

THE HISTORY OF MEDICINE AND PUBLIC HEALTH: A NEW TREND IN TWENTY FIRST CENTURY

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ABSTRACT:

The history of medicine and public health are two emerging areas in the recent past. The histories of colonial medicine, health and disease with environmental, ecological and local themes have been attracting. The responses to epidemic diseases both within the colonial administration and among different sections of the indigenous population have been studied by the social historians of modern India. The demonstrated history of Western medicine controlling the mortality from epidemics and diseases has given inspiration to indigenous medical practitioners. The western ideas like sanitation, hygiene, vaccination and medical institutions were considered superior to Indian traditional systems and ideas. Modern medicine laid the solid foundation for the modern drug research and development of science, technology and medicine. The Twenty first century mainly characterized by experimenting and the studying the progress of the new technologies in the medicine and public health. This meets high standards and standardization of medical knowledge. The main objective of the paper is to highlights the recent developments and new themes in the history of medicine and public health under colonial rule and new changes in the western medicine in the context of colonialism.

Key Words: Medicine, Public health, Diseases, Drug, Medical Knowledge, Western Medicine etc.

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Introduction:

The system of medicine was practiced in ancient civilizations like Greek, Persian, Egypt, Babylonian, Sind and other civilizations from past to present for healthy environment. They introduced and practiced diagnosis, prognosis, diseases and several treatment methods. In Ancient and Medieval India, *Ayurveda* and *Unani* systems of medicine was very popular. *Charaka*, *Susruta* and *Dhanwantary* were professionalized in the practice of medicine and surgery. Later this medicine will became modernized and characterized as ‘Scientific Discipline’ under Europeans. Western medicine was introduced by Europeans in India as early as the seventeenth century. They were medical humanists, and they had conscious about illness, epidemics, treatment methods, technology and technics. Under colonial rule, various systems of medicine sought survival through professionalization and they are: ‘*Allopathy*, *Homeopathy*, *Ayurveda*, *Siddha* and *Unani* systems, known as the ‘*Indigenous System of Medicine*’ in India. *Naturopathy* and *Yoga* have also attracted the medical practioners for their therapeutic values.

Health is one of those terms which most people find it difficult to define although they are confident of its meaning. Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. Public health is seen by the state as community health managed by institutional framework. The mission of public health is to fulfill society’s interest in assuring conditions in which people can be healthy. According to *Ayurveda*’s definition of health, the person who always eats wholesome food, enjoys a regular lifestyle, remains unattached to the objects of the senses, gives and forgives, loves truth, and serves others is without disease. Health is the level of functional and or metabolic efficiency of an organism. Health is commonly thought of as the absence of disease. Historically the system of public health has developed in the pre-modern times, but acquired institutional and legal framework in the nineteenth and early twentieth centuries. In the recent debates about health, disease, and medicine, Ethics and moral values in health care became an essential public discourse for a broad range of moral and political dilemmas in an increasingly secular culture. In this context, medical historians discovered a new set of meanings and questions, about the nature of medical and public health interactions in the past. The study of diseases, medical systems and institutionalized public health under the colonial rule in India is therefore should be located in the historical context of changing ideas in the west and as well as in South Asia.

Medicine and Public Health: A New Trend: The study of history is inevitably a dialogue with past and present, the study of medicine and public health history is inevitably a dialogue with contemporary medicine. The field of medical history of South Asia has expanded rapidly in recent years and historians exploring varied shades and trajectories of medicine. The historiography sought to understand the nationalist perceptions, policies and programs towards different systems of medicine in India. The endeavor was not only to understand them but also to contextualize their struggle to survive within the context of British colonial state policies and ideological and institutional interventions. Indian society had good relation with indigenous system of medicine from times immemorial, but the introduction of western medicine impact on the decline of indigenous medicine and changed the attitude and mind-set of the people.

The history of medicine under colonialism mainly focuses on the nature and meaning of diseases and social responses. Western medicine was generally presented as one of the few indubitable benefits of European imperialism. Historians of colonial medicine entailed an enquiry into how episodic and extraordinary medical events reflected and produced changes in the organization of cultural norms and values. They view the western methods of treating diseases under colonial regime as colonizing the body. The colonial medical and public health programmes were aimed at demonstrating effective, efficient and economical methods, techniques in disease control, public health education and community participation. From the beginning, official health policy has shown a strong curative orientation at the expense of preventive care. Western medical practices were seen as articulating political, economic and cultural hegemony over the colonized society. Social scientists and medical historian's emphasis on the role of western medicine in the context of epidemic mortality and how it was reduced death rates from various diseases and in particular, the role of the state in organising and generating institutional responses to diseases has a central theme.

