in the environment". Instead, he added drinks like ash gourd juice to my diet that have a cooling effect on the digestive system. As someone who was consulting an Ayurvedic practitioner for the first time, the meeting was significant for me for two reasons. First, it was clear early on that the diagnosis, treatment, and approach towards my headaches were grounded in fundamentally different assumptions from biomedicine. I knew that there can be multiple triggers for migraine headaches in a person, including food, but that was still far from the statement that the headaches were directly related to the condition of my stomach. Second, it raised questions for me about heat. While Singapore is often liked or disliked for its hot, humid weather, Dr. Ratheesh's conceptualization of heat piqued my curiosity about its meaning in Ayurveda. While it was immediately clear that heat was not a measurement for him, its meaning was difficult to grasp due to its depth and complexity. As is the case with many research topics, our personal experiences shape our scholarly pursuits, and the conceptualization of heat in knowledge disciplines such as architecture and medicine eventually emerged as my area of research and teaching over the next few years.

In the next two years, as I spoke with Ayurvedic practitioners and educators, heat emerged as the most significant criterion in addressing health and disease. Like most concepts and diagnosis in Ayurveda, heat is not a single category that can be delineated and set apart for observation and experimentation. It only acquires its meaning through associations and connections with other states and conditions in the body. In every conversation, "heat" meant a lot more than temperature. Like the concept of "balance" that is a guiding principle in Ayurveda, yet that is often an ideal that one can approximate but never achieve (Alter, 2005), heat too is a *quality* inherent in food and bodies, a determining factor of diseases, and an indication of life force, yet it is difficult to grasp the entirety of its meaning. With words like *uṣna*, *agni*, *tāpa,* and others describing different aspects and purposes of heat, it is only through association of meanings that one can somewhat grasp the concept . In the body, which is always a biomoral entity in Ayurveda, forms and substances that carry heat mediate the already fluid relations between inside and outside, or between health and illness.

A concept- word that explains heat and its layered meanings is *agni*. Although one can translate *agni* as 'fire,' its meaning and use depend on the process it describes. *Agni* in Ayurveda is associated with the conversion of food and metabolism in the body (Agarwal et al., 2010). *Agni* converts food and provides the body with its life force. Once the function of *agni* stops, the person dies. It is *agni* that allows a body to continue with all the vital functions. *Pitta* is therefore considered as the most significant of the *doṣa* and *agni* resembles life force (Shastri et al., 2004, p. 452). In Acharya Yaska's Nirukta, he describes the etymology of *agni* in several ways. One explanation that is relevant for this article is translated by Agarwal et al.: "Agni = A + G + Ni. The letter "A" denotes root "I" meaning "to go"; "G" denotes the root "Anja" meaning "to glitter" or root "daha" meaning "to burn" and "Ni" means "to carry" (Agarwal et al., 2010, p. 396).

Yaska's Nirukta considers *agni* as a fundamental conceptual block in the study of Ayurveda. No *yajna* can begin without *agni.* It exists on earth. It has the characteristic of always moving, consuming, and burning things, and it carries honey, yogurt, and other materials given by humans during *yajna* to the gods and goddesses (Thakur, 1963: pp. 886–888). When it comes to the body, it metamorphoses substances, protects the body from diseases and it is a symbol of life. *Agni* is the "pivot around which the remaining factors responsible for the maintenance of health and causation of disease, as well as decay, revolve" (Agarwal et al., 2010, p. 396). In Caraka's work, there are thirteen kinds of *agni—jaṭharāgni—agni* of the stomach/ duodenum (1), *bhutāgni—agni* of the five elements (5), and *dhatvāgni—agni* of the *dhātus* or tissues of the body (13). Suśruta, an ancient physician-surgeon in Ayurveda, explained five kinds of *agni*, whereas Vāgbhaṭa was of the opinion that there are twenty-three kinds (Dash, 2015, p. 27).

The *pitta doṣa* is sometimes considered as a kind of *agni* or *agni* itself. There are differences in the classical texts about this. The characteristic of *pitta* is *tejas* (heat) or put differently, the reflection of heat in the body is through *pitta*. The two properties of this element *tejas* are colour and touch. Its colour is *bhasvara* (illuminating), and its touch is *usma* (hot). Solar heat, "is the source of all the store of heat required for chemical change in the world. Citing the example of the colour of grass, he has suggested that (the colour) is due to *tejas* in the form of invisible heat, not in the form of *agni* and that the cold, in winter, cannot take away the store of heat, derived from the sun" (Dash, 2015, p. 11). While pointing out that the main *function* of *agni* is transformation, other scholars have given examples such as fruit ripening, metal rusting, and food turning into waste matter. As Dr. Girish Tillu, researcher and practitioner of Ayurveda at the Savitribai Phule Pune University and co-author of *Integrative Approaches for Health: Biomedical Research, Ayurveda, and Yoga*, pointed out during an interview that transformation or conversion —the central function of heat—is also its primary characteristic. Hence, instead of measuring heat through the rise or drop in temperature, texts explain it through the function it performs in a specific body. Although there are differences of opinion among scholars of Ayurveda on whether *agni* and *pitta* are identical, especially

when it comes to the direction of their movement, most agree that they are similar because they both perform the same function of burning/ combustion and conversion from one form to another (Patwardhan et al., 2015). Those who are of the view that *pitta is agni*, consider it so because "it performs fire-like actions, i.e., *pāka*, which refers to *pācana* (digestions); *dahana* (burning, combustion or oxidation) including *bhinna samghata* (splitting); *tāpana* (heat production); *parināma* (conversion); *parāvritti* (transformation); *prakāśana* (illumination); *ranjana* or *varṇākara* (colouration); and *prabhākara* (to cause luster)" (Dash, 2015, p. 23).

It is this function of transformation and conversion that takes the body through its different phases. Most treatments are performed by studying the relationships among the *doṣa*, *dhātus*, a person's history of illness, and their everyday habits. Whether it is medicines, food, or practices, the properties, or *guṇas*, of objects are used in Ayurveda to maintain health and treat diseases. For instance, black pepper is often recommended during a cold because it is a substance that induces heat. It increases *pitta,* because the increased flow of gastric juices increases appetite and acidity. Hence, black pepper is considered to have the *uṣna guṇa* (quality), among twenty opposing qualities such as light and heavy, hot and cold, smooth and dry, slimy and non-slimy, and the like.

