

## **A CHRONOLOGICAL REVIEW OF COMMUNICABLE DISEASES SUFFERED BY THE ANDAMAN AND NICOBAR ISLANDERS**

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**Abstract:** Communicable diseases are known to exist since as early as humankind's hunter-gatherer days. Around 12,000 years ago, during the Neolithic period, human activities and behaviours changed with the shift to agrarian life. Communities were created and further intermixing with other communities took place, which made epidemics more likely. This shift to a settled life together with the development of densely populated agricultural communities allowed viruses to spread rapidly. Numerous such diseases appeared in Andaman and Nicobar Islands, despite it being an isolated group of islands in the Bay of Bengal. Diseases that were brought on by "civilization" since 1789, when the British East India Company began their first penal settlement, have subsequently caused epidemics that have brought much distress to the island's indigenous communities and the settlers. There are six primitive tribes in Andaman and Nicobar Islands. Four belong to Negrito race namely the Great Andamanese, Onges, Jarawas, and Sentinelese, and two belong to Mongoloid race, Shompens, and Nicobarese. The warm climatic conditions of the island and the poor hygiene and sanitation of the inhabitants trigger the multiplication of viruses and bacteria rapidly, resulting in a varied number of diseases. Some of them are syphilis, malaria which became endemic to Andaman and Nicobar Island for over a century, ophthalmia, measles (among Jarawas), smallpox, mumps, Russian flu, gonorrhoea, influenza, leptospirosis, which is infected through contact with water or moist soil that contains urine from infected animals, Andaman hemorrhagic fever, chikungunya, dengue, hookworm infection, tuberculosis, leprosy, conjunctivitis, COVID-19, etc. These have resulted in the decrease of the tribal population over time since the mid- 19th century. This effected the population figures of the indigenous tribes and has made some of them endangered. The present paper focuses on the advent of these diseases chronologically, to understand the causal factors behind their occurrence, the communities affected and their mortality rate in their respective period of occurrence, and also discusses how these diseases were controlled. It can be concluded that, the more the civilization touched the island, more intermixing between other communities, moving towards the cities, and developing trade routes to connect with the Indian mainland - eventually gave rise to epidemics and pandemics with greater likelihood.

**Keywords:** Andaman and Nicobar Islands, communicable diseases, indigenous tribes, epidemics

### **INTRODUCTION**

In human history, epidemiological and demographic changes have been associated with changes in subsistence patterns, social organization, and technological advances. (Barrett et al., 1998). The Neolithic lifestyle which began about 12000 years ago, introduced a sedentary lifestyle with plant and animal domestication as a dietary resource and transport facility. Moreover, this period was characterized by an increase in population size, accompanied by a rise of infectious diseases

compared to Mesolithic hunter-gatherers. This is because infectious agents require a certain concentration of hosts to thrive. Pathogens were able to spread easily, in over populated agricultural communities, thus, affecting entire groups and in due course reaching endemic levels. The transmission of pathogens from animals to humans were easier due to cohabitation. Thus close contact with human/animal faeces and waste also facilitated infection because of contaminated water sources. Unbalanced diets and less physical activity of tend to weaken humans immune system, resultng in reduced resistance to infections.

Infectious diseases or transmissible diseases are also known as communicable diseases that pass from person to person through a pathogen. These pathogens that cause these diseases can spread in various ways, such as through the air, contact with infected persons, contact with contaminated substances or surfaces, or from animal and insect bites. Infections may range in severity from asymptomatic (without symptoms) to severe and sometimes fatal. Some examples of communicable diseases include HIV, hepatitis A, B and C, measles, and blood-borne illnesses. The most common forms of spread include fecal-oral, food, sexual intercourse, insect bites, contact with a contaminated surface, droplets, or skin contact.