In the social context of medicine has become an ever more powerful cultural convention invoked to define and classify an expansive range of social activities and behaviours. The history of medicine in the recent years has opened a new window on the past: indeed, the distinction between medical and social history has become increasingly obscure. There is growing awareness that the field offers critical insights for all medical and public health historians. According to medical historians, the British medical and public health policies originated to meet

the needs of colonial forces working for the expansion of the British Empire. The rulers primarily concentrated on how to provide the best hygienic, sanitary and medical facilities to the military and civil population of their own race. Internally, the colonizers were seen as a collection of 'hygienically degenerate types', requiring 'constant surveillance', 'instruction' and 'isolation'. Western medicine subjugated and marginalized the traditional medical systems through the active support of the colonial state. It served as a vehicle for the cultural invasion and multifaceted tool, played a decisive role in the creation as well as the maintenance of the British Empire.

Modern medicine forged new and powerful links between the imperial capitals and distant colonial dominions. But increasing western medical intervention cannot be explained in terms of immediate material self-interest alone. Medicine was a part of the ideology as well as the accountancy of empire. In the closing years of the nineteenth century, medicine became a demonstration of the superior political, technical and military power of the west, and hence a celebration of imperialism itself. Medicine registered the imperial determination to reorder the environment and to refashion colonial societies and economies in the light of its own precepts and priorities. According to Mark Harrison, 'medicine' has also been viewed as an instrument of '*Social Control*' in the colonies, providing means of 'knowing' the indigenous population, and rationalizing of social segregation. Medicine's role as a "*Tool of Empire*" is probably the most familiar theme in the historiography on colonial medicine to date, and has its origins in the writings of colonial medical officers and imperial politicians. Medicine played an important role in the creation of colonial subject. The study of history of medicine helps us to describe and understand how people in different times and cultures experienced and dealt with the fundamentals of human existence.

Explored Themes in Medicine and Public Health in India:

The recent historiography of medicine and public health in India has shown that the origins of Western medicine primarily refer to the "*Allopathic*" system of medicine and "*Homeopathy*". It is primarily examined in the context of British colonialism. The historiography has shown how the political, economic, social and ideological considerations have superseded purely on medical concerns. Later the historiography concentrated on the study of disease and medicine as a site of contact, conflict and possible eventual convergence between western rulers and indigenous

peoples. For them medicine and disease are the two ideological and political frameworks of the empire. R.P. Dutt contended in 1940 that the “provision for the most elementary needs of public hygiene, sanitation or health is so low, in respect of the working masses in the towns or in the villages, as to be practically non-existent. Hugh Tinker argued that Indian representatives on municipal and provincial bodies had little interest in matters of public health. It is in the recent historiography that the social history of medicine is sought to be assessed in relation to system of various dynamics of colonialism and colonial rule.

The core argument of this historiography on medicine and public health under colonial rule has been that the colonial medical and public health policies are introduced for the sole benefit of European civilians and the military needs, and not for the benefit of Indians. Though it appears to be true in the eighteenth and the early nineteenth centuries, the colonial administrations gradual shift in extending the medical facilities to the Indian public, for instance, the vaccination, the hospitals and dispensaries has brought about a change in its policy in the early twentieth century. The colonial intervention in public health controlled or reduced the mortality rate of Indians from various diseases. Another argument of the medical historians has been that all the institutions, including education, particularly the medical education were introduced for the colonial commercial and administrative needs and does not give adequate attention to the public health. In the twentieth century there appears to be a marked shift in the preparation of their responsibility or duty to provide medical and health facilities to the whole country.