On the other hand, if a person has peptic ulcer, for instance, it is a symptom of increased *pitta* and it is often accompanied by dryness and a sour taste. To treat it, cooling, oily, and sweet foods are prescribed. Ghee (clarified butter) or licorice is often suggested, as they have oily and cooling properties, respectively. Professor JP Singh of the Panchakarma Department at BHU explained *agni* as a relationship between the inside and outside of the body and described the primary method in Panchakarma as purification that focuses on correcting *agni*, especially *jaṭharāgni.* Professor KN Murthy, while explaining the role of *agni*, mentioned the usefulness of fasting during fever. He explained that the role of *jatharāgni* is to process the food that one consumes. If a person is ill, fasting relieves the *jaṭharāgni* of this task, and it can then work to protect the body from fever or other diseases. The object of therapeutic intervention, therefore, writes Francis Zimmermann, is to "render the environment appropriate to the needs of the patient and conversely, to render the regimen of the patient appropriate to the ecological conditions" (Zimmermann, 2011, p. 23). He explains how a "place" in Ayurveda is both the body and the land. He further shows that this is not a biological connection between the body and the environment, but a "philosophy of action" that determines an appropriate diagnosis for the place. Heat, then, is not only an internal function of the body, but the fulcrum that connects the inside with the outside and guides this philosophy of action in Ayurveda.

3 Heat, fever, and COVID-19

If heat is the life force in an organism, how does Ayurveda explain the experience of heat during fever when it is arguably in its most adverse condition? In Volume III, *Kāyācikitsa*, chapter XXXIX of *Suśruta saṃhitā*, one of the three most significant classical texts in Ayurveda, this is how *jvara* or fever is described:

> To the query of the disciples, the divine physician, Dhanvantari replied as follows[3]:
> First, I shall discourse on the nature and origins of fever for it is king of all bodily distempers in as much as it affects the whole organism at a time. It was begotten by the fire of wrath of Rudra, and afflicted the whole animal world or organic kingdom. Its presence is perhaps an indispensable condition under which a creature can come into being or can depart from this life, and hence it is called the lord of ailments and none, but a god or man can bear the heat of fever. Men may become gods by virtue of their good deeds (karma) and would again revert to humanity (mortality) at the close of their blissful effects, and it is this divine or godly element in man that enables him to bear this abnormal heat of fever whereas the lower animals are lost under its influence.

This description is followed by a classification of eight types of fever and an explanation of the process of *jvara*. The deranged bodily *doṣas* enter into the *āmāśaya* and finally enter the *rasas* (lymph-cycle) because of their inherent heat (*uṣman*). The deranged *doṣas* mixed with lymph cycles, obstruct the digestive ducts and expel the heat from the stomach (*pakvāsaya*) and spread all over the body.[4]

A similar description of fever is found in Vāgabhaṭa's work:

> Fever is the Lord of diseases. It is evil, it is death, the devourer of energy, the terminator. It is the fury born from Śiva's third eye, which destroyed Daka's sacrifice. It consists of the confusion that is present at birth and death. It is essentially a high temperature and it arises from bad conduct. Called by many names, it is cruel and exists in creators of all species. It is of eight types, according to the way the humours

[3] Most compendiums in Ayurveda are written as dialogues between the Guru (teacher) and Sisya (disciple/student). Dhanvantari is considered the God of Ayurveda. He is often depicted as having four hands with the upper ones holding a conch and a discus, and the lower ones holding a pot of nectar for immortal life and a leech that is used in bloodletting.

[4] An English Translation of the *Susruta Samhita*, edited by Kaviraj Kunja Lal Bhishagratna. Published by S.L. Bhaduri B.L., Kolkata, 1916: 169–172.

> come together singly, in combination, or as being of external origin. Thus, the impurities, corrupted each by its own particular irritant, enter the stomach. They then accompany the crude matter and block the ducts. They then drive the fire out of the place of digestion and to the exterior. Then, together with it, they snake through the whole body, heating it, making the limbs hot, and bringing about a fever. Because the ducts are obstructed, there is usually no sweat. Its first signs are lassitude, uneasiness, a heaviness of the limbs, dryness of the mouth, loss of appetite, yawning, and watery eyes. There is friction of the limbs, indigestion, breathlessness, and excessive sleepiness. There are goose pimples, flexion, cramp in the calf muscles and fatigue. The patient is intolerant of good advice and has a liking for sour, pungent and salty things, and a dislike for sweet foods. He also dislikes children. He is extremely thirsty. For no reason, the patient likes or dislikes noises, fire, cold, wind, water, shade or heat. Following these signs, the fever becomes manifest.

As scholars like Trawick (1976) have pointed out, although the wrath of Śiva is not invoked in treating diseases in Ayurveda, fever, which is often considered as one of the most severe afflictions, is said to have emerged due to the moral degradation of people, like when they became lethargic and closely attached to worldly things, or when they disregard religious, social, and ethical duties. Although there are some variations in the explanations in *Caraka*, *Suśruta*, and *Aṣṭāṅgahṛdaya saṃhitās*, they all agree that fever involves "transference of painful heat" and is one of the few afflictions that impact the body, mind, and senses at the same time. Most other illnesses impact only one or two aspects simultaneously (Cerulli, 2012; Sharma & Dash, 2018; Shastri et al., 2004). Fever can be caused due to the vitiation of two or more *doṣa*. But there are certain kinds of fevers, like *sannipāta* fever, in which all three *doṣas* are vitiated. This is characterized by perspiration, increased heat of the skin, pain in the joints, and numbness of limbs (Bhishagranta et al., 1999). Fever is considered both a rare affliction that simultaneously affects the body, mind, and sense organs, and an ordinary one, as one experiences it at the moments of birth and death. Fever has acquired a renewed significance in Ayurveda in the context of the COVID-19 pandemic.