### **THE ISLAND**

The Andaman and Nicobar Islands, the Union Territory of India, are a group of Islands situated in the Bay of Bengal. The Islands are known to have humid, tropical, and coastal climate. The temperature of the Andaman and Nicobar Islands remains uniform almost all through the year with a prolonged rainy season. The Islands are home to six indigenous tribes and many communities from mainland India. Four tribes belong to Negrito race namely the Great Andamanese, Onges, Jarawas and Sentinelese, and two groups belong to the Mongoloid race, namely the Shompens and Nicobarese reside. These tribals together comprises of only 7.5 percent of the island's population and the Nicobarese constituting more than 95 percent of the tribal population of Andaman and Nicobar Islands (Census, 2011). These indigenous tribes lived for years in the Andaman and Nicobar Islands with virtually no contact with the outside world until the establishment of a penal colony. There are settlers brought during colonization from Mainland India. They are Bengali, Tamil, Telugu, tribals from Bihar- the Ranchi tribals and also Kerela.

### **THE PAST**

In the history of European colonization in Andaman and Nicobar Islands, Danish settlers of the Danish East India Company arrived at the Nicobar Islands on 12 December 1755. In the Nicobar Islands, the Danish colony was made on 1 January 1756 and was first given the name 'New Denmark'. The hot, humid climate and high mortality rate of the islanders led to its closure in 1796 and was entirely wiped out by 1848.

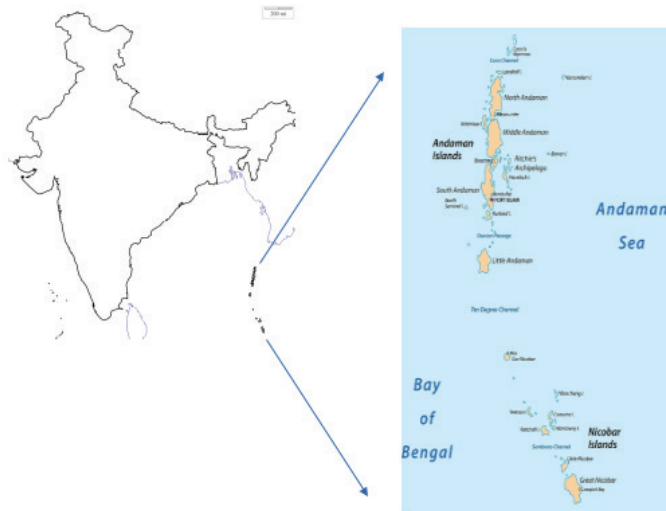
The British then established their colony in Andaman and Nicobar Islands in 1789

but abandoned the islands due to malaria. In the 19th century, the British lay down their first colony on Chatham Island with 12 acres of land. Here the British Government in India again started a penal settlement at South Andaman, in 1858 which was named Port Blair. Freedom fighters, convicted of crime against the East India Company were sent to Andaman and Nicobar Islands, with a life sentence, and were forced to live in exile. The Britishers forced the convicts to clear the forest, which disturbed the forest dwelling, hunter-gatherer tribes. They fought against the Britishers for their freedom, the first in the history of Andaman and Nicobar Islands, “The Battle of Aberdeen” took place on 17th May 1859. The indigenous tribes were defeated and were forced to work as slaves.

The British wanted to civilize these hunter-gatherer tribes by changing their hunter-gatherer lifestyle by force. Therefore, they were made to settle in homes and the first institution named the ‘Andaman Homes’ came up in 1863 to divert them from hunting and gathering. By 1890 there were 15 Homes. Andaman orphanage was set up in 1869 where the children were kept. These tribes were trained in newer activities such as agriculture, which they could never accustom. They were given jobs in government sectors as guards, manual, and other dangerous expeditions, thus making them to forget their roots.

The climate of the Island is also considered to be unhealthy because of the heavy rains, and the contact with the outsiders instigated a lot of diseases among the native people. As mentioned by Portman (1899), that epidemics and endemics were initially absent from the Andaman Islands. The Britishers brought with them a variety of pathogens and these hunter-gatherers who had stayed in isolation, had no immunity to fight against the foreign disease-causing agents.

**Figure 1: Andaman and Nicobar group of Islands.**



Source: <https://www.worldatlas.com/islands/andaman-and-nicobar-islands.html>

The paper reviews the diverse diseases suffered by the islanders through time which gives a vivid idea of the nature and the progression of infections that will help modify the medical interventions and improve the health conditions of the islanders as the infections are likely to spread faster in an Island situation.

