

## Cholera Disease in Colonial Bengal Districts: Town and Rural Areas

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**Abstract:** *Cholera also became a rapidly changing subject in biomedical science. The term dates back to the early nineteenth century. A general constitutional condition is mentioned. It will become one there was no clear idea before the specific invasive disease an aggressive agent. Towards the end of the century, cholera broke out examples of the new bacteriological theory, which defined the disease in terms of its bacterium, transformed cholera epidemiology. Here I have focused on the spread of cholera in various districts and how much affected in town and rural areas in colonial Bengal. Cholera was a laboratory science for most of the twentieth century. When laboratory and field truths collide, as they routinely develop cholera vaccines, the laboratory usually dominates - reduction and simplification to finally understand it all. It was not until the 1960s that the epidemic began to spread, that more productive interactions began to arise between fields and laboratories, ranging from molecular genetics to ecology that brought great insights into the disease but did not reduce simplicity.*

**Keywords:** Cholera, Biomedical science, Bacteriological theory, Colonial Bengal

In the 19<sup>th</sup> Century Cholera was violently destructive as an epidemic in India. It was an extremely governmental issue for British Control over the India and Crucial interaction between Colonial State and the Indigenous Society.<sup>1</sup> Cholera was one of the most formidable and fatal diseases in colonial Bengal. According to James Annesley "have excited more interest among medical men, or more terror in the mind of the Indian community at large, than the epidemic Cholera".<sup>2</sup> The Disease Cholera was a seasonal disease like Malaria. It is regularly heard of first in the outlying parts of several areas of the district and spread out to central and more highly cultivated portions. It was appeared in two separate seasons during October, November and December again during March, April and May.<sup>3</sup> But it does not occur during the rainy season. According to Hunter "Cholera would sometimes suddenly appear and carry off a few persons and then disappear with equal suddenness".<sup>4</sup> Chowkidar described the fever occur in three diseases in village areas like Cholera, Small Pox and Malaria but every mortality is not a consideration to

### Cholera.

Before 1817, one occasional disease occurred in East Indies, it was also outbreaks in Bengal. It was known as 'Mordecal' or 'Morocci', which was later identified as 'cholera'. The term 'cholera' traditionally refers to acute diarrhoea or a constitutional condition characterized by the predominance of black bile or 'cholera'. After 1817, it was sometimes accompanied by descriptors such as 'Epidemic', 'Asiatic' and 'Indian', indicating its presence in a new and more deadly form. Cholera may have co-existed year after year, making it difficult to write a continuous history of the disease. The descriptions of the 'cholera' outbreak in eighteenth-century India often bear a strong resemblance to the violent cleansing and nervous bowing and frequent deaths that occurred in 1817-21.<sup>5</sup>

All the districts suffered from inundation in Bengal. The disease was generally limited to the submerged tracts and their neighborhood and privation improper food and exposure to wet and cold are believed to have been greatly instrumental in causing the mortality. There is also no doubt that a great many of the cases set down as cholera were simply bowel complaints.<sup>6</sup>

According to a 1928 report, the total number of deaths from cholera was 1,36,245 the highest death rate was from cholera in 24 Parganas. There was a death rate was 5.1 per mile. Besides Howrah, Rajshahi, Faridpur and Dacca registered rates between 4 and 5 per mile, 5 others between 3 and 4, 11 between 2 and 3, 2 between 1 and 2 and the remaining 4 below 1.0 per mile, the lowest rate 0.4 being recorded in Darjeeling. The death rate exceeded the average decennial rate in all the districts except in Malda, Jalpaiguri, Darjeeling and Bankura.<sup>7</sup> Eight districts returned death rates above the provincial average of 1.2. Faridpur with its rate of 2.3 per mile topped the list, followed by Dacca 2.1 and Howrah 2.0. 12 other districts returned rates between 1 and 2 per mile and the remaining 12 below 1 per mile, the lowest rate 0.04 being registered in Darjeeling.

