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IDEA/S OF DISEASE/S IN COLONIAL ODISHA

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Abstract

Diseases have been seen in Indian subcontinent especially in Odisha from time immemorial. They captured the imagination of natives through memories, folktales, vernacular newspaper and colonial records. But the diseases like cholera, smallpox and malaria diffused in the nineteenth-century Odisha along with a number of diseases played an important role to create havoc among Odias. An analysis of archival and vernacular sources will help us to understand the perception of Odias towards diseases during colonial time.

Keywords: Disease, Smallpox, Cholera, Malaria, Leprosy, Odisha, Prejudice.

Introduction

Diseases are common to human being irrespective of their culture and geographical location. It is found among Odias also due to the universal phenomena while variants can be noticed in the tropical regions like Odisha. With the development of human progress, the idea of diseases also changed and it is true for Odisha even. Diseases were there unnoticed due to immaturity in human understanding and linguistic barriers. As time progressed, the way disease has been perceived and conceived what it is today. The present writ-up will investigate the perception of Odias towards diseases in colonial time.

The diseases, common to colonial Odisha, are smallpox, cholera, malaria, leprosy and varieties of fever. Some of them are epidemics and rest of them seasonal or perennial. The idea of various diseases found in autobiographies and literary writings during colonial period demonstrate the people's perception towards it. As the vernacular sources suggest that diseases were thought to be ill-spirit invaded the human bodies and they can be only removed through the divine intervention. In some cases, the diseases were considered as wrath of gods and goddess for which the human being had to get their blessings by arranging a grand worship for them. The best way to ward off cholera, as Fakir Mohan describes, was to offer a grand worship to village goddess as mentioned in his novel Chhamana Athaguntha (Six Acres and Half).ⁱ It means disease was not in human control; it is divine authority, as villagers believed, that would provide protection. The same novel presents a contrary idea on disease as a manifestation of ill-spirit and expounds Zamindar Ramachandra Mangaraj's illnesses projected as a result of exploitation and inhuman activities.ⁱⁱ The ill-spirit and wrong doing symbolizes the reason for diseases as this notion shared by the then Odias.

The diseases mentioned in the newspapers have been discussed in this study. Diseases with possible factors gives an idea of colonial Odia society, they used to live with. Many common diseases were named and medicine had been evolved for it. But some lethal diseases could not be found due to the lack of scientific knowledge during colonial time. Despite indigenous medicinal system, it was seen that a large number of native populations could not have access to it. The idea of diseases was in oblivion and common people used to die even in common diseases. As India's geographical location is tropical, especially Bengal, Bihar and Orissa,ⁱⁱⁱ the diseases are frequent visitors to this region. Therefore, this study will further discuss about diseases in colonial Odisha.

Traditional Perceptions of Odias towards Diseases

The perception towards diseases in the nineteenth-century Odia society is difficult to know due to the paucity of sources. But, some notions of diseases had been reflected in the newspapers. From the contemporary writings like autobiographies and newspapers suggest that diseases are related to goddess and connected with super natural forces. One such fact from the oldest newspaper Utkal Dipika, a paragraph on "small-pox" says that a child affected with small-pox was thrown into a well in a belief that this disease would not spread to the other children of the family.^{iv} It was a practice in Khujkin district of India. There are many such cases which clearly mention how diseases were perceived dogmatically in the late nineteenth-century India in general and Orissa in particular from various Odia newspapers.

One such article, Dhatri Shikhya (Training for midwifery),^v focuses on the lethal delivery diseases treated with helplessness in the Oriya-speaking region. The author explains the ignorant and illiterate women were allowed to serve the delivery woman. Many Odias believed that there was no treatment for diseases related to delivery. The mid-wife was the sole protector for the entire period from delivery pain to the birth of the baby and thereafter. The Vaidyas were not allowed to treat the new born baby or the mother due



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to the fear of impurity. This kind of delivery resulted in death of many women and their new born babies. In an absurd ritual, the women were touched with the hot iron rod on the paining space of their body – it was known as Chadak.^{vi}

The above paragraph was on the discussion of ignorance and fear of impurity resulted in the death of many people. The malpractices during the time of diseases carried out in the nineteenth-century Oriya society. Some facts are known to us through newspaper but literary writings also corroborate the role of superstitions and prejudices causing diseases among Odias. The dominating diseases in the Oriya-speaking region were Small-pox, Cholera, Malaria, Plague, and Leprosy. The villagers as well as the urban population in Orissa used to worship goddess for their well-being at the time of epidemic.