### THE DISEASES

The varied diseases suffered by the indigenous tribes is chronologically summarized in Table 1, since the advent of the Britishers in the Andaman and Nicobar Islands,

**TABLE-1: YEAR OF THE OCCURRENCE OF DISEASES IN ANDAMAN AND NICOBAR ISLANDS.**

| SI No. | Year of occurrences | Diseases  |
|--------|---------------------|---|
| 1.     | 1796                | Unknown diseases                                |
| 2.     | 1751-1848           | Malaria (Nicobar Islands)                       |
| 3.     | 1858-1868           | Pneumonia (Great Andamanese)                    |
| 4.     | 1875                | Syphilis (Great Andamanese)                     |
| 5.     | 1876                | Ophthalmia (Great Andamanese)                   |
| 6.     | 1877                | Measles (Great Andamanese)                      |
| 7.     | 1877-1878           | Mumps   |
| 8.     | 1890                | Russian Influenza                               |
| 9.     | 1892                | Gonorrhea                                       |
| 10.    | 1896                | Influenza                                       |
| 11.    | 1929                | Leptospirosis                                   |
| 12.    | 1968                | Pneumonia                                       |
| 13.    | 1988-2006           | Andaman hemorrhagic fever                       |
| 14.    | 1998-2002           | Malaria, mumps, pneumonia, Hepatitis B (Jarawa) |
| 15.    | 1999 and 2006       | Measles (among Jarawas)                         |
| 16.    | 2006                | Chikungunya (Locals)                            |
| 17.    | 2009                | Dengue  |
| 18.    | 2012                | Chelonitoxism (Nicobarese)                      |
| 19.    | 2013                | Hand, foot, and mouth disease (locals)          |
| 20.    | 2017                | Hookworm infection                              |
| 21.    | 2001-present        | Diarrhoea                                       |
| 22.    | 2020                | Covid -19                                       |

### *Malaria*

The Islands were repeatedly abandoned by Britishers due to outbreaks of malaria

between 14 April 1759 to 1834 in the Nicobar Islands, and ultimately in 1848 that drove out the Britishers, (Dhingra, 2005). Malaria has been endemic in Andaman and Nicobar Islands for nearly three centuries and is caused by the *Anopheles epiroticus* (An. *sundaicus*) mosquito (Alam, et al., 2006). In 1859 during penal settlement, malaria mortality was as high as 630 deaths per 1000 per year. These mosquitoes breed both in fresh and brackish water and were the vector of malaria parasites recorded in the Andaman Islands in that period. *Plasmodium vivax* and *Plasmodium falciparum* are predominant malaria-causing parasites in Andaman and Nicobar Islands, but the occurrence of *Plasmodium knowlesi* has also been reported in the islands. Quinine was the only effective therapeutic medicine in those days to suppress malaria.

Malarial fevers among the Islanders occur around June during the southwest monsoon which brings heavy rains to the Island. The intermittent form of malarial fever that is present only for several hours during the day is more common and was suffered by 91% of the population, followed by the remitted form characterized by daily fluctuations of fever exceeding 102 °C, but fever at no time touches normally.

### ***Pneumonia***

From 1858 to 1868, the rainfall was less than normal and there was high wind speed. In this period, the most fatal disease of the Great Andamanese was Pneumonia. The virulent epidemic form developed in these years and therefore chronic bronchitis was responsible for 90 percent of the then-fatal cases. The common causes of viral pneumonia are influenza or respiratory syncytial virus (RSV) and a common cause of bacterial pneumonia is *Streptococcus pneumoniae* (pneumococcus). It spreads through coughs and sneezes as these launch tiny droplets of fluid-containing germs into the air and affects individuals exposed to this infectious environment.

### ***Syphilis***

At the Andaman Home, in January 1875, a British officer-in-charge of the Andamanese people detected an unusual sore of a woman but ignored it. After a year, several islanders at the home of Viper Island were found suffering from sores. They were quarantined in an empty shed and after inspection; most of them who stayed in the homes had the same symptoms of an unfamiliar disease. It was an outbreak of syphilis. It is a bacterial infection and starts as a painless sore on the genitals, rectum, or mouth and spreads from one person to another through the skin or mucous membrane or contact with these sores.

The infection appeared to reduce, but later the children were infected which implied that the infection was present even earlier. Shortly, syphilis was not merely confined to the Homes but had spread even among the other islanders of distant villages. In the late 1980s, there was again an outbreak of syphilis.