According to 1929, Cholera has spread in almost all the police stations of Burdwan district. It spread from village to village, Introduction although many cases have been imported from fairs and festivals held outside the district. Railway stations were monitored to identify suspects among the pilgrims. Instant mass inoculation prevents disease progression. Birbhum Thana, Rampurhat, Nalhati, Ilambazar, Muraroi, Khairasol, Surrey, Moireswar and Mohammad Bazar were the worst hit. The disease first appeared in Surrey, Muhammad Bazar, Bolpur and Khayrasol in early April after the Patharchapnari fair. It was also imported from Navadwip towards the end of the year. Scattered incidents, mostly due to lack of drinking water, have occurred throughout the enteritis, Banabira district. There are mild cases in Chhatna, Suntapal, Raniband, Taldangra and Bankura thana areas. However, the disease was controlled in a short time through timely disinfection, inoculation, tank storage, temporary good immersion, isolation

and treatment of cholera, and distribution of magic lanterns and leaflets and posters. Causes include lack of potable water, contamination of dry tanks and sinkholes, cholera corpses indiscriminately dumping their dirty clothes in rivers and other streams. The cholera epidemic broke out in Midnapore district, Kharagpur, Dantan, Narayangarh, Salbani and Mahishadal police stations after Puri Rath Mela in August. In Ghatal and Tamluk subdivisions, the disease was imported from cities of this name in October. Outbreaks appear to be exacerbated by cholera in Thana, Chandrakona, Salbani, Garbeta, Ghatal, Keslipur and Daspur. In Hooghly, district cholera was prevalent in Dhanyakhali and Haripal police stations in June and in Khanakul police stations in October.<sup>9</sup>

In the 24-Parganas the disease continued in some police stations from the previous year. It appeared at the end of the year under report. The cholera epidemic has been reported in Mograhat, Mathurapur, Kakdwip, Kulpi and Diamond Harbor subdivisions of Diamond Harbor, Baruipur, Bhangar, Bistupur, Joynagar and Sadar subdivisions of Canning Thana, Sarupnagar, Hasnabad, Baduria and Basirhat subdivisions. Sanitary inspectors assisted epidemiologists wherever needed in cholera-stricken villages. In Nadia, it was prevalent in all police stations of Kushtia and Chuadanga subdivisions from October to December and in Sadar and Tehatta police stations of Meherpur subdivision. In the village of Bethberia in Chapra police station, the cholera epidemic continued for a fortnight despite anti-cholera vaccinations and disinfection and did not subside until a general measure was taken. In Murshidabad, it prevails in all quarters throughout the year. The highest death rates in the city were recorded at Dhulian and Murshidabad and the lowest at Berhampur; Raghunathganj police station tops the list in rural areas and Shamsheganj police station the lowest. The highest number of deaths occurred in December, followed by November, April and October, and the lowest in June. In Khulna district, the worst epidemic is in Katepara village of Paikgachha police station in Sadar subdivision. The first information was received when about 22 attacks and 11 deaths. The epidemic did not abate even after drastic and sustained measures until 35 people died, with lower-class people stubbornly refusing to take inoculation. With the exception of a few remote villages in Ishwaripur and Kaliganj police stations, the disease has not been firmly detected in any of the villages due to the tireless efforts of sanitary inspectors in charge of rural health circles.<sup>10</sup>

In Rajshahi, the epidemic spread to several police stations and was attended by medical officers from 32 medico-sanitary centers and sanitary inspectors from 20 rural public health centers, their health assistants and Kala-azar doctors. Prophylactic inoculations have had great success in reducing mortality and testing the spread of the disease. The disease takes epidemic proportions from January to June and then from October to December. The highest death toll was 356 at Thana Baraigram, 301 at Charghat, 288 at Bagmara, 244 at Mahadevpur, 209 at Manda and 206 at