George Rosen’s ‘*A History of Public Health*’ is a classic study of the public health that emphasize on locating the system of public health in its social context. H.P.Thakur, C.E.A.Winslow, Sheldon Watts, Norman G.Owen, H.H.Goodeve, T.J.S.Patterson, and Iris Bruijn have done extensive studies on various aspects of medicine and public health at broader context. In India, G. Mukhopadhyay’s book, ‘*History of Medicine in India*’ deals with various methods of treatments in contemporary India. This is one of the early works on history of medicine in the twentieth century India. D.G.Crawford ‘*History of the Indian Medical Service 1600-1913*’ is also one of the earliest work argued that Indian medical service was one of the major event in the colonial India, which gave more priority to health. In the work of Sanjay Bhattacharya, Mark Harrison and Michael Worboys, ‘*Fractured States: Smallpox, Public Health*

and Vaccination Policy in British India 1800-1947' deals with the history of development and implementation of public health policies to control Smallpox in British India. Mark Harrison's work, the '*Public Health in British India: Anglo-Indian Preventive Medicine 1859-1914*', explains European attitude towards India and its inhabitants, and the way they reflected in medical literature and colonial medical policy.

David Arnold has made an extensive study of various aspects of epidemics like Cholera, Smallpox and Plague in the context of colonialism. The study of western medicine is contextualised in the history of emerging tropical medicine and the colonial administrative effort to tackle the epidemic diseases in nineteenth century India. His work, '*The Imperial Medicine and Indigenous Societies*' is a collection of essays broadly explaining how the medicine itself has acted as a primary vehicle for imperial ideas and their hegemony. Another work '*Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth Century India*' revolves around the story of the western medicine in Nineteenth century India and how it touched the minds and bodies of many Indians as a potent and yet ambivalent, cultural force. Arnold explores the mix of dissent and desire, the hateful and the hegemonic in Indian response to western medicine and this is one of the paradoxical elements that his study of a colonizing process explores and not so much the history of western medicine in India. His study demonstrates that western medicine in India was a colonial science and not a simple extension or transference of western science to a colonial outpost. In the words of Ira Klein, in the early twentieth century, Plague was India's most feared and one of its deadliest maladies. The Plague and epidemics have not only induced massive fatalities, but they greatly disrupted ordinary life.

For M.N. Pearson, the study of history of colonial medicine means, tracing the early relations between European and Indian medicine. He argues that the Portuguese were the pioneers of the institutional health care in India, playing an innovative role in the introduction of hospitals with state support during the sixteenth century. Similarly, Michael Adas in his work '*Machines as the Measure of Man: Science, Technology and Ideologies of Western Dominance*' expressed similar ideas. David Arnold however argues that before 1800, Western medicine was far less dominating in its relationship with indigenous societies. The work of O.P. Jaggi shows that the creation of medical service was a major event in the development of Western medicine in India.

In his volumes provide valuable information on the history of western medicine, health, science and technology in the colonial context.

Roger Jeffery argues that while poverty made it difficult to treat disease, the available technology was inadequate and unsuitable for prevention purposes. The limitations on raising revenue, low priority accorded to sanitary and medical services in relation to other areas resulted in the civil society being left defenseless against diseases. For John Hume, the curative bias in the health policy did not enable them to fully concentrate on the preventive aspect of diseases. The colonial government did not spend much money on the development of health care in the twentieth century'. Hugh Tinker argues that the customs, social beliefs and attitudes acted as major obstacles to the growth of preventive health care system in colonial India. He focused on local self-government and its relation to public health. Waltraud Ernst emphasized on the complementary of men's and women's mental problems within the socio-economic, political and cultural confines of the nineteenth century colonialism. Deepak Kumar's work on '*Disease and Medicine in India: A Historical Overview*' is a collection of essays presenting the history of disease and medicine in Ancient, Medieval and Colonial India. The approach in this work seeks to achieve a balance between social constructivism and historical relativism.

The edited book of Biswamoy Pati and Mark Harrison, '*Health, Medicine and Empire: Perspectives on Colonial India*', is a collection of essays related to social history of health and medicine in colonial India. They explore how imperial medicine adapted to colonies for their own requirements. In another volume, '*Social History of Health and Medicine in Colonial India*' analyses the colonial legacy of public health. Anil Kumar's work, '*Medicine and the Raj: British Medical Policy in India, 1835-1911*' is a unique compendium of events that lead to the development of practice of western medicine in India. Raj Narayan Chandavarkar focuses on colonial medical interventions and its impact. Kavita Sivaramakrishnan emphasized on varied interests of medical and public health during the period of adjustment to colonial rule. Poonam Bala's study explores the relationship between indigenous and Western systems of medicine in colonial Bengal. Her main emphasis on the state patronage to the medical systems in India, and it was due to lack of colonial state support that the indigenous medicine in India had suffered. Radhika Ramasubban in her seminal work deals about public health and medical systems under colonial rule. Gary J. Hausman's paper situates '*Homeopathy in South India*' within the context

