

Chapter 2

Historical Discourses on Fevers

Abstract Fevers have been prevalent in every society since early times, and hence the history of fevers, to a certain extent, is also the history of medicine. As it is obvious that fevers are not a homogeneous category, their classification and distinction during different periods can explain the discourse on fevers during those times. The present chapter attempts to trace the history of fevers, their prevalent types, and the theories and the treatment followed in Western society since the sixteenth century, which is used as a pretext to understanding the Indian experience of fevers since the nineteenth century. This was the context for analysing the history of fever care in the state of Kerala during the 1990s when the ‘epidemics’ of fever struck the state. This historical inquiry also demonstrates the history of medical care and public health in the Indian subcontinent, especially in the state of Kerala. The history of public health and medical care reveals the distinction in approaches between the two, and the tension in terms of their interaction and areas of operation attains greater significance even in the current context when there is a blurring of boundaries of these two related disciplines. Further, the international influences in public health interventions were also significant then, and remain so even today.

Keywords History of fevers • Epidemics • Public health in Travancore • Medical cosmology fevers in India

2.1 Introduction

The present chapter is an attempt to trace the history of fevers, their prevalent types, the theories about them, and the therapies used to treat them. As fevers were prevalent in every society since early times, the history of fevers to a certain extent is also the history of medicine. However, it is obvious that ‘fever’ is not a homogeneous category. The classification and distinction of fevers during different periods can explain the discourse on fevers in those times. Thus, in this chapter, the history of fevers in Western society since the sixteenth century will be examined as a pretext to understanding the Indian experience of fevers since the nineteenth

century. This will be the context for analysing the history of fever care in the state of Kerala during 1990s when the ‘epidemics’ of fever struck the state. It is in this milieu that the discourse on fevers in Kerala and the context of establishing fever clinics in the state will be investigated in the next chapter. Bynum and Nutton (1981) cautions that the study of fevers should be limited to inquiry within a researcher’s specific purpose, as the study area involves a complex variety of complementary techniques and sources and there is a limit to one’s scholarly armour. Historical analyses of fevers envisage not only the forms of response to fever but also the medical personnel’s understanding of disease in general. As Pickstone (1992: 128) in his discussion on ‘fever’ argues:

... the changes in ideas about epidemics need to be understood in terms of political theory and medical theory and that these can be fully understood via an historical sociology of knowledge which roots ideas in changing social structures.

2.2 Early History of Fevers in the West

Fevers were identified in the Hippocratic writing as ‘acute’, with seasonal onset and durations of twenty-one days consisting of three periods of seven days duration; they were also associated with bile during that period (Smith 1981). The importance of bile could possibly have been due to the then-prevalent *humoral theory*, where bile was one of the humours. Additionally, a high fever was treated as dangerous; cessation of fever usually indicated progress towards recovery (ibid.). Fevers were given different names, and often also treated as the primary symptom for certain diseases. Treatments generally included nursing care followed by purgation and nourishment at proper times (ibid.). A special warning to the physician during that period remains relevant even now: ‘Do not, if you are the physician, treat wrongly for fear of turning the fever into another worse disease’ (ibid: 10). In other words, the role of the physician in the case of fever was more of care than of cure, as fever was seen as the body’s means of regaining balance. Later, Galen’s fever theory—similar to his general theory of disease¹ and treatment, which relied more on explanation and was unsupported by proof—was accepted as the most valid basis of practice until the twelfth century (Bynum and Nutton 1981: viii, Cartwright 1977). During the second half of the sixteenth century, the Paracelsians contradicted the Galenists, Arabists, and Aristotelians, but were also the forerunners in many subsequent approaches, not only in their contributions to the understanding of fever, but also to medicine as a whole (ibid.).

¹The theory of diseases proposed by Galen combined the *humoral* theory of the Greeks and the Graeco-Roman theory of the *pneuma*. The former consider blood, phlegm, yellow bile, and black bile as the four humours, whose imbalance can lead to disease, and for the latter, *pneuma* is a vital principle carried by the nerves wherein the *origin* of the disease is considered as supernatural with a natural *cause*. For more details, see Cartwright (1977).

Sixteenth-century fever theory was important mainly on two grounds. First, the Paracelsian theory of disease, which identifies pathologic poisons and predisposition as causative factors for any disease, and second, the contribution of Michael Servetus (1553) on the theory of pulmonary circulation of blood, which contradicted Galen's ebb-and-flow movement (Cartwright 1977: 17). Consequently, it was generally agreed upon by the sixteenth century that the nature of fever lay in the 'heat contrary to nature' or had something to do with the heat experienced by the patient (Lonie 1981: 20). In other words, the major focus during this period was on the definition of fever with respect to its well-accepted quality, 'heat', where two types that were opposed to each other were identified, viz. febrile and innate heats.² The culmination of the idea of circulation of blood as well as the heat aspect of fever becomes obvious from Avicenna's definition:

Fever is extraneous heat, kindled in the heart, from which it is diffused to the whole body through the arteries and veins, by means of the spirit and blood, reaching a heat in the body itself which is sufficient to injure the natural functions. (ibid. 21)

Averroes, following Galen, later commented: 'Fever occurs through the conversion of innate heat to the fiery'. He gave an alternate formulation that fever was not merely an extraneous heat but a unity composed of natural and extraneous heat. It is in fact these disparities that set the terms for all subsequent discussions on the relationship between preternatural heat and natural heat (ibid.). In both of these explanations, it should be noted that the two important features during this period were (1) the understanding that heat produces fever and not the other way round, and (2) the centrality of the heart in the production of heat.