The nineteenth-century Odia newspapers like Utkal Dipika and Utkal Sahitya gives us information regarding the nature and intensity of various diseases during that time. The autobiographies of Fakir Mohan Senapati and Nilakantha Das have some information on diseases in late nineteenth-century Odia society. But, Utkal Dipika gives us instances of various diseases along with its nature and medicine. The second half of nineteenth century witnessed a number of diseases spread in different regions of Colonial India, like smallpox, cholera, malaria and leprosy which created a furious epoch in colonial India as well as Orissa.

Further, the great famine of Odisha had provided the fossil for the fire of various diseases in colonial Orissa. The Odia newspapers like Utkal Dipika, Utkal Sahitya and some archival sources have provided ample information with regard to above diseases and different types of medicines that shrouded Odia society came to the lime light. It created a public sphere by circulating news about following diseases which spread during that period. From 1866, the regular newspaper like Utkal Dipika and Baleswar Sambad Bahika had enlightened Odias with appropriate information in regard to cholera. Like Bengal, the coastal Odisha was having numerous water bodies – at least one pond in each village – which was the breeding place of this epidemic. Their unsanitary life-style adds fuel to this fire intensively. The same newspaper Utkal Dipika also informs us about the coming of two British surgeons to find out the nature and causes of cholera in India in 1869.

Magic to Logic: Changing Perceptions of Odias towards Diseases

The notion of disease had perceived by Odias slowly changing in late nineteenth-century Odisha. With the coming of surgeons, dispensaries, hospitals and western medicines led to the change in the understanding of diseases in colonial Odisha. The instances of it are many and some of them are: Babu Radha Raman Das opened a dispensary in his garden building and established a hospital in the midst of the town to avail cholera pill among the sufferers. On the top of all, civil surgeon Jurab Sahib worked round the clock.^{vii}

Fakir Mohan also mentioned how Odias died due to diarrhoea and dysentery after given rice during relief distribution in 1866 due to the Great Famine. The western doctors came for the treatment of the people. In his literary writings, it is informed that how far the role of surgeon in the last decades of nineteenth century was crucial to tackle public health. Similarly, a surgeon confirmed his incurability and permitted to take home after the physically insult of Zamindar Ramachandra Mangaraj by his jail-mate while his associate Gobara Jena was declared dead by the same surgeon.^{viii} Further, both Fakir Mohan Senapati and Nilakantha Das was treated by doctors of western medical sciences which signifies the native notion towards diseases has been transformed.

Moreover, the writings in Odia newspapers and journals discuss systematic understanding of diseases unlike superstitious predecessors. Odias rely more on western medical institutions and systems that a hospital and King Edward Dispensary was established in Baripada (Mayurbhanj State) in the last decade of nineteenth century for treating natives affected in various diseases. The chief medical officer of Mayurbhanj State, Dr. Chandramadhab Singh, in his article Sadharan Swasthya O Chikitsa Bidhan, has explained the faith of Odias on western medical system and institutions enhancing day by day. Therefore, he has mentioned in the third paragraph of this article in the following manner,

The patients did not come to hospital as they had no trust on it. Surprisingly, the prejudices with regard to hospital have been ameliorated. Not only their changing perception toward hospitals but also many critical and complex diseases being cured through surgery have been erasing their trust deficit. Even a number of women turned to hospitals for treatment of gynaecological diseases through surgery.^{ix}

The school textbooks are also not behind to teach students how diseases make entry into our bodies. A lesson in the Odia Chaturtha Pathya Pustak known as Roga (Disease) has provided the changing mindset of Odias towards disease. The first paragraph emphatically demonstrates the paradigmatic shift of notion toward disease in following manner,



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Some people argue that disease depends on the bad action. We have no control over it. It is their prejudice. There is reason for any disease. Nothing can happen without any reason. Mostly messy environment and consumption of uncooked or unavailability of improper food led to the deterioration of human health which ultimately resulted in diseases.^x

Smallpox (Basanta)