As for the causes of COVID-19, there are divergent opinions among Ayurvedic practitioners and scholars. Causes of diseases in Ayurveda are categorized as intrinsic, extrinsic, and psychosomatic (Pandhkar & Sachdeva, 2020). Suśruta in the seventh century BCE mentioned *aupsargika* (infectious) diseases as well. Infectious diseases are further explained under *jvara*, *kṛmi* (parasites, worms, microbes), *viṣa*, *janapadodhvamsa* (epidemics), and *ritucarya* (season-specific diseases like flu) (Pandhkar & Sachdeva, 2020, p. 2). While all contagious diseases are infectious, not all infectious diseases are contagious. As far as Ayurvedic texts are concerned, there is no conclusive evidence that there is a strict distinction between the two. Contemporary practitioners and scholars agree that in order to address the disease, the *doṣas* and *agni* have to brought back to their pre-COVID stage, and it is an integration of "preventive, promotive, curative, and rehabilitative approaches" that will be the most impactful to address the disease (Tillu et al., 2020, p. 96). However, there seems to be differences among scholars about whether COVID-19 is caused by intrinsic or extrinsic factors. Some scholars argue that it is first extrinsic but later becomes intrinsic, whereas others argue that even if it is caused by a virus, it cannot affect a body with a good balance of *doṣas*. Hence, the cause, like most diseases in Ayurveda, goes back to the vitiation of the *doṣas*, and therefore, it is intrinsic.

On a humid afternoon, I reached the chamber of Dr Abichal Chattopadhyay in a narrow, winding street in Hedua, old Kolkata. He is a Professor in the Department of Ayurveda Samhita and Siddhanta at the Institute of Post Graduate Ayurvedic Education and Research, and an Ayurvedic doctor. I had heard about his extensive knowledge of Ayurvedic texts from several educators in Varanasi as well as in Kolkata. Moving seamlessly between long *ślokās* (verses) from Ayurvedic compendiums and detailed descriptions from modern Western medicine, his philosophy is to go back to the books for analysis and treatment. Based on the symptoms of the disease at hand, he encourages every practitioner to relate them to the context of the *Caraka Saṃhitā* and decide on the line of treatment accordingly. While explaining the causes for COVID-19, he said:

> In Ayurveda, the main reason for *janapadadhvamsa* (destruction or annihilation of large numbers of people or communities) is the vitiation of air, water, space/land, and time because of "adharma". *Adharma* is defined as disregarding social rules and prioritizing individual gain over social gain. Wars happen because of this reason. The use of atomic bombs is because of this reason. Someone might win the war, but because of this, generations of people and histories are destroyed. Nations that were experimenting with biological weapons because of individual gain, are the same nations that have paid the highest price for it. Susruta had mentioned about biological weapons. He had clearly written that "*shuksma jibanu* or a" (microorganisms) develop because if these biological weapons/*adharma* and the diseases created by them destroy *janapad* (society/country). Dr Abichal Chattopadhyay.

I find this explanation powerful because it circumscribes some of the fundamental principles of Ayurveda that I have encountered in Ayurvedic texts and in my conversations

with other practitioners. It is the biomoral aspect of diseases where analysis is inward-looking and related with one's own practices around the body and mind instead of locating causes elsewhere. Even though the language of biomedicine is repeatedly used to explain psycho-physiological processes in Ayurveda, I found the explanation of diseases through people's actions distinctive. During other interviews, I came across the statement that there are and will be thousands of viruses at any given time, and most of them will mutate constantly. It is more important to strengthen one's health rather than pursue viruses and base treatment on the characteristics of each virus. This directly speaks to Alter's argument that the fundamental assumptions in Ayurveda differ from those in biomedicine, making the two ontologically distinct.

Professor Chattopadhyay continued to explain that all bacteria, viruses, parasites are termed as "*bhuta*", with each having a different way of spreading.[5] Some spread through water, while others spread through close contact. SARS COV 2 virus is *gandharva* kind of *bhuta*/ virus. *Gandharva* lives in the air and water and causes infections through moving droplets. For any disease initiated by *bhuta*, the initial impact is *bikar bighat obhab* (impaired immune response), which leads to tissue degeneration/*dhatu khoy*. *Bhuta* or microorganism first enters the body. It then it takes refuge in the respiratory system cell (*pranobohop sroter kośa*). Once they enter the cell, they reproduce and destroy the cells that create *sansanak jvara* (fever with respiratory distress), but if resistance is high, the disease does not spread. *butopoghat jvara* thus makes cough visible, and gradually the entire body gets affected with pain, convulsion, and severe breathing difficulty. A patient cannot be treated anymore if the symptoms include restlessness and sensory dysfunction. There is a chance of treatment if body and mind are not tired or too restless, *jvara* comes down, the sense organs work, and one feels better. He considered *pañcakarma* (method of cleansing the body) along with consumption of water and *pippali rasāyana* (an herbal medicine with black pepper as the main ingredient) as the primary mode of treatment for COVID-19. There are differences of opinion among scholars regarding the correlation between *kṛmi* or *bhuta* on the one hand and viruses, microbes, or parasites on the other Instead, the difference is rooted in the problem of imposing modern concepts and categories on to ancient ones. In *Śabdakalpadruma*, *kṛmi* is described as "*Bhrame sampasarane ca*" or that which moves with *pāda* or legs. In *An English Translation of the Susruta Samhita*, edited by Kaviraj Kunja Lal Bhishagranta, Volume II, *Nidānasthāna*, chapter V, the word "virus" is mentioned while describing *kuṣtham* (leprosy). It states that like a tree draws nourishment from water in deep layers of soil, *kuṣtham* first impacts the skin, but eventually goes deeper and impacts organs and other parts of the body wherever the "virus" can reach (Bhishagranta, 1911, p. 40). While using the word *kṛmi* to describe viruses, bacteria, or parasites could arguably be performing an epistemological jump, the reason for their widely used correlation in Ayurveda is because of the similarities in their description, location of production, morphological character, and the signs and symptoms they produce (Gavande et al., 2020). "Individual probable correlation of all *kṛmi* with microorganisms is quite difficult but some of the *kṛmis* produce similar features like microbes and parasites" (Bairagi et al., 2023, p. 163). On the other hand, scholars have argued that while Ayurveda refers to organisms invisible to the naked eye, they cannot be immediately considered viruses or bacteria.