2.3 Classification of Fevers

During this period, many tried to explain the nature of fevers in terms of the nature of heat produced but did not succeed. However, based on the substances involved in the production of heat, three³ genera of fever, *ephemeral*, *putrid or humoral* and *hectic*, were identified (ibid.). Another form of distinguishing fevers was based on its frequency of presentation, one such being the intermittent fevers. Here, the distinction was based on the observation that there was a precise regularity or intermittency that was independent of age, constitution, diet, and all other variables

²The terms febrile, preternatural, unnatural, and extraneous heat were used interchangeably and are seen as in opposition to natural or animal heat. Also, one should recall that heat was regarded as a substance, capable of division into different genera and species. This view followed naturally from a cosmology that regarded heat or the hot as one of the four elements of which all things, both animate and inanimate, are composed, and where the three substances of spirits, humours, and flesh jointly compose the substance of innate heat. For details, see Lonie (1981).

³Since three substances (spirits, humours, and flesh) jointly compose the substance of innate heat, they respectively produce three genera of fever: ephemeral, putrid, or humoral and hectic.

(*ibid.*). In other words, the shift in the attempt to understand fever based on its cause (heat) to that based on effect (presentation) has to be seen as a major shift towards what is possible. This is evident from Fernel, whose fever theory later led to an explicit connection with anatomy. He states ‘the *contenta* of the body (spirits, humours and excrements) were never the subject of disease, but only its causes: diseases themselves were to be located in the parts of the body, and symptoms in the functions’ (cf. *ibid.* 32). Later, introducing the concept of combustion as an analogy to explain elevated body temperature, scholars attacked the theory that fevers are caused due to putrefaction (imbalance) of humours. With ‘heat’ identified as the main cause of fever, it was thought that burning (of something) produced the heat, and since putrefaction is related to death as a feature of a cold body, it was ruled out (*ibid.*). Thus, the feature of fever theory during that period according to Lonie (1981: 41) was that:

... the febrile heat is not specifically different from natural heat, but is an effect of the accelerated motion of the heart and arteries, this motion being provoked by a variety of causes, and its purpose being to separate and expel noxious substances from the blood.

Thus, a close examination of the sixteenth-century understanding of fever helps to identify three different features. First, a distinction between febrile and natural heat as the basis for explanation was a common feature throughout the century, though the mechanisms and purposes behind these forms of heat vary. Second, prior to Harvey who propounded his theory of circulation of blood and its relation to the heart one can find mention about the heart and circulation of blood in most of the theories on fever. Lastly, but more importantly, as Lonie (1981: 43) puts it: ‘febrile heat was a substantial entity and a causal agent, not the consequence of physiological changes’.

2.4 Fevers During the Sixteenth and Seventeenth Centuries: Descriptive to Problematic

The topic of fever during the seventeenth century was more of a description of what was happening based on experience than of explaining its characteristics. In other words, it was the heart that was the starting point of fever, with body heat being central, viewed as an outcome of some processes (fermentation) in the blood.⁴ During the sixteenth century, the whole discussion around the nature and characteristics of fever seemed to be more for the purpose of gaining knowledge than for

⁴During the sixteenth and seventeenth centuries, the terms ‘fermentation’, ‘putrefaction’, and ‘effervescence’ were used somewhat interchangeably by different scholars. During the early period, many scholars explained the processes in the blood during fever using the term ‘putrefaction of humours’, and this later became ‘fermentation’ or ‘effervescence’. This is obvious from the sixteenth- and seventeenth-century descriptions of fevers dealt with by Lonie (1981) and Bates (1981).

practical purposes, and thus had little to do with the treatment *per se*. However, in the seventeenth century, the discussion of fevers shifted more towards prescribing the way that medicine should be practiced. This was also because many different views regarding treatment were struggling for legitimacy and orthodoxy (Bates 1981). It is in this context that the contribution of Thomas Willis becomes significant. Though his doctrine was not much different from earlier theories of fermentation in blood and the primacy of the heart, he also emphasised new ways of understanding the traditional treatment of fevers. His concern was not about the validity of treatment, but that whatever treatment was given should be given with a full understanding of its operations on the body (*ibid.*). This becomes evident from Willis' writing as cited by Bates: 'a medicine rashly administered is but casting a die for a man's life' (*ibid.*: 59). This paved the way for the use of both traditional medicines and new ones like chemical remedies, provided that their use had been rationalised, which was a major issue among the Galenists and Paracelsians (Cartwright 1977: 17).

The shift of focus in the doctrine of fever towards everyday experiences of scholars mutually changed the collective knowledge as well as the condition itself. This is revealed by the fact that Northern Europeans and the British, who were the major contributors of fever literature, had experienced centuries of plague and at least two centuries of smallpox, typhus, typhoid, and dysentery by the seventeenth century (Bates 1981). Another important aspect of fevers dealt with by Willis as well as earlier by Fernel was 'rashes', again a clinical feature of the condition. Yet there was not much distinction in the way both dealt with rashes, as they were seen as signs of the 'degree of virulence' in most of the continued fevers (*ibid.*: 66). In other words, rashes were seen as marks of severity. This is to say that though differences between rashes were never a serious concern, seventeenth-century authors increasingly wrote about smallpox and measles as if they were distinct diseases (*ibid.*). As for Bates (1981), this illustrates how the changing disease environment may have played a major role in the development of thought about fevers. Thus, a seventeenth-century understanding about fever was seen as a translation of a preeminently physiological disease to a clinical description. Going further, this was seen as a reflection of the acceptance of 'Baconian fashion', using Bates terminology (*ibid.*: 69), whose culmination is seen in the work of Thomas Sydenham, who argued that the symptoms for similar diseases (species) remain the same among different persons (Reiser 1978: 9).