One of the oldest and most dreaded diseases of recorded history, the scourge of smallpox was attributed by Norman Chewers; to have formerly swept away one tenth portion of the human race and its fatality equalled the plague in its worst form.^{xi} Holwell writes in 1716 about the prevalence of small pox in Bengal where every seventh year with scarcely any exception, in the months of March, April, and May. Small pox also came to Agra on December, 1869 which attacked five hundred people and they were also killed.^{xii}

Inoculation, a preventive measure against small pox was introduced in England in 1715, but in India, particularly in Bengal it was extensively practiced long before the British arrival in religious association with a deity called Sitala, who as the deity of small pox both as the protector and prosecutor resigned in north India with a multitude of rituals for her propitiation where as in South India. She was represented by the deity Mariamma.^{xiii} There were also many persons died by small pox in the Balasore region. For which the doctor requested to all for taking Gobija vaccination cured from this disease, which was mentioned in the editorial page of Balasore Sambad Bahika. The ayurvedic texts had no answer to this disease except invoking the mercy of Sitala whose exact entry into the classical texts is difficult to ascertain.

Vaccination introduced in India in 1802 encouraged the British to regard small pox as a preventable disease. In Bengal, at the end of November 1802, the duty of preserving a constant supply of vaccine for the use of Calcutta and subordinate stations for vaccinating Indian children might wish to practice vaccination was entrusted to Dr. William Russell with the title of superintendent General of vaccination. The vaccination policy of the British amply demonstrates the inbuilt limitations of colonial medicine in India. It was never intended or allowed to serve as a true savior and protector of the people beyond the enclaves. Vaccination came as a boon in the face of such affection for the British medical crops and was also a mark of difference. The Gobija vaccination is a British vaccination and the people of Orissa didn't know about this vaccination before the coming of British to India. Except that, there was a other vaccination known as Anwontari vaccination.^{xiv}

The investigation of Dr. Barry was summarized by Dr. Buchanan for the sake of brevity:

(A) For children under ten years of age living in Sheffield during 1887-88 under the common conditions of infection in the whole borough.

Per thousand of the number of each class-----
The attack rate of vaccination was 5.
The attack rate of unvaccinated was 100.
The death rate of unvaccinated was 44.^{xv}

Therefore, every 100, 000 vaccinated children, there were 9 deaths and for every 100, 000 unvaccinated children had a 20 fold immunity against attacks by small-pox and 480 deaths by small-pox also.

Dr. Henry Tomkins, Medical Superintendent of the Fever Hospital states that,

The most striking of all evidence is perhaps that derived from the small-pox hospitals themselves. Here the protective influence of vaccination is seen and proved in a manner beyond all cavil. At Highgate, during an experience of forty years, nurse or servant having been revaccinated has ever contracted the disease and evidence of the same character I can myself bring forward for during the whole time that I have had charge of the Fever Hospital more than a thousand cases of small-pox have passed under my care, yet no servant, nurse porter or other person engaged there has, after revaccination ever taken it, though exposed daily to infection in its most concentrated form. One woman, a laundress who escaped vaccination, took the disease and died, one nurse who some years before had suffered from small-pox and was then considered protected, had a very attack: and this summer, a workman who didn't live on the premises, but came into work as a painter was not vaccinated and had rather a severe attack and still more recently a servant, who by an oversight was allowed to go about her work three days before being vaccinated, had before the latter had run its course, a slight abortive attack. Again, all the students who during the past two years have attended the hospital for



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clinical instruction, not one has suffered, all having been re-vaccinated before being permitted to enter the small-pox wards.^{xvi}

So, these information shows that the same policy reintroduced and re-practised in India because India was also affected by diseases especially small-pox like England, Scotland, Prussia, Holland etc. the epidemics was severely spread by the foreigners through communication by rail. So, Bengal, Madras, Bombay, Oudh and some other provinces had been comparatively free after vaccination made compulsory by 1891 Act. Before the implementation of this act, the city of Madras was suffered severely by epidemics. This act acted like a life-saving weapon for all through vaccination. Through this act, the primary vaccination was confirmed and many people were saved from lameness, eyesight, deafness and some other dangers.