Professor Chattopadhyay's approach to disease and treatment is in stark contrast to the account of disease etiology presented by Professor Kishor P. Patwardhan of the Department of Kriya Sarir, Faculty of Ayurveda, Benaras Hindu University. With a long history of research and teaching, Professor Patwardhan has been skeptical about certain Ayurvedic theories for some time, but it was during the pandemic years that he wrote "Confessions of an Ayurvedic professor" in the *Indian Journal of Medical Ethics.* As a way of background to this article he explained:

> There are some things that are very basic in physiology that have already been falsified, like formation of blood or semen: Ayurveda shows that semen is formed from bone marrow or that blood is formed in liver and spleen. These have been falsified. We can do "strained interpretation", but ultimately we are being dishonest. What I want to say is Ayurveda should not be called a mature science. Since times have changed, if we read the old texts "as is", there is a problem. With certain symptoms, we can make conjectures about the diseases causing them. But that is not sufficient to make clinical decisions. If we want to make clinical decisions, we have to use modern laboratory methods. If we do not take laboratory results into account, if we say we only take *tridoṣa* into account, we are deceiving ourselves. For example, if someone comes in with joint pain, there could be hundreds of diseases where joint pain is a symptom. If you do not assess or diagnose, you cannot conclude that this is *vata, pitta, or kapha*. Hence, this approach has limitations. It does not guide clinical decisions among clinicians even though they take it as a heuristic model. For instance, if the *prakriti* of ten people is studied by ten Ayurvedic physicians, there will be only a 70-80% overlap. That is a huge

[5] For further discussion on correlation between categories in Ayurveda and modern medicine, please see, "Ayurveda and Modern Correlation of Some Infectious Diseases: A Literary Review"; Dr Ashutosh Kumar Jain, Dr Jinesh Kumar Jain, Dr. O.P. Diwedi; Journal of Drug Delivery and Therapeutics; 2019 9(2-s): 695–697.

> variability. You cannot accept that scale of variability if we are doing a blood test, for instance. If you study a patient's hemoglobin count and one lab shows 10 while another shows 7, that will not work. There is no accuracy. This lack of accuracy has been part of our practice. We think we have not assessed properly, or our tools are not accurate enough, or that the patients have not adequately explained their symptoms. That is what we think. We do not go a step back and question whether the theories are correct and whether they need modification. Until we test theories, it is not always believable.--- Professor Kishore Patwardhan.

These fundamentally opposed viewpoints, I suggest, also make Ayurveda inherently more-than-one, if not multiple, not just in its applied state, but also in the interpretation of the texts and in identifying disease etiologies, diagnoses, and treatments. This dichotomy between intrinsic and extrinsic is intricately linked with the continuous process of "(re) inventing" Ayurveda as it moves through "the economy of health and illness, the politics of culture, or the theoretical projects of the academy" (Langford, 2002, p. 9). During most discussions on heat and its effects on the body during COVID-19, and on the role of Ayurveda in treating it, people used concepts of *doṣa* alongside biomedical explanations. This slippery slope of the need for Ayurvedic principles to be legible and acceptable in biomedicine while maintaining its distinctiveness was a theme that ran through all my conversations with scholars and practitioners of Ayurveda. Those who consider the disease intrinsic often make a distinction between Ayurveda and biomedicine in how they form relations between the body and the environment, or between inside and outside. As one informant said "In reality, the difference lies in the fundamental difference that defines approach to fevers between modern medicine and Ayurveda. Modern medicine has always looked for a cause from "outside", basing itself on the "germ hypothesis", whereas Ayurveda has always looked "inwards" and feels it is *doshas* or *nija hetu* that cause all these fevers" (Langford, 2002, p. 3). Such practitioners consider this vitiation of the *doṣa* to be the main cause of the different impacts of the disease on different people. If the former group of scholars/practitioners considers the main state of COVID-19 as *sannipata jvara*, the other group considers it as *aupsargika* (infectious) *jwara* (Akhila, 2022). A range of medicines and foods are prescribed, but they address the nature of vitiation at each discrete stage of the disease. They emphasize the prophylactic approach of preventing the disease and recommend health-promoting immune modulators and herbs such as Indian long pepper, *aśvagandhā* (winter cherry), guduchi, and the like (Tillu et al., 2020, p. 96). Whether it is a general fever or the specific case of COVID-19, analysis and treatment are often dynamic. It is a *relation* and an *association* between *doṣas*, *dhātus*, and malas (waste) in a body that determines the best way to address it. And heat is a quality that performs significant functions in the body, especially during COVID. With this significance attached to heat in Ayurveda, fever, when heat is in its adverse condition, is studied as a relation among different phenomena in the body. Heat then mediates the connections between the body and its different states with the environment.

4 Ayurveda in Kolkata and Varanasi

> Knowledge should be understandable to the general public. If we cannot explain our principles and theories to the world, we will lose out. A Japanese scientist won the Nobel Prize for autophagy, an important aspect of which is fasting. Ayurveda mentions *langhan* or fasting as a way to cleanse the body in several contexts. Herbs like Guduchi are known to have anti-ageing and immunity-boosting properties, and *Aśvagandhā* is good for the regeneration of brain cells. But it is not enough to speak our own language among ourselves. When we say *kapha*, *pitta*, *vāta*, it is not understandable for others. But if we can explain the concept of *agni* through the language of biochemical and enzymes, the principles of Ayurveda will be more legible to others, and that is important. In order for others to have faith in Ayurveda, and for the science to be valued, we need to reach out to a larger audience. ---Professor JS Tripathy, Benaras Hindu University, Varanasi.
>
> Even during my childhood, Ayurvedic doctors used to rely on *darśana* or observing the patient, along with listening to the symptoms of the patients. This would be carried out along with *nādi parīkṣā* or reading the pulse. It is said that the great Ayurvedic doctor, Bidhan Roy already knew the disease of the patient, as s/he would walk in through the door of the chamber. That kind of knowledge, diagnosis, and training are hard to find these days. It is difficult to trust Ayurveda in the same way as before. ---- Professor Geetalekha Bhattacharya, JB Roy state Medical College, Kolkata.