2.5 Practising Physicians' Knowledge of Fevers: An Eighteenth-Century Characteristic

During the last decades of the seventeenth century extending towards the early eighteenth century, the dominance of practising physicians and their theories over the pre-existing intellectual institutions of medical expertise were observed (Cunningham 1981; Geyer-Kordesch 1981). This could be possibly due to the

upper hand of practising physicians in their ability to demonstrate efficacy through treatment. Thus, the prevalent principles⁵ of treatment were questioned on the grounds of Sydenham's method of experimental basis, which envisages: 'the cure was found by confronting disease by skilled trial and error, rather than by working from within a theoretical understanding of physiology and pathology' (Cunningham 1981: 77). Three physicians were known for their contribution to fever theory during this period—Andrew Brown in Edinburgh following Sydenham's path, Cornelis Boentkoe in Holland, and Georg Ernst Stahl in Germany. Some commonalities can be identified in their approaches, as all of them were practising physicians and their theories on fevers were always tested within their daily practise of medicine. In other words, the physiology as well as the fever pathology per se became secondary, whereas disease descriptions based on prognosis and theory rooted in efficacy of the cure were the major focus. These physicians agreed on the opinion that nature has its own way of responding to any disease and that the task of the physician is either to assist or to facilitate this process depending on the stages of intervention (Cunningham 1981; Geyer-Kordesch 1981).

2.6 Classification of Fevers: The Primary Task During the Early Nineteenth Century

Later during the eighteenth century, Sauvages and Cullen following the work of Sydenham were engaged in the classification of diseases into classes, order, and genera (Reiser 1978: 9–10). Cullen, though recognised late, became well known during the early nineteenth century for his work on fevers. Cullen divided fevers into *periodic* and *continued*, and the latter was further sub-divided into *synocha*, *typhus*, and *synochus* (Smith 1981: 122). As Smith opines, Cullen's distinction is the same as that which classifies fevers as either *inflammatory*, *nervous*, or a third, mixed type neither purely inflammatory nor purely nervous (ibid.). Cullen's understanding of fevers and their connection to nerves was seen as an achievement of an open-minded physician who was keen in treatment. Following Sydenham, observing patterns in order to categorise fevers was a feature of seventeenth-century physicians as they were engaged in identifying epidemic patterns of similar kinds and associating them with the atmosphere (ibid.). Cullen learned from many of his forerunners and was more of a rationalist. Smith's (1981: 132) interpretation of Cullen's view of reasoning makes this evident:

A physician used experience and reasoning in combination, the one supporting the other. Armed with analogies and the best understanding of physiological and pathological

⁵Fevers during Galenic times were found to occur due to four cause categories, viz. predisposing, external, antecedent, and immediate. Accordingly, treatment also comprised bleeding, vomiting, incisers (a medicine believed to have sharp particles that would cut up and allow the offending viscous fluid to be eliminated), and sweating. For more details, see Cunningham (1981).

processes the physician approached the bedside. He must always be aware of the limits of his theory *as the... system is entirely defective* [*emphasis added*].

Cullen furthered his study of fevers beyond classification and moved on to the stages of fever, viz. debility, chill, and heat, the first stage being in some sense the cause of the subsequent events (Bynum 1981). These stages defined fever both as a disease as well as a symptom when found in conjunction with other disorders. This was reflected in his practice of treating fever, where he elaborates:

... Fever is a disease to be diagnosed by quizzing the patient about his feelings; by observing him for indications of shivering, sweating, and other manifestations of temperature change; and by carefully noting the sequence in which these events occur. (cf. *ibid.* 138)

At this juncture, it is interesting to note that despite the importance of body temperature in the description of fever, Cullen dismissed the role of the thermometer in measuring body heat, as the 'experience of the patient do not correlate very well with the numbers registered on the thermometer' (*ibid.* 138). Scholars consider the minimal use of thermometers by eighteenth-century doctors as more due to conceptual disagreement rather than technological ones (*ibid.*, Reiser 1978: 110–120).

Moving on to the causes, Cullen identified *proximate* and *remote*, *external* and *internal*, and *predisposing* and *exciting*, encompassing prominent theories on causes and thereby linking them directly or indirectly to the physiological events of fever (Bynum 1981). This complex explanation of fever as compared to earlier ones was also reflected in his therapeutic practice. He considered a range of factors before deciding on any treatment, as reflected in his focus on climate, variety of fever, type of patients, and the stages of illness (*ibid.*). An understanding of fever as nature's effort to restore healthy equilibrium and the doctor's role being conceived of as only to assist nature were of less importance to Cullen. This is because he considered only the initial stage of fever as 'natural', and that it too needed to be countered medically as it would otherwise lead to *debility* or weakness (*ibid.* 139–140). To sum up, Cullen's classification of fevers was based more on the *clinical course* rather than on an aetiology that comprised a range of factors. He was also cautious of the difficulty in distinguishing between fevers, and therefore the diagnosis of fever was implicitly based on exclusion (*ibid.*), which is true even in current practice.

Cullen's remarkable contribution to identifying predisposing and exciting causes⁶ as well as to the significant role that the doctor has to play in therapeutics influenced the need for isolation and special care for fever patients. The above understanding of fever transmission as well as significant cases reported from jails, ships, and cotton spinning factories, as well as in agricultural fields generated the

⁶Malnutrition and anxiety were considered predisposing causes whereas re-breathing expired air was seen as the major exciting cause. Also, the latter was strengthened by the frequent reporting of fevers from jails and ships, leading to the isolation of patients as a prerequisite for fever care. See also Pickstone (1992) and Bynum (1981).

idea of cleanliness, especially an obsession for fresh air as a means of prevention (Pickstone 1992; Bynum 1981). These factors together contributed to the setting up of ‘fever wards’ in the pre-existing general hospitals and later to fever hospitals during the late eighteenth century (Bynum 1981: 146).