Cholera (Jhadabanti)

In a series of articles, the spread of cholera in various parts of Balasore district has been reported in Utkal Dipika. Cholera broke out in south and north region of Balasore district. Many died of cholera in Bhadrak and Soro region. Many schools in Jaleswar and Lakhannath closed and students died out of it. The unavailability of doctor and improper arrangement of hospital and dispensary floated an atmosphere of despair in these regions.^{xvii} On 8th May, 1879, cholera was in its extreme form which perished many souls in Remuna and its nearby villages.^{xviii} To stop cholera the mass Sankirtan (Devotional Music in a Congregation) became important on daily basis in Balasore. People offer worship to Goddess on every Saturday and Tuesday and oracle put their all effort to ward off cholera. It still persists and appeal to divine power can't control it.^{xix}

The earliest literary sources discuss about epidemic diseases like cholera in a short-story "Rebati" authored by Fakir Mohan Senapati. How did a happy family of Shyambandhu Mohanty, Goomasta to his village Zamindar, devastated by an epidemic known as cholera? The author has symbolized cholera - as an old woman who collects the human dead bodies into her basket – also perceived in general. The mother of Protagonist Rebati also meted the same fate. Basudev, the teacher of Rebati, also perished due to cholera. Later on, Rebati and her grandmother also succumbed to same.^{xx}

Not only in autobiography but also in fictional writing, cholera also known as Badi thought to be a divine intervention minutely described in a novel Chhamana Athaguntha (Six Acres and Half) by Fakir Mohan Senapati in the social settings of end of nineteenth Century. The village goddess Budhi Mangala was the symbol of human wishes beyond its logical or common understanding related to happenings in its life. One among them is epidemics like cholera which swept many lives in various pockets of Orissa. "A wave of worship continues at the residing place of Goddess Budhi Mangala during cholera period. Like doctor and lawyer, the village Goddess became important for the villagers at the time of crisis. With the grace of Goddess, no major untoward situation occurs in the village. Whenever the cholera occurs in the village the toll goes not more than hundred if the village Goddess worshipped properly. In most of the cases, the village Goddess get proper worship as medicine or vaccine is not available for epidemics.^{xxi}

In a rather vivid description of Cholera in Balasore, the town has come under cholera.the central part of the town Motiganj Bazar closed due to it. The sounds of weeping come from various pockets of the town. No villagers enter the town either for court or any other purposes. The English school has been closed indefinitely. The wrath of cholera can be solaced through Nagar Sankirtan to the late night.

On the contrary to superstitious notion of disease, an article, Ola-Uthare Ete Loka Maribara Hetu Kisa (What is the reason behind death of many in Cholera?), explains the reason of cholera that succumbed many lives. The absent of pure drinking water is the main reason for the spread of cholera. Due to lack of rain people forced to drink stand still impure water of pond and other water bodies. It is observed that wherever people drink impure water they were affected by cholera. So, it is requested to the people to dig well to have clear, crystal drinking water for which they have to contribute a day or two in this regard.^{xxii} In an article of Utkal Dipika, many died due to cholera. A number of pilgrims perished on Jagannath Road. Apart from Puri, this disease spread to Balasore, Cuttack, Midnapur and Bhadrak. The govt. has taken no measures for public health for which mortality rate is going high.^{xxiii}

Several prisoners in jails of Odisha perished due to cholera in post-famine eruption. The same news agency informs us that 41 prisoners were affected and 22 of them died after the treatment by Dr Stewart in the Chauliaganj Jail of Cuttack, Odisha. To substantiate the fact that cholera symbolized as death can be noticed from the autobiography of renowned Odia literary personality Fakir Mohan Senapati. His father lost to cholera in his childhood days while returning from Puri near Bindusagar Pond, Bhubaneswar around 1840s. But his description of post-famine scenario of 1866 to narrate the ugly face of cholera in following manner, while dealing with starved people of Odisha,



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The Government has sent rented big ship full of rice from Rangoon and Calcutta. The food point has been opened by the government in several places. The information regarding food point has attracted many starved villages to town. They have not seen any grain for a fortnight. They survived with tender leaves and wild fruit and root. They fled to town for food for which they have to cross far away distances and hundreds of people died on the way. Those who reached the relief centre they died with cholera and dysentery after having some food. The empty stomach of the starved people filled with boil rice. Their digestion could not function with heavy meal. Cholera and other diseases followed them and perished in subsequent days.^{xxiv}