These two statements are significant for a few reasons. First, they are both concerned with trust in Ayurveda, though one emphasizes the need for translatability across space, while the other explains irreplaceability of time. If one considers demystifying knowledge as the legitimate future of Ayurveda, the other, by pointing at the impossibility of returning to a past that contained a richer understanding and practice of Ayurveda, considers translation as a continuation of the disintegration of knowledge. A third view is a radical restructuring of Ayurveda's fundamental theories, as suggested

by Professor Patwardhan. Implicit in these assumptions are notions of Ayurveda and its principles that are sometimes juxtaposed, imbricated, or placed in opposition to one another. Those who propose integrative approaches to learning and practising Ayurveda often have a more pragmatic view about its past and future. Ayurveda is considered a way of life that can be practised alongside biomedicine. The other approach to Ayurveda is that it is a *worldview*, and to truly understand it, one needs to be *oriented* towards it by being familiar with Sanskrit, which is the language historically used in Ayurvedic texts, or by developing the keen eye of an Ayurvedic practitioner who addresses the problem by observing and listening to the patient. Ayurvedic technomodernity, writes Projit Bihari Mukharji, was often formed at the cusp of opposite propensities. "On the one hand, global medical instrumental culture sought to engender a shared, singular scientific modernity; on the other, non-biomedical medical traditions were predominantly interested in fabricating a distinctive modernity" (Mukharji, 2016, p. 16). The binary between folk and classical medical knowledge, itself a creation of colonial modernity, was constantly negotiated through different practices and interpretations of Ayurveda as well as through figures like Jwarasur (the fever-demon) (Mukharji, 2013; Mullick, 1889).

These comments about Ayurveda from educators in two cities not only reflect the tension between its different meanings and the practice of Ayurveda, but they are also embedded in the distinctive histories of the two cities. It is indeed the political histories of cities, I argue, that determine institutional trajectories that ultimately shape Ayurveda in distinctive ways. The historical context of emergence, pedagogy, and visions for the future have been significantly different at Benaras Hindu University in Varanasi and JB Roy State Ayurvedic College and Hospital in Kolkata. During several conversations with Professor Bhattacharya, she repeatedly pointed out that Kolkata lacks what she termed the "Ayurveda mentality" found in places like Gujarat, Varanasi, and Maharashtra. While there are individuals in these institutes who are enthusiasts (like Professor Chattopadhyay) or skeptics (like Professor Patwardhan) of Ayurveda, I show that the culture and politics in the two cities have shaped the different trajectories of Ayurveda as an institutional form of knowledge. Professors and practitioners of Ayurveda seemed to agree that the political history of Kolkata, from the colonial period onward, did not allow for the flourishing of Ayurveda, even though the city has produced some of most prominent Ayurvedic scholars and practitioners throughout history.

In the nineteenth century, West Bengal was one of the central locations where Ayurveda received a new lease of life. Acharya Gangadhar Roy made a significant effort to revive Ayurvedic teaching and practice by writing the commentary *Jalpakalpataru* on *Caraka Saṃhitā* and by collaborating with the printer Bhuvan Chandra Vasaka to print important texts, thereby making Ayurvedic texts accessible to a larger public. His commentary on *Caraka Saṃhitā* featured several innovative features, including "simplification of expression, addition of words, specific lexical choices, grammatical changes, and interpretive semantic choices, including changes in textual sequence" (Saha et al., 2024). His, along with Madhusudan Gupta's edition of *Suśruta Saṃhitā*, marked the beginning of combining traditional Ayurvedic knowledge with emerging technology, such as printing, which brought together scholars and practitioners to form new Ayurvedic institutes. While Roy was innovative in his teaching approaches and insisted on combining theory with practice, he wanted to maintain the "integrity of Ayurveda" from the colonial imposition of Western medical practices as was evident in his decision to move from Calcutta to Saibabad as a protest against Madhusudan Gupta's dissection of a corpse in 1836 (Saha et al., 2024, p. 276). During the nineteenth and twentieth centuries, the relationship between Ayurveda and biomedicine shifted from peaceful coexistence to a strained one due to the increasing professionalisation of medicine and the standardisation of drugs in Britain. This led to a complete separation of the two and the predominance of Western medicine by the turn of the twentieth century (Bala, 1991). The colonial government established the Native Medical Institution (NMI) in 1822, followed by Calcutta Sanskrit College and Calcutta Madrassa, where Ayurveda and Unani were taught respectively, along with translated texts from European biomedicine. As the names of the colleges suggest, knowledge of Sanskrit and Persian were critical in teaching and learning in these colleges. Knowledge of indigenous plants and medicines was still considered valuable for experiments conducted in medicine in England at the time. However, there were sustained efforts to gradually and consistently incorporate themes and methods of Western medicine into the curricula of these colleges. John Tytler, for instance, began a series of lectures on Mathematics and Anatomy at these two colleges in 1827, and students who performed well in these subjects were recruited into government hospitals (Bala, 1991, p. 43). In the next few decades, biomedicine penetrated medical institutions across the state and English began to replace vernacular languages. By 1865, classes were discontinued at these two colleges, NMI was abolished, and Calcutta Medical College was established to reinforce the hierarchy, with allopathy at the top.

During this period of integration and eventual replacement of Ayurveda by allopathy, some practitioners held different views on the place of Ayurveda in the changing political and cultural context in Calcutta. It was never a complete replacement of one form of medicine by another, but nationalist leaders and medical practitioners contested the imposition of biomedicine by putting forward different forms of

medical knowledge and wisdom, and efforts to modernize and institutionalize Ayurveda and Unani created complex and pluralistic healthcare realities (Bala, 2012). There was a lack of state funding for Ayurvedic research and education in the post-colonial period, and this continued under the successive governments since the decades after independence.

Although JB Roy Ayurvedic College is more than a century old, it did not become operational until the mid-2000s. Until then, there were few faculty members, most of whom worked on a contractual basis. They had been sending petitions to the state government since the 1990s, but it was only in 2008 when the Central Council of Indian Medicine–- the statutory body that controls affiliation, syllabi, and enrollment of all colleges and universities teaching Ayurveda, Unani, and Siddha, or what they consider 'Indian Medicine'— recommended cancelling affiliation of all colleges that did not meet certain criteria like the number of permanent teachers, enrollment rates, and conducting regular classes. The college has been running as a full-fledged educational institute since then. Whether the goal was to integrate Ayurveda with modern medicine or to strictly separate them, both faced their own set of challenges. As Professor Chattopadhyay explained, "the frameworks that we work with, like the protocol set up by the Central Council for Research in the Ayurvedic Sciences (CCRAS) under AYUSH, do not have anything specific for Ayurveda. It is difficult to create a research protocol that is entirely based on Ayurvedic principles. That will require significant effort and creativity from a team of scholars and practitioners. And true integration of biomedicine and Ayurveda can be challenging. A student of Ayurveda cannot prescribe allopathic drugs. Even though interest in Ayurvedic education declined in the post-independence period for various political reasons, it regained popularity in Kolkata from the 1990s, and currently, a lot of interesting research is being conducted at the Institute of Post Graduate Ayurvedic Education and Research.