Singra. The epidemic in Pabna was less severe than the previous year; The first outbreak mainly affected Bera, Shajadpur, Taras and Raiganj police stations and was responsible for about 800 attacks and 600 deaths. It bears a more rapid response to the outbreak than the second outbreak from September to December, which was much more severe and mainly affected in Pahna, Sara, Sujanagar, Ullapara, Shahjadpur, Chouliali and Taras police stations, with 2,800 attacks and 1,800 deaths. Delays in obtaining information and opposition to wholesale inoculation often counter the success of preventive measures. Only 20 people have died and all happened in the Darjeeling district in the Siliguri subdivision, with traveling sub-assistant surgeons visiting many affected areas and distributing medicines. Scattered incidents have taken place in Adamdighi and Gabtali police stations of Bogra district. These were quickly brought under control by disinfection and inoculation. In Gabtali, it was traced to the fakirs and disappeared as soon as a case was filed against some of them. In Malda, the cholera epidemic spread in November, mainly in the southwestern part of the district and was brought under rapid control. The mortality rate among the infected was very high, with most of the deaths occurring according to the district health officer who had been suffering from malaria for months without adequate and proper quinine treatment. In many villages, only intensive quinine distribution stopped the so-called cholera outbreak when the most systematic vaccination of the whole village and disinfection of infected houses and water supply failed to test it. It was therefore assumed that most of the symptoms of cholera were not real cholera but the after-effects of malaria. The cholera epidemic was in Dinajpur district almost throughout the year, with it being the worst in the first two months. All police stations except Hematabad, Dhamairhat, Haripur and Atwari were affected. The highest death toll was 152 in Porsha and the second largest in Phulbari. Thana Porsha, Phulbari, Parbatipur and Nawabganj were responsible for 562 out of 1,147 deaths. The disease was imported last year from Porsha to Malda and to Phulbari by up-country coolies who came to work in a brick kiln in a village in Taliya. Eleven doctors, 21 sanitary inspectors and one immunization sub-inspector were appointed to deal with the epidemic. Dispensary doctors also helped. Inoculation was very popular. Dr. Samadhi's mixture was distributed among the patients. Leaflets and leaflets about cholera are distributed free of charge. Lectures were given in the Hat Bazaar and in important places. Because of the veil, Muhammad's women could only be vaccinated in a few places. Arrangements were made to vaccinate aspiring pilgrims for the Puri Rath Yatra and Snan Yatra festivals and to monitor passengers returning from Ganga Sagar and Kumbh Mela at Parbatipur, Raiganj, Dinajpur, Phulbari and Chorkai railway stations. The highest number of deaths occurred in January, February, June, October and November, with a total of 857 deaths out of 1,147 throughout the year. The disease was mainly imported from outside, especially in the coastal districts of Gaya, Puri and the country, and spread

from one village to another without any treatment, care and dieting of the patients. The death-roll is too heavy. The epidemic was prolonged by the refusal of other women in the area to vaccinate them, in addition to female contact.<sup>11</sup>

In Rangpur, an outbreak occurred in November under Jaldhaka and Domar police stations; In the beginning, very quick measures were taken to prevent the epidemic. The highest number of deaths occurred in December in Balkarganj. Barandi, Glourandi, Mehendiganj and Mathbaria police stations have been damaged. Contamination of tanks and waterways by carriers and washing of dirty clothes and contact spread the disease. A mild epidemic prevailed in Chittagong district from January to July, started in January at Patia and Raozan police stations and gradually spread to Patikchhari, Banshaliali, Mirsarai, Pachlai, Hathazari, Anwara, Maheshkali and Chakaria police stations and continued till July. The highest number of deaths occurred in April. Inoculation, disinfection of tanks and wells, infected items of clothing, latrines and vomiting items and stools, treatment of patients by epidemiologists and demonstration of the spread of the disease through discourse and display of magic lanterns. The highest death toll in the Noakhali district was 458 in Laxmipur and the lowest was 47 in Sandwip police station. In August and September, a significant number of cases were registered at Ramganj police station, the first of which was imported from Chandpur. The disease then spread to Raipur and Laxmipur. The incidence was high in Begumganj throughout the monsoon. The constant traffic jams of jute traders in Chaumohoni and other small markets of the police station helped maintain the epidemic during the monsoon season when the incidence of the disease was very low in other parts of the district. It spread from Begumganj to Sadar, Senbagh and Bamni. There were different centers of infection in different places of Feni police station and there the infection was brought partly from Begumganj and partly from the Chittagong Hill Tracts.<sup>12</sup>

According to 1930, 3,837 deaths from cholera occurred in the towns and 51,126 in the rural areas yielding death rates of 1.2 per mile for each of these areas respectively against 2.0 and 1.7 in 1929. The town rate was thus less by 40 .0 percent, and the rural rate by 29.4 percent, compared with the previous year. 36 towns returned death rates for cholera above the urban average. The highest death-rate 3.2 per mile was registered in Noakhali followed by 3.1 in Bansberia and 3.0 in Kandi. 12 other towns recorded rates between 2 and 3, 40 between 1 and 2 and 50 below 1 per mile. No death from cholera was reported from 13 towns.<sup>13</sup>

According to 1931, seven districts returned death rates above the provincial average of 1.6. Pabna with its rate of 4.8 per mile topped the list, followed by Dacca 3.5 and Faridpur 3.5. Three districts returned rates between 2 and 3 per mile and 11 districts between 1 and 2 per mile. Ten districts returned death rates from cholera below 1 per mile. The lowest rate

being .01 per mile was returned from Darjeeling. When compared with 1930 we find an increase in the death rates from cholera in 14 districts. The death rate was stationary in two districts and showed a decrease in 11 districts.<sup>14</sup>