Certain measures were taken to control the spread of the syphilis epidemic. The infected were asked to stay away from their partners, were told to keep themselves clean, and were instructed to bathe frequently. A special hospital and a well-ventilated barrack, with concrete flooring, were constructed for their treatment. Social workers were sent to other areas far away to bring syphilitic cases for treatment to these treatment centers.

### *Ophthalmia*

In July 1876, another epidemic broke out, ophthalmia and the Great Andamanese were affected. The infection may be caused by bacteria, chlamydia, or virus. It is an inflammation of the eye and resulted in the blocking of the eyeball. The symptoms include watering of the eye, redness, swelling, itching, and burning. A feeling of irritation under the eyelids is also felt.

Ophthalmia resulted in leaving many islanders partially or entirely blind. Cases of syphilis too continued to increase during this period. According to the Annual Report of 1876-77 by E.H. Mann, 54 patients were admitted to the hospital where seven of them died, five stayed under treatment, and 32 of them were discharged. There was no record of the others and were said to run away as these indigenes chose to live freely in distant jungles and suffer alone rather than take medical aid. They were not habituated to a disciplined life and detention for a long course of treatment at the hospital. They wanted to live in the jungles.

### *Measles*

In March 1877, another deadly epidemic broke out when a batch of convicts from Madras brought measles to Ross Island. First, the children at the Andaman Orphanage were infected, then the rest of the Great Andamanese. Caused by *morbillivirus*, it is found to occur during the winter and spring season, it spreads from one person to another through direct contact with discharge from the nose and throat. It even spreads through airborne droplets (cough or sneeze) from an infected child. Within a month, 100 cases were reported at the hospital and after another six weeks, 51 of 184 patients who were admitted were dead. E.H. Man in his Annual Report of 1876-77, said ‘ that at the Viper Home, 71 Andamanese suffered and six of them died. Out of 43 syphilitic patients, ten died. Among the visitors in the hospital, 77 were attacked and 37 died. Those who remained in the jungle and self-treated themselves were better as out of the 350 patients suffering from measles, 56 died. The measles epidemic was so dangerous that the Andamanese population in the Great Andaman died from its effects and was reduced to half. All the people inhabiting the west coast of South Andaman between Port Campbell and the Middle Straits died.

M. V. Portman (1899) officer-in-charge of the Andaman Home wrote that

measles was highly epidemic and had spread rapidly from one end of the Great Andaman to the other, affecting all the indigenous tribes except the Jarawa. The outbreak of measles among the Great Andamanese was the result of the negligence of the officer in charge of the Andaman Orphanage and the medical staff at Ross Island and the male population decreased to almost nil.

### *Mumps*

The Great Andamanese were affected by yet another epidemic - mumps. Mumps is a very contagious disease caused by a virus and causes painful swelling of the salivary glands, especially the parotid glands (between the ear and the jaw). It has flu-like symptoms and starts with a few days of fever, headache, muscle aches, tiredness, and loss of appetite.

### *Russian Influenza*

In April 1890, Russian Influenza broke out taking the lives of over one million people from all over the world from 1889–1890. It was declared a pandemic and was often referred to as the Asiatic flu. On the Island, about 38 indigenes and the last member of the Rutland Island sect were dead by June. Towards the end of July, there were only a few survivors between Port Blair (South Andaman) and Rangat (Middle Andaman).

### *Gonorrhoea*

In 1892 there was an attack of gonorrhoea and the Andamanese had declined by 83 percent. Gonorrhoea is an infection caused by a sexually transmitted bacterium that infects both males and females. Epidemics continued to resume on the island and in 1896, most of the islanders suffered from influenza, with flu-like symptoms but highly contagious.

These continued infections and epidemics of the Great Andamanese lowered their fertility. There were 11 births and 38 deaths at the Homes in 1884-85. But the newborns hardly survived. Portman (1899) reported that the mother was always sent to the jungle to be confined, as the very small babies seem to be better in those surroundings. The children who survived were affected by hereditary syphilis and in their tenth or eleventh year, they develop it as hip disease. Therefore, it was assumed that the Andamanese suffered from syphilis even before 1873 (Portman, 1899). In 1890, there were 20 deaths but no birth at the Andaman Homes.