It is a separate chapter dedicated for the understanding of Cholera among children in a textbook of early 20th century Odia Chaturtha Pathya Pustak. Cholera is known as Hoiza, Ola-Utha, Mahamari, and Maribhaya in Orissa. It is probably contaminated through air. This disease enters a person's body if they have contaminated food, untidy lifestyle, and lack of proper sleeping in the night. The character of this disease can be found when a person experience loose motion followed by vomiting. The symptoms like dehydration, headache and body pain confirm the activeness of this disease in the body. The preventive measures are segregation and quarantine of the patient as medicines and vaccines are hardly available.^{xxv}

Though cholera was known in Asia and Europe much before the British arrival in India, which appearance in extremely virulent and fatal form was properly recorded only in the first quarter of nineteenth century. It was commonly known as haiza. This disease was assigned different names such as morysey, mirtirissa, vizucega, mordeyin and mordechien in different parts and different languages of India. It spread suddenly in an area and kill its inhabitants most violently.^{xxvi}

The main symptoms are watery diarrhoea and vomiting. Remission occurs primarily by drinking water or eating food that has been contaminated by the faces of an infected person including one with no apparent symptoms. Severe cholera requiring hospitalization result from the accumulation of about a million bacterial cells within the body. Cholera has been nicknamed the 'blue death' because a victim's skin turns bluish gray from extreme loss of fluids. There were about seven male persons and ten female persons died in cholera in Cuttack districts.^{xxvii} The first cholera pandemic occurred in the Bengal region of India starting in 1817.

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Malaria

Malaria is another disease that swept many souls in coastal regions of Orissa. Both government records and vernaculars newspapers provide description of malarial death in colonial Orissa. Many theories were there regarding malaria until Ronald Ross proved the mosquitoes responsible for it in 1893 for which he was given Nobel Prize in 1902. However, Malaria has killed many Europeans in Asia and Africa rather than in battle field. In Latin language, malus means bad air and Webster describes it as 'bad air, air tainted by deleterious emanations from marshy districts, capable of causing fever or other disease.' In Greek, similar word 'miasma' was also held responsible for causing fever, the word meaning 'defilement, infection floating in the air, the effusive or fine particles of any putrefying bodies rising and floating in the atmosphere, and considered to be noxious to health.'^{xxviii}

A B. Fry (1912), noted that "the early records of the East India Company prove that Calcutta and Bengal were malarious from the commencement of the British occupation". In 1770, Marquis of Murshidabad and to the amount of ague prevalent among the troops quartered at Berhampore". Another investigation made by Dr. C.A. Bentley, the Director of Public Health, led to the conclusion that interference with the natural flow of water across the country from field to field, obstruction or silting up of water courses and any condition which seriously diminished the supply of water and promoted stagnation, either on the surface of the land or in the beds of streams and drainage channels led to a local increase of malaria.^{xxix}

Storm water drainage in towns and cities of Orissa was one of the utmost important in the prevention of malaria. The storm water drains in individual compounds were generally connected with the main storm water drainage system in towns and cities of Orissa, where open drains were constructed with a suitable and uniform gradient. The chief anti-malaria requirement was to obviate stagnation of water and it was therefore important that the gradients in small drains should be receive as much detailed attention as any other part of the architecture. Apart from this, undetected pockets in which water accumulates, which gave rise to mosquitoes breeding within the precincts of habitants were liable to occurred.^{xxx}



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Leprosy (Kustha)

Leprosy is a chronic infection caused by the bacteria. It can be progressive causing permanent damage to the skin, nerves, limbs and eyes. It is also a contagious disease. The palm leaf manuscripts and the popular oral tradition suggests that one of the kings who ruled before the 17th century had learnt in a dream about the usefulness of the Bhramaramari plant as a cure for leprosy patients. They used it twice daily and avoid non-vegetarian food, milk, sour and sweet.^{xxxi}

Conclusion

Diseases were integral part of colonial Odia society. Some were epidemic while many were seasonal diseases equally affected Odias. But the above discussion was on the notion of indigenous people towards various diseases. Also, we have noticed, in many cases, the advertisements did bring some awareness among the people who were encouraged to fight against blind beliefs, dogmas, and superstitions regarding the ferocious diseases of the times. In other words, medicine made the people realize that diseases were not a divine curse or beyond human understanding but a medical and physiological disorder curable by human effort in the form of medicines and medical treatment.