2.7 Morgagni and ‘Pathological Anatomy’

It was during the late eighteenth century that Morgagni observed pathological lesions in diseased bodies by opening up the corpses, which eventually became a method for disease identification (Reiser 1978:16; Foucault 1975). The general impact of this morbid anatomy on medicine was the shift from verbally oriented to observation-oriented⁷ diagnosis (Reiser 1978). Foucault (1975: 181) interprets Morgagni’s treatise on fevers as:

...an analysis of fevers based only on their symptoms, with no attempt at localisation, became not only possible but necessary: in order to provide the different forms of fever with a structure, organic volume had to be replaced by a space of division occupied only by signs and what they signify.

This expression by Morgagni shows how fever became understood as an exception to other diseases when it was found that bodily lesions, considered to be the feature of all diseases, were not necessarily always found in all kinds of fevers. This also resulted in an inquiry into the possibility of understanding fevers based on symptoms, which were usually seen as effects that could ultimately be traced back to bodily spaces (Foucault 1975: 182). This led to a shift in the classification of fevers from a system that was until then based merely on clinical symptoms to one based on symptoms and morbid anatomy, thereby institutionalising dissections in hospitals as a means for better understanding. On this Pickstone (1992: 141) elaborates:

Surgeons were keen to dissect; in the services, as in civilian medical schools, mastery of the corpse was becoming a hallmark of the investigative doctor; the geography of the corpse was coming to rival the taxonomic spaces of nosologies, as the major means of ‘placing’ a disease.

Jewson (1976) called this a shift from ‘bedside medicine’ to ‘hospital medicine’, thereby changing the role of the early ‘practitioner’ to that of a ‘clinician’.

Inspired by Morgagni’s pathological anatomy that identified geographical divisions within the body and its organs, Bichat, a French physician, extended the analysis to the tissue level (Foucault 1975: 128–130). For Bichat, ‘between the systems and tissues the organs appear as simple functional folds’, entirely relative

⁷Up until the end of the eighteenth century, observation was mainly confined to the pulse as well as weakness of the patient and so on. Later, this shifted to observations (in a literal sense) that looked into the body (gaze). See also Jewson (1976) for clear distinction and Reiser (1978) for differences in patient examination during these two periods.

both in their roles and disorders (ibid.). In other words, the focus has changed from organ pathology to tissue pathology. This new approach not only resulted in a new categorisation of diseases based on lesions but also raised specific questions as to the very concept of disease in general and fevers in particular. First, does the lesion constitute the original three-dimensional form of disease or it is only the first visible manifestation of a hidden process? Second, is it necessary for all diseases to have lesions as a correlative within the body (ibid.)? The first question was not adequately addressed until Broussais' contribution, whose details will be dealt with later. Bichat addressed the second question (similar to the exception of fevers because of the absence of a lesion mentioned earlier) by treating certain kinds of fevers and nervous affections as non-lesional diseases, since there can be fevers *without* local lesions (essential) as well as *with* local lesions (sympathetic) (ibid.).

Returning to the first question, Broussais explains the mechanism of lesions in diseases through the case of fever and inflammation (lesion) as:

... a phenomenon involving two pathological layers at different levels and with different chronologies: first an attack on the functions, then an attack on the texture. Inflammation has a physiological reality that may anticipate anatomical disorganisation, which makes it perceptible to the eyes. (ibid: 186)

In other words, the functional disorders become primary and allow one to *perceive* the lesion, i.e. 'to make the observation of symptoms speak the very language of pathological anatomy' (ibid: 187). This is similar to theory-ladenness in observation where one can *see* only those things about which one is aware and the *ways of seeing* depend on the nature and kind of awareness (underlying theory). Thus, Broussais' contribution was in rediscovering the role of symptomatology that was side-lined during Bichat's work, since for the former it appears that symptomatology (knowledge about symptoms) is essential to the visibility of the lesions. Going further, Broussais argued that the absence of lesions is nothing but the ignorance of those who look for them, ignorance in terms of inadequate questioning (of symptoms) (ibid.). These efforts led to the disappearance of a *being* concept of disease, as the new explanation assumes the existence of disease *in space* before it is visible *for sight*, leading further to defining a *physiology of the morbid* phenomenon rather as normal and pathological anatomy (ibid. 188). This has also altered the causal aspect of diseases that has been a dominant area of inquiry since the seventeenth century, which was dismissed by Broussais in regarding 'the local space, the seat of the disease as also the causal space' (ibid.). To elaborate, the earlier notion of disease as a separate entity, with lesions as its genesis, was replaced by a new understanding, where the functional disorder (local space) of the system not only presupposed the presence of a disease, but also explained and predicted its nature and cause, which was validated by the lesion. Moreover, the medicine of diseases ultimately ceased to exist, thereby opening the path towards a medicine of pathological reactions, a structure of experience that dominated the nineteenth, and to a certain extent, the twentieth century (ibid.). In other words, it was this search for the physiology of the morbid phenomenon, later known as pathology, that generated a need to unravel the 'normal physiology' as an opposition to the former. This is what Canguilhem (1991: 42)

argues, owing to Broussais and therefore to Comte, that ‘... pathological phenomena found in living organisms are nothing more than quantitative variations, greater or lesser according to corresponding physiological phenomena’.