### *Leptospirosis*

At the end of the nineteenth century another highly endemic disease, leptospirosis appeared in the history of the Andamans. During 1890- 1930 there have been several instances of the disease with high fever, jaundice, and hemorrhagic tendencies, but

there was no record of the existence of the disease after the 1930s. In a study by RMRC (ICMR), Sehgal et al. 1998 showed the prevalence of leptospirosis among the Nicobarese, Shompens, Onge, and the Great Andamanese (Sehgal, 1999). It became an important public health problem in the Andaman Islands. The bacteria *Leptospira* causes leptospirosis and can be found in marsh areas. These pathogens form aquatic biofilms and adhere to surfaces of ponds, rivers, puddles, sewers, agricultural fields, and moist soil by excreting a slimy, glue-like substance. and includes algae, protozoa, and other microorganisms. This slimy substance aids their survival in the environment and the suffering lasts for several years. When the bacteria enter an animal, it circulates in the bloodstream and colonizes in the kidneys. The animal does not experience significant ill effects but continuously sheds bacteria in the urine. When humans walk barefoot and come in contact with the moist soil that contains urine from infected animals, the bacteria enter through cuts, abrasions, or contact with the mucous membrane of the body (e.g. mouth, nose, and eyes), they suffer from leptospirosis. Without treatment, leptospirosis leads to kidney and liver problems. Research had been carried out on the possibility of the existence of Weil's disease in the Andaman Islands during the early 20<sup>th</sup> century. The first report of a series of confirmed cases of leptospirosis that occurred in 1929 was published in 1931 (Vijayachari et al., 2015).

### *Andaman Hemorrhagic Fever*

Outbreaks of a febrile illness continued to occur in the Andamans since 1988, with pulmonary infections and high fatality. This disease was referred to as Andaman Hemorrhagic Fever (AHF) by local medical professionals. The etiology of the disease remained unidentified till 1993. Investigations were carried out by the Center during an outbreak of AHF at Diglipur in North Andaman in 1993. The outbreak indicated the possibility of leptospirosis again, though the clinical features were very different. With the medical history of the islands along with the epidemiological features of the disease, the Center could establish that AHF was a clinical variant of leptospirosis. This diagnostic demystification of AHF was the turning point in the history of the Centre and several community-based studies conducted later showed the disease is highly endemic in Andaman. Andaman Haemorrhagic Fever has been a mysterious disease in the islands for several years and the investigations showed that it was due to leptospirosis that occurred earlier in 1929.

The Jarawas of the Andaman Islands made contact with outsiders and were free from contagious diseases. They made their first contact with the settlers residing in their neighbourhood in October 1997, after a boy was treated in G B Pant hospital for a broken leg and was cured. After they first stepped out of their remote forest habitat, to make friendly contact with the neighbouring settlers, were they afflicted with a severe epidemic of malaria (Das, 2005), mumps, pneumonia, Hepatitis B and measles, and also other infections like severe skin diseases, one year since



***Measles (Jarawa)***

The Jarawa suffered outbreaks of measles twice, in 1999 and 2006. The disease had wiped out many tribes worldwide following contact with outsiders and it was feared that measles could wipe them out too as they are particularly vulnerable. In 2006, medical aid was provided and seven Jarawa children had been admitted to the hospital. As the medical response was competent, and the possibility that the tribe has some immunity derived from the earlier epidemic in 1999, it did not turn deadly as was in the case of the Great Andamanese where half the population was wiped out.

***Broncho-pneumonia***

After the measles epidemic, broncho-pneumonia is a common complication as also conjunctivitis. People with fewer immune systems develop a dangerous variety of pneumonia which is sometimes fatal. Most of the Jarawa suffered from upper respiratory tract infections. August 16th, 2006, the first death was reported, when a young Jarawa woman died due to acute broncho-pneumonia congestion. After another, around 30 Jarawa were admitted to the G B Pant Hospital. By the end of September, 59 Jarawa of an estimated population of 300 were in hospital suffering from measles and post-measles pneumonia infections.

It was never proved how the infections reached the forest people, however, there is also a possibility that pockets of infection exist deep in the forest and the indigenes get infected with measles from time to time. The outbreak of the disease might also be an outcome of the contact made with the hostile community, which had always avoided interaction with the outside world which caused much damage and even death to the members.