According to 1932, nine districts returned death rates above the provincial average .7. 24-Parganas with its rate of 1.6 per mile topped the list followed by Khulna 1.5, Midnapur 1.2 and Howrah 1.1. Three districts returned rates of 1.0 per mile, nineteen districts below 1 per mile, while Darjeeling was wholly free from cholera. When compared with 1931 we find an increase in the death rates from cholera in three districts and a decrease in 21 districts. The death rate was stationary in three districts.<sup>15</sup>

Here was discussed on how much affected Town and Rural areas by cholera? In 1927, 7,212 deaths in urban areas by cholera, but here was not included deaths of rural areas. According to 1928, there were 7,288 deaths from cholera occurred in urban and 128,957 in rural areas with a death rate of 2.3 and 3.0 per mile respectively against 7,212 and 111,165 deaths with rates of 2.3 and 2.6 respectively in 1927. While there was not much difference in the town rate in the two years, the rural areas showed an excess of 15.4 percent in 1928 in its cholera rate. No case of cholera was reported from 4 towns. The highest death rate 908 per mile was returned from Netrakona, 2 other towns registered rates between 8 and 9 per mile, 6 between 6 and 7 per mile, 5 between 5 and 6 and the rest below 5.0 per mile.<sup>16</sup>

In 1931, Cholera killed 3,333 people in urban areas and 75,740 in rural areas, at rural area yielding deaths rates of 9.9 and 1.6 per mile, respectively, compared to 1.2 per mile in 1930 for each of these areas. The urban rate was, therefore, 25 percent lower than the previous year, and the rural rate increased to 33.3 percent. Cholera death rates in 43 cities are .9 higher than the urban average. Baduria and Satkhira municipalities recorded the highest death rate of 3.9 per person, followed by Narayanganj municipality at 3.4 and Sirajganj municipality at 3.1. The other seven cities recorded rates from 2 to 3, 1 to 2 in 32 cities and 58 cities below 1 per mile. Seventeen cities reported "no deaths from cholera."<sup>17</sup>

In 1932, there were 2,399 deaths from cholera in urban Bengal and 31,511 in rural areas, giving a death rate of .9 per mile and 1.6 per mile in 1931, respectively. So, the urban rate was 22.2 less than the previous year and the rural rate was 56.3 percent. The Cholera mortality rate in 28 cities is higher than the urban average which is .7. The highest mortality rate 4.9 per mile was recorded from Dhulian, followed by Rajpur Municipality at 2.4, Patuakhali at 2.3 and Tamluk, Arambagh and Bhola at 2.0 per mill. Death rates between 1 and 2 were recorded in 16 cities, with less than 1 death per mill in 72 cities and no deaths from cholera in 24 cities.<sup>18</sup>

Cholera caused 2,268 deaths in urban Bengal and 26,974 in rural areas in 1933, compared to .7 for each area in 1932, respectively. The rural rate,

therefore, is 14.3 percent lower than the previous year. Cholera mortality rates in 23 cities are higher than the urban average .6. The highest mortality rate 2.1 per mile was recorded in Kalna. Death rates between 1 and 2 were recorded in 13 cities and below one per mile in 76 cities, with no cholera deaths in 28 cities.<sup>19</sup>

Cholera killed 3,196 people in the cities and 47,546 people in the rural areas of Bengal in 1934, resulting in .9 and 1.0 deaths per mile, compared to .6 for each area in 1933. Both urban and rural rates, therefore, are 50 and 66.6 percent higher than the previous year, respectively. Thirty-five cities have higher cholera mortality rates than the urban average .9. The highest death rate 4.8 per mile was recorded in Dhulian. Two cities recorded death rates between 3 and 4, seven cities between 2 and 3, twenty-five cities between 1 and 2, and 69 cities below one per mile, while 14 cities reported no deaths from cholera.<sup>20</sup>

In 1935, there were 4,770 deaths from cholera in the cities and 54,835 in the rural areas of Bengal. Both. So, the urban and rural rates are 55 and 20 percent higher than the previous year, respectively. Thirty-two cities have higher cholera mortality rates than the urban average of 1.4. The highest mortality rate 4.5 per mile was recorded in Jhalakati (Bakarganj), followed by Halihsahar 4.2 in the 24-Parganas district. Six cities recorded deaths between 3 and 4, seventeen cities between 2 and 3, eighteen cities between 1 and 2, and 61 cities below one mile, while 15 cities reported no deaths from cholera.<sup>21</sup>