2.8 Late Nineteenth- and Early Twentieth-Century Pathologisation on Fever

As mentioned before, Bichat’s category of non-lesional diseases categorised fevers and nervous disorders together until the mid-nineteenth century (Foucault 1975: 175–176). Additionally, Broussais’ approach was inadequate in addressing the ultimate origin (cause) of diseases, especially epidemics, thereby upholding the earlier doctrine that fevers were caused by a poison (Naraindas 1996: 8). This eventually led to a need to distinguish fevers and nervous disorders, resulting in the identification of the law of periodicity and a contagious characteristic as features specific to fevers (*ibid.*). The consequence of this was twofold. The first was the re-establishment of the pre-existent theory of contagion that attributed a kind of fever poison as the more general cause, which in turn could be an outcome of weather, overcrowding, or filth, which explained the *epidemic* character of the disease (*ibid.*). The second, concerning therapeutics, supported the earlier approach of allowing fevers to run their course, as symptoms were not treated as the cause of fever. This is owed to Broussais, who held that while in other diseases symptoms generally signified lesions, this was not always true for fevers (*ibid.*). The situation was more or less similar among physicians at the London fever hospital, who, though accepting of Broussais’ doctrine on inflammation, also identified exhalations of the fevered bodies as the major means of propagation (Pickstone 1992). They saw these exhalations not as specific poisons, ‘but as direct analogues of marsh miasma—as poisons arising from the decomposition of animal matter’, which was the ‘heart of the Chadwickian movement’ in public health (*ibid.* 144).

This prevalent understanding of disease at the causal level provided space for the contagion or miasmatic theory of Chadwick (hygienists) that ultimately set the stage for Pasteur’s germ theory, and for followers of Pasteur such as Robert Koch and Pettenkoffler (Cartwright 1977: 135–137). Here, it is highly possible that those diseases belonging to the categories of fever as well as other infectious diseases initially followed the miasmatic theory, and later, germ theory. This opens up infinite possibilities for discovering new causative organisms, be they microbes or viruses, and thus new diseases. Further extending the explanation of the ontology of diseases offered by Broussais, and expanded upon by Bernard, has resulted in a new field of specialisation, experimental pathology, based on the type of medical treatment performed (Canguilhem 1991: 58–64). Furthermore, Virchow’s cell theory of 1858 not only replaced Bichat’s theory on tissues as the building blocks of the body, but also ushered in a new technique for diagnosis: the laboratory (Cartwright 1977). It is highly possible that these perceptions of disease might have

resulted in the treatment of non-infectious diseases, which are known to have multiple causal factors and hence are not necessarily looked for, as well as those infectious diseases whose causal factor could not be identified.⁸ It could be that the extension of the above premise has created the biomedicine of the contemporary period, with an dependence on medical technology that is obvious from its power to define disease categories in technological terms. Having thus traced the history of fevers in the West, the history of fevers in the Indian subcontinent during the nineteenth and twentieth centuries will be examined below, in which it becomes clear that the former set the context for the latter.

2.9 History of Fevers in the Indian Subcontinent

Fevers have always been a common ailment in India. As mentioned before, several theories about fever existed in the West during the nineteenth century whose repercussions can be seen in the foundational understanding and conceptualisation of fever in the Indian sub-continent. Moreover, according to Rosenberg (1989: 14), in order to understand the framing of disease:

...[one] need to know more about the individual experience of disease in time and place, the influence of culture on definitions of disease and of disease in creation of culture, and the role of the state in defining and responding to disease ... understand the organization of medical profession and institutional medical care as in part a response to particular patterns of disease incidence.

Therefore, nineteenth-century India under British rule also acted as an experimental ground for the British in terms of the then prevalent theories of contagion and tropical diseases. Per the contagion theory, it was understood that living in tropical climates as well as in *unhygienic* living conditions together contributed to the process of putrefaction, thereby leading to morbidity (Naraindas 1996). Despite this notion, during the initial years of the nineteenth century the British believed that they could adapt to the Indian environment, especially the climate. Later during the epidemic of cholera this belief was shattered, with the British thereafter identifying the Indian conditions as *unhygienic* and *reservoirs of dirt and disease* (Harrison 1994: 48). Moreover, Indian medical systems like Ayurveda and Unani until the mid-nineteenth century shared with Western medicine a common notion of

⁸For infectious diseases the search for a causative agent resulted in the identification of a microbe in the case of cholera, dengue fever, leptospirosis, tuberculosis, avian flu virus, and so on. The list goes on unending, and the reality becomes clearer only through detailed study of the context of those discoveries of microbes similar to Latour's (1988) study on the *Pasteurization of France*. For non-infectious disease the search is not for microbes but for the abnormality in the physiology, a search that is armed by the available medical technology that redefines the abnormality and therefore defines diseases in technological terms, be them hypertension, diabetes, and so on. In other words, two kinds of disease definitions operate according to different logic despite the fact that the logic of disease management shows some similarities.

disease causation as a complex system of *exciting* and *predisposing causes* and rarely made reference to divine intervention, though moral conduct was considered an important factor (ibid.). It is in this context that the fevers in India during the nineteenth century will be examined.

Cholera was the major epidemic of the first half of the nineteenth century, whereas fevers and especially malaria were the major threat during the latter half. This was proven by reports from the Bombay presidency in 1856, which show that around 40 % of all deaths during the five-year period were due to fevers alone (Jaggi 2000: 151). It should be noted that until Laveran's discovery of the malaria parasite, malaria was thought even by the Europeans to be caused by 'miasma', arising from rotten vegetable matter (Harrison 1994; Jaggi 2000). The other fevers prevalent during this period were kala-azar, known by different names, viz. *kala-jwar*, *jwar-vikar*, *burdwan fever*, etc., and typhoid fever, also known as enteric fever. Earlier during the 1850s, several classifications of fevers were prevalent, of which *intermittent* and *remittent* were the broad clinical categories with similar causes but different degrees of the same kind of derangement (Jaggi 2000: 151). The essential difference between the two was that in the former there was complete cessation, whereas in the latter there was only an abatement of fever (ibid.). Belonging to the latter category, malaria's differential diagnosis was made based on seasonal consideration or on the possibility of the individual's previous exposure to malaria (ibid.).