***Hepatitis B***

Hepatitis B infection is one of the major public health problems and is hyper-endemic among the tribes of these islands. The prevalence of hepatitis B surface antigen (HBsAg) ranged from 23% among the Nicobarese to 66% among the Jarawa (Murhekar, 2000, 2008). Among the Nicobarese, there were no risk factors significantly associated with HBV infection. According to the study, almost 20 percent of the women in the reproductive age group were positive for HBsAg, which indicates the possibility of vertical transmission of Hepatitis B infection among the Nicobarese. High HBsAg prevalence among pregnant mothers (20.5%) in the study reveals a linear increase in the age-specific rates of HBV exposure and the occurrence of HBsAg-positive individuals in every family suggested a combination of perinatal and horizontal transmission among the Nicobarese'. Molecular studies of HBV isolates from the Onges, Nicobarese, and Great Andamanese indicated a predominance of genotype D and there was a close similarity between these isolates

and isolates from mainland India, suggesting that HBV may have been introduced from mainland India. Due to its high prevalence rate, the hepatitis B vaccine is regularly included in the childhood vaccination program in these islands.

### *Chikungunya*

In July and August 2006, an increase in the number of cases of febrile illness among the residents of Port Blair was observed. Most of the patients had associated joint pain. There was an outbreak of Chikungunya in Mainland India in that period. According to a study by Regional Medical Research Centre (ICMR), blood samples were collected from these patients and serum samples were separated and sent to the National Institute of Virology, Pune, for detection of anti-chikungunya virus (CHIKV) immunoglobulin M (IgM) antibodies (Sathya, et al., 2007). CHIKV infection was confirmed among 15 of 17 patients (Manimunda, 2007). Aedes mosquitoes were found to be the vectors of the disease and showed widespread infestation. Mosquito breeding site elimination along with other vector control measures, awareness, etc, were taken to contain the outbreak.

### *Dengue*

Several patients in June–December 2010 with dengue fever (DF) were detected which was not reported prior to that. The illness was associated with headache, retro-orbital pain, rash, muscle pain, and pain in the joints. They were tested and 15.5 percent were found to be positive. This study showed that DF is emerging as an important public health problem on the island. The presence of Aedes mosquito is widespread in the islands and there is a strong likelihood that outbreaks would emerge in the future if not controlled. Illnesses, ranging from febrile illness to severe and fatal syndromes such as dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) is caused (Pandey, 2008). Multiple serotypes of the virus exist in the islands and it increases the risk of DHF and DSS therefore, future dengue outbreaks could lead to increased morbidity and mortality.

### *Chelonitoxism*

Chelonitoxism is a seafood poisoning that usually occurs due to the consumption of marine turtle flesh. The chemistry of the toxin is still unknown, so an antidote for chelonitoxism is still unknown. The symptoms vary from common gastrointestinal symptoms to neurological manifestations and even death. A case report of community poisoning among the Nicobarese, caused by consumption of turtle meat and resulted in the death of an adult male of 56 years in August 2012. The symptoms were, common gastrointestinal problem after one day of ingestion of green turtle flesh and later developed neurological symptoms and did not respond to symptomatic treatment and expired after four days. Wildlife protection acts, banned

the catching of turtle and making them a source of food still it is quite common in coastal areas of the Andaman and Nicobar Islands. Monitoring and follow-up of food-borne health education protocols should be implemented to avoid such incidents in the future.

### ***Hand, foot, and mouth disease***

Yet another disease characterized by rashes on the hands, feet, and mouth, hand, foot, and mouth (HFMD) usually affects children and is most commonly caused by Enterovirus-A (EV-A) species. There are severe complications, and deaths have been reported rarely. In 2013, cases of HFMD were reported from various hospitals in Port Blair. 246 patients were clinically diagnosed. Maximum (99.2%) cases were reported from the South Andaman district. (Palani, 2018). HFMD, being one of the new illnesses, is a hazard to the public health of the Andaman population, especially to children. Surveillance and public health awareness would help to keep the infection localized to prevent future outbreaks.