of shifting relationship between 'scientific and indigenous systems of medicines. Sean Lang, writing on midwifery and women's health in the nineteenth century India, has analysed the role of medical missionaries and voluntary organizations in the Madras presidency. K.N. Panikkar discusses the indigenous medicine and cultural hegemony by considering the revitalization movement in Kerala.

Deepak Kumar explores the development of science in the colonial context and the social implication of the western science; he argued that cultural encounters reflected in the transmission of medical ideas and practices in colonial India. V.R. Muraleedharan wrote on health policy in colonial South India clearly reflects the connection between the growth of knowledge of various diseases, and the government policy. He attempts to bring out certain aspects of the health care delivery system that was developing in Madras Presidency during 1919 and 1939, particularly in the rural areas. How the administration and medical establishment shaped the colonial policy has been analysed by V.R. Muraleedharan and D. Veeraraghavan. Seema Alavi concentrated on the public health, Unani and medical interventions under Indo-Muslim traditions. Shirish N. Kavadi in his work on '*Public Health in Colonial India 1916-1945: A Narrative History*' explores the colonial government health policies and structural changes in the twentieth century. For C. Leslie stressed on the medical revivalism in modern India. The recent work, '*Power, Knowledge, Medicine: Ayurvedic Pharmaceuticals at Home and in the World*' by Madhulika Banerjee locates the story of modern Ayurveda and growth of medical systems in the colonial context in India. The book on '*Indigenous and Western Medicine in Colonial India*' by Madhuri Sharma reflects on the complexity of social interaction between indigenous and western medicine in colonial India.

There are few indigenous regional works, for instance, Hymavathi's work, dealing with Ayurveda system in Medieval Andhra. The earliest Andhra contributions to the study of history of medicine started from the last quarter of the Nineteenth century: the writings by Nageswara Rao Panthulu, Pandit Kesari Gaudham, Krishna Rao, Achanta Lakshmi Pathi, and Divi Gopalacharlu (1872-1920) etc. They started practice in Ayurveda at a time when the attitude of the British towards oriental medical system was a matter of deep rooted hostility. Another notable name amongst the early contributors to Indian medicine was K.S. Kesari (1875-1953), who started popular tonics like "*Lodhra, Amruthanjan and Arka*". While, V. Nageswara Rao

Panthulu (1893) introduced combination of herbal medicines, Dr. Achanta Lakshmi Pathi brought into public domain the movement for professionalization of indigenous systems of medicine in general and Ayurveda in particular with significant success. Achanta published works that explained how local diseases could be treated locally available natural herbs.

Among the early twentieth century publications, the work of Achanta Lakshmi Pathi is noteworthy. His two works, '*Infectious Diseases: Their Causes and Prevention and Cold-Fever: Its Spread, Prevention and Treatment*' were useful to understand how the indigenous medical system, Ayurveda engaged with and treated various diseases and epidemics in the Madras presidency. He wrote many books, both in English and Telugu languages: for instance, '*How to Fight Disease, National Health, Health Expedition, History of Indian Medicine*', the '*Mind in Health and Disease, Practice of Medicine, and Ayurveda - Its Scope and Importance*'. Some of his works dealt with indigenous as well as western medicine, diseases and health. His philosophy has been that health and medicine are two components are always close relation with human life. The other medical researches i.e Maneesha Lal, Geraldine Forbes, Neelam Kumar, Sanjiv Kakar, Muhammad Umair Mustaq, Kabita Roy, Niels Brimnes, B.Eswara Rao, DVS.Subba Reddy, P.K.Guha and Gurumurthy have done regional case studies in the history of medicine and public health in British India, but still it is a huge historiographical gap in the field of medicine and public health, particularly in south India. A few research scholars have touched health care system in colonial South India, but they neglected colonial health policies and their attitude towards epidemics. The areas like health propaganda, the role of private organizations, maternity and child welfare, vaccination system and its impact, the role of hospitals and dispensaries, venereal diseases and their impact on society, the role of western medicine etc., has been neglected.