TA third category included idiopathic fevers, also called ephemeral, common, continued, and so on, which were produced by changes in temperature, violent exercise, excitement of the mind, excess heat, and imperfect excretion (ibid.). Similar to the case of cholera (Singh 2001), there was staunch contradiction in the theories of causation and treatment in the case of malaria as well (Kumar 1998). Regarding fevers, it appears that not only was the theory on causation different but also the categories used were predominantly malaria-centric. The fact that during the mid-1800s both kala-azar and typhoid fevers were considered a type of malaria with exceptions, and also considering the *black water fever controversy*⁹ during 1897 substantiates the above argument (Harrison 1994; Jaggi 2000). This becomes more obvious in an editorial on the aspect of fevers from the *Indian Medical Gazette*, published in 1872:

There is no fact connected with the medical history of India more freely conceded by the most advanced thinkers in this country and indeed by any of those at home who take an interest in the matter that the obscurity which surrounds many forms of Indian fevers...Of all the causes, which have tended to obscure them, none appears to us to have been so powerful for evil as the too frequent use of the term malaria. In every attempt at scientific

⁹'Black water fever' or 'haemoglobinuria' was an illness during the mid-eighteenth century whose symptoms showed similarity to that of malaria and also turned the victim's urine dark red or black due to the toxins released into the blood stream. The London school headed by Manson considered this as a disease *sui generis*, whereas for another major group including Robert Koch, it was a form of quinine poisoning. This has prevented a significant population in India from taking quinine as a treatment for malaria. For more details, see Harrison (1994).

diagnosis we are met by the old bugbear malaria as either the cause of fever or it has imprinted its mark so indelibly that the original characters of the complaint are lost. (*Indian Medical Gazette*, 7, III, 1872, cf. Jaggi 2000: 152)

Despite this controversy, two methods of preventing the disease existed: the drainage or avoidance of swampy areas and the prescription of prophylactics provided by various cinchona preparations, most commonly quinine. Laveran's identification of the malaria parasite in the blood of malaria patients and Ross's later work that established the *Anopheles* mosquito as the vector of malaria, together with the *black water fever* controversy resulted in a malaria control programme predominantly comprised of mosquito eradication, anti-larval measures, and sanitation measures like the cleaning of drainage and avoidance of water collections owing to earlier sanitary traditions (Harrison 1994). Similar was the case with kala-azar, another disease that was confused earlier with malaria until its causative agent was found in 1904, and later, its transmission route. This time, however, the focus was predominantly on the treatment of affected cases rather than on the sanitation aspects. This change in focus could be due to the greater efficacy of treatment-based control measures as compared to the sanitary-based control measures carried out earlier, which were not successful as expected.

The case of typhoid fever, known then as enteric fever, was also identical to that of malaria in that there was strong objection to the discovery of a single micro-organism as the cause of the disease. Joseph Fayrer, the leading figure during this time criticised this attempt as follows:

The cause will probably not be revealed to anyone who searches with narrowed views. There is a great tendency in these days to trace all disease to a specific exterior cause, but we must not lose sight of the possibility of poisons auto-genetically developed...or of altered conditions of innervate. (Fayrer 1888, cf. Harrison 1994: 54.)

For Fayrer, germ theory was in itself inadequate to explain the cause of any disease, as more general environmental conditions were found that were more important than the germ. The sanitary commissioner from the government of India expressed his conviction that a specific germ theory was *inapplicable* to the history of enteric fever in India. This resulted in the propagation of sanitary measures as the major means for the control of enteric fever even after the discovery of the *typhosis* bacillus in 1884, thereafter known as typhoid fever, and even still after its confirmation (Harrison 1994: 56–58). This becomes obvious from the opinion of then sanitary commissioner with the Indian government, W.R. Rice: 'practically all bacteriologists agree[d] that bacillus [was] ... a necessary factor in the causation of the disease, the question of how it was conveyed was still unresolved' (cf. Harrison 1994: 57).

The history of fevers in the Indian subcontinent during the nineteenth century raises certain issues. First, no uniform theory was yet agreed upon to explain the cause or the categories of fevers prevalent during this period, which was equally true in England. The dominance of malaria during this period might have led to many other fevers going unrecognised. Second, the germ theory of diseases faced staunch objections from the numerous sanitary commissioners as well as from the

Indian Medical Services, leading to a majority of the interventions during this period being ultimately targeted at sanitary activities. This could possibly have been due to the then-dominant paradigm of disease causation as well as the popular notion of *practical application* and *practical work* as being more important than the ambiguously understood microbial invasion leading to diseases. This dominance in the sanitary movement lasted until the early decades of the twentieth century. Another important feature of the twentieth century was that fevers were no longer ‘seen’ (to exist) as a disease but instead as a symptom for a range of diseases like malaria, typhoid, kala-azar, viral fever, and so on, the reason of which may have been the discovery of germs and thereafter the establishment of the germ theory. Thus, the twentieth-century history of fevers is in fact a history of discovery in terms of the causative organs of diseases with fever as a symptom, a field of inquiry that continues even today.