Cholera caused 1,761 deaths in urban areas and 30,949 deaths in rural Bengal in 1937 where the mortality rates were .5 and .7, respectively, as against 1.1 and 1.6 per mill in 1936. Thus, the mortality rate in urban areas was 54.5 percent lower, while in rural areas it was 56.2 percent lower than the previous year. Cholera deaths in 28 cities are higher than the urban average .5. The highest death rate 3.0 has been recorded in Navadwip Municipality. Only three cities have mortality rates between 2 and 3, 10 cities between 1 and 2, and 1 in 75 cities below 1 per mill. Thirty cities a year were free of cholera, according to the report<sup>22</sup>

Compared to the previous year, the death rate from cholera has increased in both urban and rural areas; 100 percent before, and 114.2 percent later. In cities, the total death from cholera in 1938 was 3,362, with a mortality rate of 1.0 where 1,761 people died and .5 deaths per mile. The total number of deaths from this disease in rural areas in 1938 was 67,771 with a mortality rate of 1.5 per mile which was double the previous year 30,949. In 1938, 21 cities were free of cholera, compared to 30 in 1937. Cholera mortality is lower than the city average 1.0 in 49 cities, with cholera mortality rates ranging from 1 to 2 per mile in 35 cities, 2 in 3 and 3 in 7 cities, and above 3.0 per mile in the remaining 7 cities, with Sirajganj topping the list with 4.8. It is also to be noted that due to the massive floods, the rural population temporarily

migrated very large even though it was in the adjoining urban areas, which was clearly a contributing factor to the increase in the incidence of this disease in the cities Area.<sup>23</sup>

In towns, the total deaths from cholera numbered 3,213 in 1939 with a death rate of 0.9 per mile as against 3,362 deaths and a death rate of 1.0 per mile. In the rural areas, total deaths from this disease numbering 30,008 with a death rate of 0.6 per mile in 1939 slowed down to less than half the preceding years figure 67,771 with a death rate of 1.5 per mile. Twelve towns were free from cholera in 1939 as against 21 towns in 1938. Seventy-two towns returned cholera death rates below the urban average of 0.9, 21 towns returned cholera death rates between 1.0 and 2.0 per mile, 6 towns between 2.0 and 3.0 and 2 towns above 3.0 per mile Uttarpara with 4.9 heading the list.<sup>24</sup>

The number of cholera deaths recorded in urban areas has decreased from 3,213 in 1939 to 1,859 in 1940, the rates being 0.9 and 0.5 per mile respectively. Thirty-one towns did not report even a single death from this disease. The highest rate of 3.4 per mile was returned from Patuakhali. Other towns which recorded high rates were Satkhira 3.1, Barisal 2.6, Budge-Budge 2.2 and Nalchiti 2.1. 19,884 deaths from cholera were registered in rural areas during the year under report giving a rate of 0.4 per mile as against 30,008 in the previous year with a death rate of 0.6 per mile.<sup>25</sup>

However, anti-cholera measures were adopted every year. Like as 1,001,690 c.c. of the anti-cholera vaccine was issued in 1932 and gradually increasing vaccine dose for the people. As well as 148,726 wells, 37,889 tanks were disinfected against cholera in 1932 in addition to 3,111 river ghats 7,732 houses, 1,560 dobas and 64 latrines. Besides adopted various decisions like the Inoculation of pilgrims to the Puri Rathajatra, Ganga Sagar Mela and the Haj and Assistance to the various local bodies in anti-cholera work and Magic lantern and microscopic film demonstrations together with the distribution of leaflets and posters on cholera.

#### Note and Reference: (Endnotes)

- 1 David Arnold, *Colonizing the Body: State Medicine and Epidemic Disease in 19th Century India*, 1993, Berkeley Los Angeles, University of California, p. 159
- 2 Ibid, p. 160
- 3 W. W. Hunter, *A Statistical Account of Bengal: Maldah, Rangpur and Dinajpur*, 1877, Vol. VII, New Delhi, Concept Publishing Company (P) Ltd, p. 457
- 4 Jatindra Chandra Sengupta, *West Bengal District Gazetteers: Malda*, 1969, Calcutta: Sree Saraswaty press Ltd, p. 213
- 5 Mark Harrison, *A Dreadful Scourge: Cholera in early nineteenth-century*