Conclusion: Medical historiography is fundamentally influenced by the many questions affecting medicine in contemporary life. It is believe that the study of the history of medicine will necessarily continue to change in the process. The contemporary historiography must take into account the impact of new diseases and epidemics on medical history. Women, gender and sexuality, social medicine, clinical medicine, Medical pluralism in local contexts of illness and healing, Tele-medicine, alternative medicine, treatment methods, health propaganda, hospitals and dispensaries, vaccination systems, mental and physical health, government health related

schemes, health acts, health plans, health insurance, medical drugs and products, pharmaceuticals, Surgeries, infantile and maternal mortality, private medical cost, medical inflation, health care organizations, institutions for promoting health, expansion of technology in medicine and public health, medical education, diagnostic systems, are the major trends of the new medical and public health history. The dimensions of the enquiry are vast, in the years ahead, the social historians of medicine and public health will look again to the past, to cull the historical record for new and more sophisticated ways of understanding the past and present and facing the future.

References:

1. Achanta Lakshmi Pathi., (1914). Infectious Diseases: Their Causes and Prevention (1880-1960), Indian Printing Works, Madras.
2. Achanta Lakshmi Pathi., (1973). Autobiography, Avadi Arogya Samiti, Madras.
3. Anil Kumar.,(1998). Medicine and the Raj: British Medical Policy in India, 1835-1911, Sage Publications, New Delhi, PP.216-218.
4. Biswamoy Pati and Mark Harrison (Ed.), (2000). Health, Medicine and Empire: Perspectives on Colonial India, Landon: Sangam Books, PP.1-30.
5. Biswamoy Pati and Mark Harrison (Ed.), (2000). The Social History of Health and Medicine in Colonial India, Rutledge, New York.
6. C.Leslie, (Ed.), (1977). The Ambiguities of Medical Revivalism in Modern India in 'Asian Medical Systems: A Comparative Study', California University Press, London, PP. 356-67.
7. David Arnold, (1993). Social Crisis and Epidemic Diseases in the Famines of Nineteenth Century India, Social History of Medicine, Vol.6, P.385. Warm Climates and Western Medicine: The Emergence of Tropical Medicine 1500-1900, Amsterdam: Rodapi, 1996. Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth Century India, University of California Press, Berkeley, 1993, and Cholera and Colonialism in British India, Past and Present, Nos.110-113, 1988, PP.118-123. David Arnold (Ed.), (1989). Imperial Medicine and Indigenous Societies, Oxford University Press, New Delhi, PP.16-17

8. Deepak Kumar., (2006). Science and the Raj: A Study of British India, Oxford University Press, New Delhi and Medical Encounters in British India 1820-1920, in 'Economic and Political Weekly', Vol.32, 1997. And Probing History of Medicine and Public Health in India, 'Indian Historical Review', No.32, December, 2010, PP.259-273. And Disease and Medicine in India: A Historical Overview, (2001). Tulika Books, New Delhi.
9. George Rosen., (1993). A History of Public Health, JHU Press, PP.9-10.
10. Gary J. Hausman.,(2002). Making Medicine Indigenous: Homeopathy in South India, 'Social History of Medicine', Vol.15, P.303.
11. G. Mukhopadhyay., (1923). History of Indian Medicine, Vol.II, Calcutta.
12. Hugh Tinker, (1954). The Foundations of Local Self-Government in India, Pakistan and Burma, Pall Mall Press, London, P.73.
13. Ira Klein., (1998). Plague, Policy and Popular Unrest in British India, 'Modern Asian Studies', Vol.22, PP.723-55.
14. J.R. John Hume., 1986, Colonialism and Sanitary Medicine: The Development of Preventive Health Policy in the Punjab, 1860 to 1900 in 'Modern Asian Studies', Vol.XX, P.703-724.
15. K.N. Panikkar, 1997, Indigenous Medicine and Cultural Hegemony: A Study of Revitalization Movement in Kerala, 'Studies in History', Vol.18, PP.283-308.
16. Michael Adas, (1990). Machines as the Measure of Men: Science, Technology and Ideologies of Western Dominance, Cornell University Press, Ithaca, P.21.
17. Mark Harrison.,(1994). Public Health in British India: Anglo-Indian Preventive Medicine 1859-1914, Cambridge University Press, New Delhi, PP.1-5.
18. Madhulika Banerjee., (2009). Power, Knowledge, Medicine: Ayurvedic Pharmaceuticals at Home and in the World, Orient Black Swan Private Limited, Hyderabad.
19. Madhuri Sharma., (2012). Indigenous and Western Medicine in Colonial India, Foundation Books, Cambridge University Press, New Delhi.
20. M P. Sutphen., 1995, Health in British India, 'Social History of Medicine', Vol.8, PP. 325-26.
21. O.P. Jaggi., (1979). Western Medicine in India: Epidemics and Other Tropical Diseases, Vol.12, and also see the Western Medicine in India: Public Health and its Administration, (1979). Vol.14, Atma Ram and Sons, Delhi.