2.10 History of Public Health in Travancore¹⁰

Public health in Travancore can be traced back to the nineteenth century based on the diseases prevalent in what was then a princely state and by the interventions carried out by various institutions. Smallpox and cholera created a lot of havoc in Travancore, the intensity of which was at its peak during the late nineteenth century (Vinayachandran 2001: 49–54). However, smallpox vaccination has been in use in the state since 1813, thereby initiating the *preventive* approach within public health (ibid.). Initially, there was public dissent towards the use of vaccines due to the accumulation of puss at the vaccine site and the subsequent scar left there (ibid.). This problem was resolved, thereafter leading to the establishment of a vaccine department in 1865–1866, which underwent development several times with increasing numbers of staff and sub-departments (ibid.). It was reported that by the year 1935 around 71 % of the population was vaccinated in the region, which along with the reduction in the smallpox cases resulted in greater acceptance of public health activities (ibid., Panicker and Soman 1984: 50).

Epidemics of cholera were reported during the years 1819, 1822, 1837–38, and later in 1870, 1881, 1883, and 1892 (Kooiman 1991). Of these, the latter two epidemics took many lives, especially in northern Travancore (Vinayachandran 2001: 72–76). This ultimately led to the establishment of the sanitary department in 1895, despite the fact that fatality due to cholera was greater during the period after the establishment of the department (ibid.). The vaccine department that was under development also came under the administration of the sanitary department, with a sanitary commissioner in charge of both activities. The major functions of the

¹⁰Kerala before its formation consists of the princely states of Travancore, Cochin and Malabar. The state of Travancore covered the contemporary southern and central districts of Thiruvananthapuram, Kollam, Alappuzha, Pathanamthitta and parts of Kottayam.

department were vaccination and sanitation, the latter comprised of ensuring safe drinking water by digging new wells, cleaning old wells—involving use of chlorination when required—and introducing public health acts, especially to combat the plague and food adulteration (ibid. 43–45). The above set of activities also demonstrates the acceptance of public health as a separate field distinct from medicine, which reached its peak during the Second World War.

2.10.1 International Interventions in Public Health

The state of Travancore had plans to modernise its public health department since 1927 (ibid.) During the same period, the Rockefeller Foundation and the League of Nations were engaged in the field of public health activities worldwide and Travancore was identified as one of the possible destinations to receive their attention (ibid.). This, along with the state of Travancore's official request to modernise the existing public health activities, resulted in the submission of a report by Dr. W.P. Jackocks, the Foundation's representative who became adviser of the public health department from 1929 to 1933 (ibid., Kawashima 1998). Surveillance of hookworm infestation and its treatment and health education were the major recommendations of the Rockefeller Foundation, and subsequently resulted in the identification of 93 % of the population as infested with hookworm in the state; thereafter, the state implemented a Hookworm Eradication Programme (ibid., Panicker and Soman 1984: 34). It should be noted that the Rockefeller Sanitary Commission for the eradication of hookworm disease was founded in 1909 in the USA, whose concern was later extended to the rest of the world including Travancore (Kawashima 1998: 122–123). Additionally, there were recommendations from the health organisation of the League of Nations to select people from Travancore and send them for training at Johns Hopkins, Baltimore, and Harvard universities in order to make them capable of organising local health services (Vinayachandran 2001: 45). Thus, in September 1933, a new public health department was set up in which hookworm control was highlighted as the initial success story (ibid.). Some scholars critiqued the above interventions as 'the outcome of the concern towards the public health of the people in developing countries, a concern of the 'neo-colonialism' or the 'informal empire' which supplied raw materials to the developed world and also provided consumers for Western commodities' (Kawashima 1998: 123).

2.11 Medical Care in Travancore

By the end of the nineteenth century, Western medicine had gained acceptance among the public, thereby increasing the provisioning for various health institutions at different levels. Government-led initiatives established new hospitals for leprosy

and mental illness, over which the state had authority, and also promoted private practice in rural areas (Vinayachandran 2001: 22–35). In addition to this, health institutions were set up by medical missions like the London Mission Society (LMS) (1838) as well as the Salvation Army (1885) (ibid. 85–95). In 1868, an Ayurvedic physician was appointed by the state in the civil hospital whose main duty was to identify the benefits of Ayurvedic medicine and to include it in the treatment regime (ibid. 72–76). However, the secondary status given to Ayurveda was changed by the end of nineteenth century, thereby initiating a movement for *revitalisation* that ultimately led to the setting up of the Ayurvedic departments in 1917–1918 (Panicker 1992; Kawashima 1998). Along with this, modern medicine was also supported by the government of Travancore, as reflected in a rise in the number of medical care institutions set up during the period. Only nine government medical institutions existed in the state of Travancore in 1863–1864, yet this grew to 27 hospitals and 26 dispensaries during 1915, and finally to 32 and 55, respectively, in 1939 together with 21 private health institutions financially supported by the government (Kawashima 1998: 117; Vinayachandran 2001: 30–35). Besides this, there were provisions for the free distribution of medicines as and when required through government machinery, of which the distribution in 1896 of quinine and chloroquine for malaria through post offices was the first such instance (ibid.).

After the success story of smallpox and hookworm treatments as well as the sanitary measures carried out, it was only in 1935–36 that cholera reappeared in the state, resulting in the deaths of around 6000 people (Vinayachandran 2001). Malaria was also reported in epidemic proportions during the same period in Travancore. For cholera, the interventions involved the chlorination of water sources together with vaccine distribution, whereas for malaria the surveillance centres took on the major task of distributing the treatment drug, quinine (ibid.). It is worth mentioning here that in 1931 a new division was started in the existing public health department to study malaria and filariasis, whose experts were from the school of tropical medicine in Kolkata (ibid. 78). Later in the next year, mosquito control measures were initiated in the state with the financial support of the Rockefeller Foundation, as the mosquito had been identified as the common vector for both malaria and filariasis (ibid.). After the epidemic of malaria in 1935–1936, a separate division for the control of malaria was set up that has since considerably checked the disease incidence (Panicker and Soman 1984).