References

- ⁱ Fakir Mohan Senapati. Fakir Mohan Granthavali (Part-2). Cuttack: Cuttack Students Store, 1963, P. 17.
- ⁱⁱ Fakir Mohan Senapati. Fakir Mohan Granthavali (Part-2). Cuttack: Cuttack Students Store, 1963, P. 93.
- ⁱⁱⁱ In 2011 the English rendering of was changed from “Orissa” to “Odisha” as per the Indian Constitution of (113th Amendment) Bill, 2010 in the Parliament.
- ^{iv} Utkal Dipika, 03.04. 1869, P. 55.
- ^v Utkal Dipika, 08.05.1869, P. 75.
- ^{vi} Ibid., P.76.
- ^{vii} Utkal Dipika, 05.06.1879.
- ^{viii} Fakir Mohan Senapati. Fakir Mohan Granthavali (Part-2). Cuttack: Cuttack Students Store, 1963, P. 92.
- ^{ix} Mayurbhanj Gazette, First Part, First Issue, October, 1931, p. 14.
- ^x Binayak Rao. Odia Chaturtha Pathya Pustak. Cuttack: Cuttack Mission Press, 1901, P. 101.
- ^{xi} Anil Kumar, Medicine and the Raj: British Medical Policy In India, 1835-1911, (New Delhi: Sage Publication, 1998), P.162.
- ^{xii} Utkal Dipika, 30th January, 1869, P.20.
- ^{xiii} Anil kumar, Medicine and The Raj: British Medical policy In India, 1835-1911, (New Delhi: Sage Publications, 1998), P.162.
- ^{xiv} Utkal Dipika, 20th February, 1869, P.35.
- ^{xv} Ibid., P.36.
- ^{xvi} Home Department, Sanitary Branch, March 1891, Progs. No. 59-60, P. 8.
- ^{xvii} Utkal Dipika, 02.01.1879.
- ^{xviii} Utkal Dipika, 08.05.1979.
- ^{xix} Utkal Dipika, 15.05.1879.
- ^{xx} Utkal Sahitya, Kartika, 1306, p. 227-233.
- ^{xxi} Fakir Mohan Senapati. Fakir Mohan Granthavali (Part-2). Cuttack: Cuttack Students Store, 1963, P.17.
- ^{xxii} Utkal Dipika, 26.06.1879.
- ^{xxiii} Utkal Dipika, Gobind Dwadasi Upalakhya Upamruta, 16.03.1877, p. 385
- ^{xxiv} Utkal Sahitya, 22nd Bhaga, Sastha Sankhya, pp. 268-269. Fakir Mohan Senapati. Fakir Mohan Granthavali, Part-1, Cuttack: Cuttack Students Store, 1963, P. 37.
- ^{xxv} Binayak Rao. Odia Chaturtha Pathya Pustak. Cuttack: Cuttack Mission Press, 1901, Pp. 123-25.
- ^{xxvi} Anil Kumar, Medicine and the Raj: British Medical policy In India, 1835-1911, (New Delhi: Sage Publications, 1998), P.170.
- ^{xxvii} Utkal Dipika, 6th February, 1875, P.26.
- ^{xxviii} Anil, Kumar, “Medicine and the Raj: British Medical Policy in India, 1835-1911”, New Delhi: Sage Publications, 1998, Pp. 178-179.
- ^{xxix} Kabita, Ray, “History of Public Health: Colonial Bengal (1921-1947), Calcutta: K P Bagchi & Company, 1998, Pp. 96-97.
- ^{xxx} Major H.W. Mulligan and Major M. K. Afridi, “The Prevention of Malaria Incidental to Engineering Construction’, New Delhi: Government of India Press, 1912, PP. 1-39.
- ^{xxxi} Biswamoy Pati and Chandni P. Nanda, “The Leprosy Patient and Society, Colonial Orissa, 1870s-1940s” in an edited book The Social History of Health and Medicine in Colonial India by Biswamoy Pati and Mark Harrison, New York: Routledge, 2009, P.114.