Trend Analysis of the Diseases - Dengue, Malaria, Leptospirosis, Cholera and Scrub Typhus for the State of Kerala

Aparna Ajith[a], Tina Sam[a], Susmitha K Sudarsan[a], Antony Stanley[b]

a. Government Medical College Trivandrum;
b. Department of Community Medicine, Government Medical College Trivandrum*

ABSTRACT

Published on 30th June 2017

Our study aims to trend analysis of the communicable diseases such as Dengue, Malaria, Leptospirosis, Cholera and Scrub Typhus scenario of the state of Kerala in the years 2013 -2015. The unique model of Kerala state is witnessing newer challenges in its public health arena. The rapidly increasing migrant workforce from relatively poorer states of India, rapid urbanization and its consequent stress on public health, unsolved issues of urban waste disposal, re-emergence of many communicable diseases like malaria and of many zoonotic diseases like scrub typhus and vector born disease such as dengue. Scrub Typhus has the major burden among the communicable disease in which the number of cases increases from 18 (2013), 433 (2014), 1098 (2015) respectively, Leptospirosis increases from 2013 (800), 2014 (1075), 2015 (1098). In case of dengue the cases decrease from 2013 (6000) to 2014 (2000) then a slight increase in the year 2015 (4000). Malaria cases increase from 2013 (1600) to 2014 (1800) decrease to 2015 (1500). In case of cholera the number of cases reduced drastically from 2013 (20) to 2014 (8) to 2015 (1). Outbreak of these communicable disease need investigations by the Department of Health and Family Welfare and the local bodies looks this matter seriously; appropriate measures such as vector control and public education about the disease and its mode of transfer should be addressed.

Keywords: Trend Analysis, Communicable Diseases, Cause Analysis

*See End Note for complete author details

INTRODUCTION

Kerala State, situated at the South Western corner of India, and is unique in many ways. It has a highly literate society, with a population of 3.34 cores, and has a high sex ratio of 1061, birth and death rates are very low compared to other Indian states, and Infant Mortality, Maternal mortality rate and improving life expectancy are at par with the most advanced countries. The population is rapidly declining the rate of growth, an advanced literacy and education, a slowly reducing mortality. Poor sanitation and hygiene, inadequate garbage disposal and drainage facilities are the most critical routes of transmission of infectious diseases. This leads to a high rate of communicable diseases including dengue fever, malaria, leptospirosis, cholera and scrub typhus. The influx of the large number of migrant workers from backward states of India, where many diseases like Malaria, Cholera, etc., are endemic is a major reason. Rapid urbanization of rural villages into modern cities with congested dwelling places, shortages of safe drinking water, poor sewage disposal system, compromised waste disposal facilities-ideal situation for disease such as Leptospirosis and typhoid. Organized resistance of pre-urban or rural populace against urban waste dumping into their backyards is further aggravating the urban waste disposal. The mobile population, in relation to various socioeconomic activities like higher education, trade, and businesses, tourism, pilgrimage factor is favouring waterborne, vector-borne and food borne infections.

Changing dietary habits, burgeoning vehicular traffic, substance abuse coupled with highly stressful life style. Many of the communicable and non-communicable diseases currently having a high prevalence in the state can be traced to some of the risk factors mentioned.

Cite this article as: Ajith A, Sam T, Sudarsan SK, Stanley A. Trend Analysis of the Diseases - Dengue, Malaria, Leptospirosis, Cholera and Scrub Typhus for the State of Kerala. Kerala Medical Journal. 2017;10(2):5–14.

Corresponding Author:
Dr Tina Sam, MBBS Student, Government Medical College Trivandrum
E-mail: tina11zam@gmail.com

OBJECTIVE

Primary Objective: To analyse the trends of communicable diseases such as Dengue, Malaria, Leptospirosis, Cholera and Scrub Typhus scenario of the state of Kerala in the years 2013-2015.