The political history in Kolkata that led to these various phases of integration and separation between biomedicine and Ayurveda is starkly different from that in Banaras (now Varanasi). Varanasi is one of the oldest cities in the world and is also considered one of the most important seats of Hindu religious and cultural thought in northern India. There are historical references to significant religio-cultural events in the city, like the first sermon given by the Buddha in nearby Sarnath around 528BCE, the great poet Tulasidas crafting the epic *Ramcharitmanas*, the creation of the worship of Shiva as an official sect in the city by the philosopher and theologian Adi Shankaracharya, and the construction of temples by the Mughal ruler, Akbar. There is also a long history of silk weaving in the city and its surrounding areas, primarily by Muslim weavers. Although these events are rooted in different religious traditions, there was a conscious effort during the colonial period to construct this space as "Hindu" that continues to this day. As historians have pointed out, the romanticisation of Varanasi has produced an "orientalist commodity" that is a one-dimensional space outside of mortal time and devoid of the usual challenges of other urban spaces like deteriorating infrastructure or increasing population (Dodson, 2012, p. 2). Underneath this identity of Varanasi as a sacred place, it was an important economic and political location during the colonial period. It was an important center for the production of silk and muslin textiles and served as a station in trans-regional trade connecting the north with the east, especially Kolkata (Dodson, 2012, p. 7). The city's economic power was founded on the capital of the banking families that were both commercial traders and religious pilgrims, and the East India Company drew heavily on this elaborate banking system. The city's image as the center of Hinduism in the subcontinent attracted many missionaries during the colonial period. Based on this kind of fetishisation, it was assumed by many missionaries that if Varanasi could be converted to Christianity, soon the rest of the country would follow suit.

In the early twentieth century, within the broader context of colonial rule, efforts across the country were underway to build a nationalist movement.[6] Educational institutes were often the center of these efforts. Many Indians found the country's educational system compromised, as it was administered and controlled by the British to rule the country efficiently. "Secular education" as propounded by the British meant that the medium of instruction was English and that the curriculum did not include Indian sciences, math, literature, or religions. The implicit hope behind such a curriculum was also that it would allow the Indian people to recognise the value of Western education, move away from the irrationality of the Indian religions, and eventually adopt Christianity. It was within this context, prevalent for most of the nineteenth century, that several Indian scholars and nationalists began to envision different systems of education in the country. They had a close ally in Annie Besant, an Anglo-Irish woman who fought for education, Hinduism, and the nationalist movement, and who tried to amalgamate Hindu and British models of education. To translate this vision, she founded the Central Hindu College in 1898, which combined Western education with Sanskrit texts. Based on this groundwork that was already done by Besant towards the end of the nineteenth century, Madan Mohan Malviya, a scholar and a prominent political leader of the nationalist movement, envisioned constructing the Banaras

[6] For a detailed description of the various categories of Ayurveda in ancient India and trasformations of Ayurveda during different historical period, please see "Medical Education in India since Ancient Times" by Nadkumar H. Keswani in *The History of Medical Education.*

Hindu University in the early twentieth century "that would be the first in India to be administered by Indians that would bring together Hindus from all over India and would offer both Indian and western subjects" (Renold, 2021, p. 347). He believed that the key to a successful nationalist movement was to build an educational institution that would combine knowledge of Western science, technology, and medicine with Hindu religious education and bring students in touch with their own history. He further emphasized the need for Indian youth to be morally and physically strong, which he believed could be achieved by familiarizing them with their own culture, instilling national pride, and incorporating various physical activities and sports into the curriculum (Renold, 2021, p. 353). Although he was critiqued by other nationalist leaders like Mahatma Gandhi for invoking communal violence and disharmony, Malviya maintained that BHU was for both Hindus and Muslims, and getting in touch with one's own past would ultimately strengthen the ties between the two religious communities.

It was no surprise that BHU has one of the oldest Ayurveda departments in the country. Soon after the university was established, the Ayurvedic College was started in 1927. By 1960, the undergraduate college was dissolved to focus more on postgraduate training and research in Ayurveda. The College of Medical Sciences was established under the leadership of KN Udupa. This move to allocate more resources to higher-level training and research emerged from long-standing debates over the best ways to advance knowledge in Ayurveda. Not only did scholars and activists like Malaviya and Besant advocate for the integration of Western and indigenous knowledge, but several committees were also established to determine the best way to achieve this goal.

The integrative approach to medicine at BHU was based on the Udupa KN Committee's report that was submitted to the Government of India in 1958 (Udupa, 1958). Beginning with the Chopra Committee Report of 1948, there were committees such as the Pandit and Dave committees that recommended everything from gradual integration to complete separation of Western medicine from Ayurveda and Unani (Sheehan et al., 2002). Whereas most recognized the value of these systems of medicine and recommended different ways to integrate them into the medical systems introduced by the British, some suggested a complete shift towards Western medicine, as they considered the training and research infrastructures in Ayurveda and Unani inadequate. This led to a brief movement towards "Suddha Ayurveda," a form of Ayurveda devoid of any influence from other forms of medicine. Although the word *"suddha"* translates to "pure", the proponents of this form of Ayurveda considered the institutional form of training at odds with the principles of Ayurveda. They wanted to reintroduce the "*guru-śiśya*" tradition of teaching, which involved gathering knowledge under the tutelage of a single person for about 7 years. Integrative medicine, however, became the widely accepted approach in most universities and hospitals across the country. The Udupa Committee Report was one of the most comprehensive reports that recommended two simultaneous methods of training —integrated as well as *suddha*. Students completing the integrated training would be offered Bachelor's degrees, and those pursuing *suddha* would be considered *Ayurvedacārya* or *pravina.* Based on visits and communication with Ayurveda colleges and hospitals across the country, it laid out the then-existing problems with Ayurveda training, like the lack of a central institution controlling training, curriculum, and practice, the absence of a future vision, and the low prestige and value given to Ayurveda resulting in low salaries of teachers and practitioners. The report provided thorough recommendations on all these aspects of teaching and practicing Ayurveda. For the integrated system, the committee recommended the requirement for students to learn "principles of modern medicine so that they can compare and contrast it with the Ayurvedic system of medicine. He must know about the etiology, pathology, signs and symptoms and diagnostic procedures in modern medicine. The uses of radiology and other laboratory methods should be known to him" (Udupa Committee Report). For *suddha*, the need for a large pool of herbs and plants was strongly suggested. Both training systems advocated a close link between teaching and practice, highlighting the need to build hospitals alongside colleges and to include internships after the completion of academic training.