### ***Hookworm disease***

Hookworm disease is common in the Andaman and Nicobar Islands and is one of the most common parasitic roundworm infections of the intestines. This disease occurs when people defecate in the open and the moisture in the soil is most favorable for hookworm eggs to develop into larvae until they come into the contact with human skin. When stepped on it by barefoot, the larvae enter the skin, travel through the bloodstream, and enter the lungs, windpipe, and small intestine

Hookworms cause ulceration of the intestine leading to bleeding, which in turn leads to anemia characterized by low hemoglobin, which can even lead to heart failure in severe cases. Children suffering from hookworm infections experience slow physical growth and mental development due to a deficiency of iron and protein.

### ***Diarrhoea***

The incidence of diarrhea in Andaman and Nicobar Islands continued for a long period from 2001 to the present day. Rotavirus is the most common cause of severe diarrhoea on the Island (Reesu, 2013). An outbreak of diarrheal disease caused by GARV, the G2P genotype, was reported among the children of a temporary relief camp of the Nicobarese affected by the Tsunami of 2004 (Roy et al., 2009). Apart from Nicobar, children suffering from diarrhoea have been reported in other parts of the islands.

### ***COVID-19***

The first case of COVID-19 was detected in the Andaman and Nicobar Islands on 24th March 2020 with 78 deaths. Though the virus dangerously affected the world

population, the Islands' Administration had successfully managed the outbreak. The indigenous tribes and the Islanders were more vulnerable to infections because of their low immunity and it was a matter of great distress when ten individuals of the Great Andamanese tribes were infected with the Coronavirus. The Andaman Administration had strictly followed all pandemic protocols to control the infection from spreading and stopped the entry of non-islanders. This might be because the previous infections since history have allowed the authorities to rethink and handle the case of an Island situation that enabled them to restrict the deadly infection successfully.

### CONCLUSION

The indigenous Andaman Islanders descended from one of the founder populations of modern humans, who migrated out of Africa about 75,000 years ago to populate South Asia, Southeast Asia, New Guinea, and Australia (Barik, et. al., 2008). Two groups of tribes live in the Andaman and Nicobar Islands. One shares the physical features with African pygmies, the other similarly featured Asian people (Tamang, 2012), and the other share the physical features with the Chinese, Malays, and Burmese. They protected themselves from strange diseases, unknown to them and other harm that the outsiders could bring by killing anyone who landed in their territory. The islanders had thrived in the harsh terrain for ages, with their ancient way of living- hunting and gathering for food and leading a simple life, were suddenly wiped out by the touch of civilization and so-called development.

Numerous diseases came and went for several years which made their continued existence a dilemma. The most alarming example is that of the Great Andamanese whose population decreased and hundreds of them died in epidemics of pneumonia in 1868, a measles epidemic in 1877, and, later, syphilis reduced them to half in less than 40 years of contact with the outsiders and by the 1931 census they were only 90. The population of the Onge too is alarming and the persistent efforts to assimilate the Jarawa into the modern world would push them toward destruction.

Malaria has been endemic to Andaman and Nicobar Archipelago for over three centuries, and caused severe illness for the indigenous tribes. However, the cases were observed to decline during the past few years. Malaria transmission is being suppressed through effective interventions but is likely to resurge if these measures are not continued. Bioenvironmental control strategy, especially through the use of larvivorous fishes was the main contributory factor for the cases to decline.

Improvements in sanitation also lower the occurrence of rotavirus infection in children, but successful vaccination is the best option to reduce disease burden and mortality. Walking barefoot or not touching the soil or sand with bare hands, especially in areas that might have faeces in the soil is recommended though it cannot be maintained among the tribes, to reduce hookworm infections. Regular health checkups would help them recover if infected, using better sewage disposal

systems and reducing open human defecation, drinking safe water, practicing proper handwashing, and improving sanitation can reduce the number of infections. The probable reason for the emergence of HFMD, Chikungunia, etc., in the Andaman Islands, could be the influx of tourists from mainland India.

The Regional Medical Research Centre and Directorate of Health Services, Andaman and Nicobar Administration, has undertaken a comprehensive community-based survey to assess the impact of chikungunya fever and *Aedes* infestation levels. They have been doing applied field research to prevent future outbreaks of chikungunya fever, as well as dengue fever and SARS-CoV-2 (the virus that causes COVID-19). The outbreak could be a warning about preparedness for health authorities to control future infections. Prevention is always better than cure.

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