2.11.1 Fevers in Travancore

Smallpox and cholera were the most prominent diseases to be reported in epidemic proportions in the state during the second half of the nineteenth century and proceeding into the early twentieth century. This could be due to the fact that plague,

which was also an epidemic in other parts of India during this period, was not reported from the state. Additionally, the familiarity with smallpox and cholera made them easy to identify (Panicker and Soman 1984). It is an accepted fact that there was a steady decline of smallpox and cholera in the state, with a rapid pace for the latter especially after 1920–1921 (ibid.). Reports on the causes of death by the medical and public health departments of Travancore since the 1900s identified fevers as a major category along with cholera and smallpox. Of the total deaths, around 30 % were attributed to fever until the 1940s (Panicker and Soman 1984: 34). Since then, there has been a steady decline in deaths caused by fever, which is attributed by scholars to the decline in malaria cases (ibid.). Another disease that was prevalent in Travancore that involved fever symptoms was typhoid, then known as enteric fever. It was reported that the typhoid-paratyphoid A and B (T.A.B) vaccine was distributed through the public health laboratory, Thiruvananthapuram, during the 1940s, but the vaccine gained acceptance among the public only very slowly (Vinayachandran 2001).

2.11.2 Fever Care in Twentieth-Century Kerala

A brief outline on how fevers were dealt with in Kerala society during the mid-twentieth century can throw some light on the transformation of fever and fever care that has taken place in the recent period. During the nineteenth century, the benefits of Western medicine were felt in the state of Travancore, but these were essentially restricted to the family of the King while the common public was dependent more on the local practitioners who practiced local remedies (Vinayachandran 2001). It is obvious that the local practitioners themselves were not a homogeneous group, as they ranged from the present-day Ayurveds to naturopaths and other traditions. During the mid-nineteenth century, the order of treatment preference was first home remedies, then local remedies, and lastly, modern medicine (ibid.). Many of the treatments carried out by various systems of medicine were reportedly based on the symptoms and were effective, despite the fact that an understanding of the root cause was unknown (ibid.). During the early twentieth century, several systems of medicine prevailed, of which modern medicine was the last option.

Later, the establishment of the public health department that provided treatment for malaria, vaccine distribution for cholera, and other sanitary measures might have popularised modern medicine in the state. However, the worldwide acceptance of modern medicine as effective in tackling problems faced during the periods of World War I and II fuelled the domination of modern medicine in several places (Cartwright 1977). Despite this dominance of modern medicine by the mid-twentieth century, a range of home remedies was used to manage fevers. They included the intake of black coffee mixed with pepper and *chukku*, taking *kanji* and

kurumulakurasam,¹¹ and a variety of other preparations (Ramachandran 2000). Only if these failed did patients move on to seeking help from local practitioners, and finally to the allopathic system. In other words, it is obvious that fever was an illness that was managed effectively in homes in Kerala during the 1960s and 1970s. It should be noted that the fact that Kerala state was free of malaria until the mid-1960s also contributed to a situation in which fever was never a major threat (as it did not lead to death) for the population until the middle of the 1990s when it struck hard, as if it were an ‘epidemic’.

2.12 History of Fevers and Public Health

The present chapter traces the history of fevers across the world from the sixteenth century to the current period. It is important to note that an understanding of fever as an illness—being as old as humankind—will then naturally involve the progression of humans and their interaction with diseases and medicine. During the sixteenth century an understanding of fever tended more towards description, whereas in the seventeenth century the search for causes began to result in the domination of the practising physician’s interpretation based on experience, a feature that continued into the eighteenth century. It was during the late eighteenth and through the nineteenth century that the inquiry of fevers took a ‘scientific’ turn, in a time when anatomical interpretations dominated the field of medical understanding, and thus the understanding of fevers. The classification of fevers also expanded during this period. The modern understanding of fevers is an outcome of the engagement with the then dominant germ theory on one hand, and the uncertainty of those fevers whose causative agent could not be identified on the other. In the Indian context, the history of fevers is more a history of malaria, where other fevers were subsumed within the problem of malaria. This is true even today, as other diseases with fever as a symptom tend to get greater attention only in places where malaria is under control. The identification of different fevers in the states of Kerala and Tamil Nadu could therefore also be due to the negligible prevalence of malaria.

Another aspect that emerges from the Indian history of fevers is the public health profession’s acceptance of the cardinal role of environment in preventing a range of diseases. The Indian public health sector, then dominated by the sanitary commissioners during the twentieth century, adopted sanitary measures as a way to prevent diseases despite the emergence and dominance of germ theory. This is an important orientation of public health, as even now there is a failure in the Indian context of public health to seriously engage with the environmental concerns of any

¹¹*Chukku* is dried ginger, and *Kanji* is a mixture of rice and water prepared while making rice without draining the water. *Kurumulakurasam* is a preparation with tamarind, salt, tomato, pepper, and mustard, a favourite dish among those in southern India. When prepared to treat fever, the quantity of pepper will be increased slightly.

public health problem. This is evident in that the National Vector Borne Disease Control Programme (NVBDCP) considers the lack of cooperation by the environment department as a bottleneck to implementing vector control measures. The need to integrate environmental concerns into the Indian public health system is discussed elsewhere by the author (George 2016). The state of Kerala, too, saw numerous cases of malaria, cholera, and small pox until the early twentieth century, which then declined by the 1920s. Subsequently, the response to fevers was largely based upon home remedies and through the ‘vaidyas’ of Ayurveda at the local level, while modern medicine remained the last option. This treatment pattern is true even now for some groups in the states, a strategy that is also strongly proposed by some practitioners of alternative therapists as an option to be explored.

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