22. P. Hymavathi., (1993). History of Ayurveda in Andhradesha (14th to 17th Centuries), Bhargava Publishers, Warangal.
23. Poonan Bala., (1991). Imperialism and Medicine in Bengal: A Socio-Historical Perspective, Sage Publications, New Delhi. And Indian and Western Medicine: Rival Traditions in British India in Colonialism and Psychiatry, Edited by Dinesh Bhugra and Ronald Littlewoods, (2001). Oxford University Press, Delhi, PP.232-243.
24. Raj Narayan Chandavarkar., (1992). Plague Panic and Epidemic Politics in India 1896-1914, in Epidemics and Ideas: Essays on the Historical Perception of Pestilence, Edited by T. Ranger and P. Slack, Cambridge University Press, PP.203-240, Also see Kavita Sivaramakrishnan., (2006). Old Potions, New Bottles: Recasting Indigenous Medicine in Colonial Punjab, 1850-1940, Orient Longman, Delhi.
25. Radhika Ramasubban., (1982). Public Health and Medical Research in India: Their Origins and Development under the Impact of British Colonial Policy, Stockholm, SAREC.
26. Roger Jeffery., (1988). The Politics of Health in India, University of California Press, Berkeley.
27. Sean Lang., (2005). Drop the Demon Dai: Maternal Mortality and the State in Colonial Madras, 1840-1875, 'Social History of Medicine', Vol.18, P.357.
28. Sanjay Bhattacharya, Mark Harrison and Michael Worboys., (2005) Fractured States: Small Pox, Public Health and Vaccination Policy in British India 1800-1947, Orient Longman, Hyderabad.
29. Shirish N.Kavadi., (1999). The Rockefeller Foundation and Public Health in Colonial India 1916-1945: A Narrative History, Foundations for Research in Community Health, Mumbai, PP.1-5.
30. Shamshad Khan., 2006, Systems of Medicine and Nationalist Discourse in India: Towards 'New Horizons' in Medical Anthropology and History, 'Social Science and Medicine', Vol.62, P.2787.
31. Seema Alavi., (2007). Islam and Healing; Loss and Recovery of an Indo-Muslim Medical Tradition 1600-1900, Permanent Block Publication, Ranikhet, PP.100-102. And PP. 1-17.
32. V.R. Muraleedharan., (1991). Malady on Madras: The Colonial Government's Response to Malaria in the Early Twentieth Century", in Science and Empire: Essays in Indian

Context (1700-1947), Edited by Deepak Kumar, Development Studies, Veronica Press, Delhi, PP.101-111. And Rural Health in Madras Presidency: 1919-39, 'The Indian Economic and Social History Review', Vol.24, 1987, PP.323-334. And also see, V.R. Muraleedharan and D. Veeraraghavan., 1995, Disease, Death and Local Administration: Madras City in Early 1900s in 'Radical Journal of Health', PP.9-24.

33. Warwic Anderson., 1998, 'Where is the Post-Colonial History of Medicine', Bulletin of the History of Medicine, PP.522-30.

34. Waltraud Ernst., 1996, European Madness and Gender in Nineteenth Century British India, 'Social History of Medicine', Vol.9, P.357.

35. Mark Harrison., (1994). Public Health in British India: Anglo-Indian Preventive Medicine 1859-1914, Cambridge University Press, New Delhi, PP. 2-5.