*India*, Book Modern Asian Studies 54, 2019, p. 507

- 6 Charles J. Jackson, *Report of the Sanitary Commissioner for Bengal for the year 1871, 1872*, Calcutta: Calcutta Central press company ltd, p.13
- 7 Dr. C.A. Bentley, *Bengal Public Health Report: for the year 1928*, Government of Bengal, Public Health Department, 1930, Calcutta: Bengal Secretariat Book Depot, p.26
- 8 Dr. R.B. Khambata, D.P.H., *Reports of the Bengal Sanitary Board and the Chief Engineer Public Health Department: For the year 1930*, Bengal Public Health Report, Public Health Department, Government of Bengal,1932, Calcutta: Bengal secretariat book depot, p.39
- 9 Dr. C.A. Bentley, C.I.E. M.B. D.P.H., *Reports of the Bengal Sanitary Board and the Chief Engineer Public Health Department: For the year 1929*, Bengal Public Health Report, Public Health Department, Government of Bengal,1930, Calcutta: Bengal secretariat book depot, pp. 60-61
- 10 Ibid, p.61
- 11 Ibid, pp.61-63
- 12 Ibid, p.63
- 13 Dr. R.B. Khambata, D.P.H., *Reports of the Bengal Sanitary Board and the Chief Engineer Public Health Department: For the year 1930*, Bengal Public Health Report, Public Health Department, Government of Bengal,1932, Calcutta: Bengal secretariat book depot, P.41
- 14 Dr. R.B. Khambata, D.P.H., *Reports of the Bengal Sanitary Board and the Chief Engineer Public Health Department: For the year 1931*, Bengal Public Health Report, Public Health Department, Government of Bengal,1933, Calcutta: Bengal secretariat book depot, p.42
- 15 Dr. R.B. Khambata, D.P.H., *Reports of the Bengal Sanitary Board and the Chief Engineer Public Health Department: For the year 1932*, Bengal Public Health Report, Public Health Department, Government of Bengal,1934, Calcutta: Bengal Government Press, p.32
- 16 Dr. C.A. Bentley, *Bengal Public Health Report: for the year 1928*, Government of Bengal, Public Health Department, 1930, Calcutta: Bengal Secretariat Book Depot, p.32
- 17 Dr. R.B. Khambata, D.P.H., *Reports of the Bengal Sanitary Board and the Chief Engineer Public Health Department: For the year 1931*, Bengal Public Health Report, Public Health Department, Government of Bengal,1933, Calcutta: Bengal secretariat book depot, P.44
- 18 Dr. R.B. Khambata, D.P.H., *Reports of the Bengal Sanitary Board and the Chief Engineer Public Health Department: For the year 1932*, Bengal Public Health Report, Public Health Department, Government of Bengal,1934, Calcutta: Bengal Government Press, p.34
- 19 Dr. R.B. Khambata, D.P.H., *Reports of the Bengal Sanitary Board and the*

- Chief Engineer Public Health Department: For the year 1933*, Bengal Public Health Report, Public Health Department, Government of Bengal, 1935, Calcutta: Bengal Government Press, p.34
- 20 Dr. R.B. Khambata, D.P.H., *Reports of the Bengal Sanitary Board and the Chief Engineer Public Health Department: For the year 1934*, Bengal Public Health Report, Public Health Department, Government of Bengal, 1936, Calcutta: Bengal Government Press, p.35
- 21 Dr. S. N. Sur, D.P.H., *Reports of the Bengal Sanitary Board and the Chief Engineer Public Health Department: For the year 1935*, Bengal Public Health Report, Public Health Department, Government of Bengal, 1937, Calcutta: Bengal Government Press, p.38
- 22 Lt.-Col. A. C. Chatterji, M.B., D.P.H., I.M.S., *Bengal Public Health Report: For the year 1937*, Bengal Public Health Report, Public Health Department, Government of Bengal, 1939, Calcutta: Bengal Government Press, p.40
- 23 Lt.-Col. A. C. Chatterji, M.B., D.P.H., I.M.S., *Bengal Public Health Report: For the year 1938*, Bengal Public Health Report, Public Health Department, Government of Bengal, 1940, Calcutta: Bengal Government Press, pp.41-42
- 24 Lt.-Col. A. C. Chatterji, M.B., D.P.H., I.M.S., *Bengal Public Health Report: For the year 1939*, Bengal Public Health Report, Public Health Department, Government of Bengal, 1941, Calcutta: Bengal Government Press, p. 42
- 25 Dr. B. Mookherji, M.B., D.P.H., *Bengal Public Health Report: For the year 1940*, Bengal Public Health Report, Public Health Department, Government of Bengal, 1942, Calcutta: Bengal Government Press, p. 44