In the post-colonial period, there has been consistent state support to advance research and teaching in Ayurveda, reflected in the participation of the Ayurveda Department of BHU in major national policy decisions and research initiatives during the recent pandemic. BHU has been prominent in experimenting with different kinds of drugs for COVID-19. Researchers in the Ayurveda Department under the leadership of KN Dwivedi, for instance, conducted clinical trials of the Ayurvedic drug Fifatrol to check its efficacy in managing the infection (PTI 2020). BHU and AYUSH also collaborated to organize an international seminar on the role of alternative medicine and the need for establishing strict regulatory systems to support research and training. Other departments in the university conducted experiments by using plants in the BHU Ayurvedic Garden to combat COVID-19. I had the opportunity to speak with a team of researchers led by Dr. Parimal Das, a Professor at the Center for Genetic Disorders at the Institute of Science. As part of the Drug Discovery Hackathon-2020, where the Government of India invited applications from institutes across the country, his team identified two molecules from *Aśvagandhā*—a plant widely used in Ayurvedic medicines —as particularly useful for managing COVID-19 symptoms. Around 3,777 phytochemicals were screened from 41 plants to finally zero in on these two. Instead of

focusing on spike proteins that most institutes were working on, the team focused on target proteins with minimal mutation rates, explained Prashant Ranjan, one of the lead team members. They selected targets that are crucial for the virus's movement and replication within the body. Based on this approach, they identified the two *Aśvagandha* molecules as the most effective. The department, in collaboration with the Patient Safety and Access Initiative of the India Foundation (PSAIIF), Quality Council of India (QCI), and Federation of Indian Chamber of Commerce and Industry (FICCI), organized a webinar in April/May 2020, to draw up with the 'Mahamana Declarations' that advocated for a stronger connection between Ayurveda, Unani, and Sowa Rigpa with mainstream biomedicine.[7] These significant involvements of the BHU Department in major decision-making, treatment, and research, I suggest, are an outcome of over a century of state support for Ayurveda, which is starkly different from Kolkata.

While there have been collaborations across departments, backed by a long history of familiarising students with both Ayurveda and biomedicine, the university is still a long way from integrating the two, as that requires research and reimagination of Ayurveda in fundamental ways (Pathak, 2010; Patwardhan, 2023; Shankar et al., 2007; Keswani 1970; Leslie 1976; Ministry of Health 1948). "While the ontologies of biomedicine and Ayurveda might be different, there are similarities in epistemologies in that Ayurveda mentions *pramaṇa* or proof. Unless we follow some of these steps, we will never be able to achieve true integration, and we will not be able to realize the true potential of Ayurveda," explained Professor Patwardhan, who, along with other Ayurvedic scholars and practitioners have written extensively on the need for a complete overhaul of Ayurvedic education in the country to make it more effective as a treatment method as well as a beneficial learning experience for students. Both the connection between theory and practice and the integration of Ayurveda and biomedicine have been concerns throughout the twentieth and twenty-first centuries. The Central Council of Indian Medicine (CCIM) lists papers from the two sciences separately, but there is no clear guideline for integrating the two, and the differences in approach are especially significant in anatomy and physiology (Joshi et al., 2013). In 2008, a nation-wide survey conducted with postgraduate students, faculty, and interns across thirty Ayurveda institutions across eighteen states was conducted by faculty members at BHU that revealed that "teaching methodology" was the main concern of the respondents, and the "memory-oriented" approach instead of "understanding and application oriented" approach emerged as an impediment to education and sustaining careers in Ayurveda (Joshi et al., 2013; Patwardhan et al., 2015). These two trajectories of Ayurveda in the two cities highlight the challenges of both integrating and separating Ayurveda from biomedicine.

[7] BHU comes up with 'Mahamana Declarations to Check Covid-19. The Times of India. May 5, 2020.

5 Conclusion

The article explains the concept of heat in Ayurveda by exploring the meanings of words like *agni, pitta,* and *tapas*, which are relational and processual rather than fixed measurements like body temperature. It then shows that even though Ayurvedic scholars and practitioners agree on the significance of *agni* in maintaining the life force of an organism, in cases where internal heat gets manifested on the outer surface of the body like during fever and COVID-19, analysis, diagnosis, and treatment can take multiple forms, depending on the perspective of the practitioner-educator. By situating heat and COVID in the context of Ayurvedic institutions in Kolkata and Varanasi, the article finally argues that the different institutional trajectories of these institutions are linked to the political histories of those cities, which directly impact both textual and applied Ayurveda, making it more-than-one, if not multiple.

Acknowledgements My deepest gratitude to Professors Abichal Chattopadhyay, Geetalekha Bhattacharya, Parimal Das, Kishore Patwardhan, and Kuldeep Kumar Pandey for their time and guidance. This paper would not have been possible without them. I thank Professors JS Tripathi, KH Narasimamurthy, Rashi Sharma, Sushil Kumar Dubey, Bijoyananda Mukhopadhyay, Chandra Shekhar Pandey, B Ram, Yamini Tripathi, Girish Tillu, and Jai Prakash Singh for explaining Ayurvedic concepts in detail. I am grateful to the anonymous reviewers for providing insightful comments on the draft. Finally, I thank Asia Research Institute, National University of Singapore for funding the research and Professor Gregory Clancey for giving useful suggestions at early stages of this work.

Funding The funding was provided by the Asia Research Institute, National University of Singapore.

Data availability Not applicable, as no pre-existing datasets were used in this study.

Declaration

Competing Interests The author has no competing interests to declare that are relevant to the content of this article.

References

Agarwal, A. K., Yadav, C. R., & Meena, M. S. (2010). Physiological aspects of agni. *AYU: an International Quarterly Journal of Research in Ayurveda, 31*(3), 395–398.

Akhila, V. G. (2022). Management of COVID-19 as Sannipata Jwara–A Case report. *Journal of Ayurveda and Integrative Medicine, 13*(1), 1–3. https://doi.org/10.1016/j.jaim.2021.02.007

Alter, J. (2005). *Asian medicine and globalization*. University of Pennsylvania Press.
Bairagi, P., Abhishek, S., Dandappanavar, A., & Shukla, A. (2023). Concept of Krimi and its scientific understanding. *Journal of Ayurveda and Integrated Medical Sciences, 8*(6), 158-164. https://doi.org/10.21760/jaims.8.6.26
Bala, P. (1991). *Imperialism and medicine in Bengal: A socio-historical perspective*. Sage.
Bala, P. (2012). *Contesting colonial authority: Medicine and indigenous responses in 19th and 20th century India*. Lexington.
Banerjee, M. (2020). Ayurveda and COVID-19: The politics of knowledge systems, yet again. *Fieldsights*.
Banerjee, M. (2007). *Power, knowledge, medicine: Ayurvedic pharmaceuticals at home and in the world*. Orient Blackswan.
Berger, R. (2013). *Ayurveda made modern: Political histories of indigenous medicine in North India, 1900–1955*. Palgrave Macmillan.
Bhishagranta, K. K. L. (1911). *An English Translation of the Sushruta Samhita*. Calcutta: Published by the author.
Bhishagranta, K. K. L. (1999). *An English Translation of the Sushruta Samhita*. Varanasi: Chowkhamba Sanskrit Series Office.
Cerulli, A. (2012). *Somatic lessons: Narrating patienthood and illness in Indian medical literature*. State University of New York Press.
Chee, L. P., Zou, D., & Clancey, G. (2024). Heat, cold and climatic determinism in China's urban epidemics. *Urban Studies, 61*(15), 2995–3011.
Dash, B. & RKS. (Trans.). (2018). *Caraka samhita* (Vols. 1–3). Chowkhamba Sanskrit Series Office.
Dash, B. (2015). *Concept of agni in ayurveda with special reference to agnibala pariksa*. Chaukhamba Sanskrit Series.
Dodson, M. (2012). *Banaras: Urban forms and cultural histories*. Routledge.
Gavande, S. S., Joshi, A. H., Sardeshmukh, S. P., & Deshmukh, V. V. (2020). Concept of krimi, from vedic and ayurvedic perspective—A review. *Ayurlog: National Journal of Research in Ayurved Science, 8*(1), 1–10.
Hamlin, C. (2014). *More than hot: A short history of fever*. Johns Hopkins University Press.
Joshi, H., Singh, G., & Patwardhan, K. (2013). Ayurveda education: Evaluating the integrative approaches of teaching kriya sharira (Ayurveda physiology). *Journal of Ayurveda and Integrative Medicine, 4*(3), 138–146.
Keswani, N. H. (1970). Medical education in India since ancient times. In C. D. O'Malley (Ed.), *History of medical education: A symposium.* University of California Press.
Kloos, S., & Calum, B. (2022). *Asian medical industries: Contemporary perspectives on traditional pharmaceuticals*. Routledge.
Langford, J. (2002). *Fluent bodies: Ayurvedic remedies for postcolonial imbalance*. Duke University Press.
Leslie, C. (1976). The ambiguities of medical revivalism in modern India. In C. Leslie & A. Young (Eds.), *Asian medical systems: A comparative study.* University of California Press.
Ministry of Health. (1948). *Report of the committee of the indigenous systems of medicine*. Government of India.
Mukharji, P. B. (2013). In-disciplining jwarasur: The folk/classical divide and the transmateriality of fevers in colonial Bengal. *Indian Economic and Social History Review, 50*(3), 261–288.
Mukharji, P. B. (2016). *Doctoring traditions: Ayurveda, small technologies, and braided sciences*. University of Chicago Press.
Mullick, R. (1889). *Bishwo chikitsa*. Ramayana Press.
Pandhkar, P. D., & Sachdeva, V. (2020). Pathophysiology of COVID-19 and host-centric approaches in ayurveda. *Journal of Ayurveda and Integrative Medicine, 13*(1), Article 100380. https://doi.org/10.1016/j.jaim.2020.11.010
Pathak, N. (2010). Ayurveda education: A student's perspective. *International Journal of Ayurveda Research*. https://doi.org/10.4103/0974-7788.64410
Patwardhan, B., Mutalik, G., & Tillu, G. (2015). *Integrative approaches for health: Biomedical research, ayurveda, and yoga*. Elsevier.
Patwardhan, K. (2023). Confessions of an ayurvedic professor. *Indian Journal of Medical Ethics, 8*(1), 61–64.
Renold, L. (2021). Nationalist education: The case of Banaras Hindu university and Malaviya. In P. Sarangapani (Ed.), *Handbook of education systems in South Asia.* Springer.
Saha, S., Bhushan, S., & Gajji, B. (2024). Kaviraj Gangadhar Roy: Catalyst of ayurveda's revival in the 19th century. *Journal of Research in Ayurvedic Sciences, 8*, S273-278.
Shankar, D., Unnikrishnan, P. M., & Venkatasubramanian, P. (2007). Need to develop inter-cultural standards for quality, safety, and efficacy of Indian traditional systems of medicine. *Current Science, 92*(11), 1499–1505.
Shastri, K., & Chaturvedi, G. (Eds.). (2004). *Charaka samhita*. Chaoukhamba Bharati Academy.
Sheehan, H., & Hussain, S. J. (2002). Unani tibb: History, theory, and contemporary practice in South Asia. *Annals of the American Academy of Political and Social Science, 583*, 122–135.
Thakur, A. (Ed.). (1963). *Yaska's nirukta, part III*. University of Calcutta Press.
Tillu, G., Salvi, S., & Patwardhan, B. (2020). AYUSH for COVID-19 management. *Journal of Ayurveda and Integrative Medicine, 11*, 95–96.
Trawick, M. (1976). Death and nurturance in Indian systems of healing. In C. Leslie & A. Young (Eds.), *Asian medical systems: A comparative study.* University of California Press.
Udupa, K. N. (1958). *Ayurveda research evaluation, 1958*. Government of India.
Viale, M., & Vicol, M. (2023). Conserving traditional wisdom in a commodified landscape: Unpacking brand ayurveda. *Journal of Ayurveda and Integrative Medicine, 14*(1), 100667.
Wujastyk, D., & Frederick, M. S. (Eds.). (2008). *Modern and global ayurveda: Pluralism and paradigms*. State University of New York Press.
Wujastyk, D. (1998). *The roots of ayurveda: Selections from Sanskrit medical writings*. Penguin.
Zimmermann, F. (2011). *The jungle and the aroma of meats: An ecological theme in Hindu medicine*. Motilal Banarsidass.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.