REVIEW OF LITERATURE

MALARIA

Malaria **(figure 1)** is a potentially life threatening parasitic disease caused by parasites known as *Plasmodium viviax (P. vivax), Plasmodium falciparum (P. falciparum), Plasmodium malariae (P. malaria)* and *Plasmodium ovale (P. oval)*

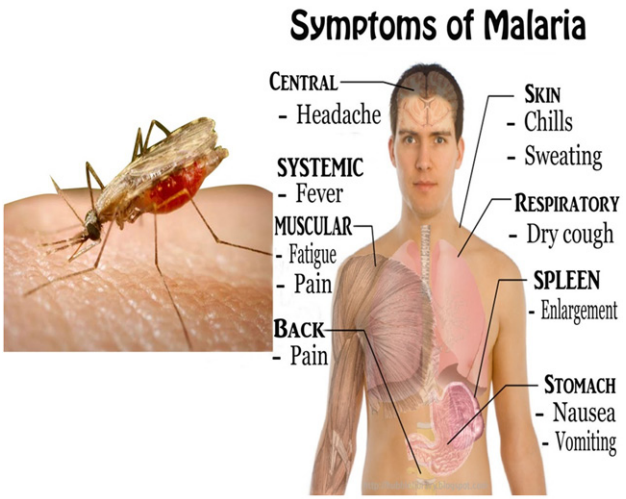

Figure 1. **Symptoms of Malaria**

- It is transmitted by the infective bite of the *Anopheles mosquito*
- Man develops disease after 10 to 14 days of being bitten by an infective mosquito
- There are two types of parasites of human malaria, *Plasmodium vivax, P. falciparum*, which are commonly reported from India.
- Inside the human host, the parasite undergoes a series of changes as part of its complex life cycle. (Plasmodium is a protozoan parasite)
- The parasite completes life cycle in liver cells (pre-erythrocytic schizogony) and red blood cells (erythrocytes schizogony
- Infection with *P. falciparum* is the most deadly form of malaria.

Magnitude of Problem in Kerala:

Malaria was successfully eradicated from the state in 1965. But the resurgence occurred in the state after a few years following the importation of cases from other endemic states coupled with the slow and gradual build-up of vector population in the absence of Indoor Residual Sprays (IRS).

DENGUE

Figure 2. **Aedes Aegypti Mosquito**

Dengue is a viral disease. It is transmitted by the infective bite of the Aedes Aegypti mosquito **(figure 2).** Man develops disease after 5-6 days of being bitten by an infective mosquito. It occurs in two forms: Dengue Fever and Dengue Hemorrhagic Fever (DHF). Dengue Fever is a severe, flu-like illness. Dengue Hemorrhagic Fever (DHF) is a more severe form of disease, which may cause death.

India is one of the seven identified countries in the South-East Asia region regularly reporting incidence of DF/DHF outbreaks and may soon transform into a major niche for dengue infection in the near future. The first confirmed report of dengue infection in India dates back to 1940s, and since then more and more new states have been reporting the disease which mostly strikes in epidemic proportions often inflicting heavy morbidity and mortality, in both urban and rural environments.[3] Several fatal forms of the disease i.e., DHF, DSS have been reported in India from time to time in Kolkata, Delhi, and Chennai.[4-7] Until mid-1990s, dengue was reported from only three of the four South Indian states, namely, Andhra Pradesh, Karnataka and Tamil Nadu. All the four serotypes of the virus have been in circulation and documented in Tamil Nadu.[8] Since then, Kerala too, has reported annual epidemics.

Magnitude of Problem in Kerala:

Dengue was reported for the first time in Kerala in1997. Subsequently, it spread far and wide and now it has become endemic in certain areas especially in Thiruvananthapuram district. Aedes aegypti and Aedes albopictus are the vectors of dengue. The former is considered globally as the epidemic vector while the latter is recognized as the secondary vector. The presence of Aedes aegypti has been noticed in few districts namely

Figure 3. **How Leptospirosis is spread?**

Thiruvananthapuram, Ernakulam, Kozhikode and Kannur. But, Aedes albopictus is widely distributed in the state.

The dengue fever, which surfaced as a new problem in the state in 1997, assumed epidemic proportion in 2003 and resulted in 3546 cases and 35 deaths. The dengue fever has now almost become perennial in some districts of the state. Although the dengue cases are reported from all the districts in Kerala, Trivandrum, Idukki, Kottayam and, Kannur have reported more cases than the other districts.

LEPTOSPIROSIS

Leptospirosis is essentially an animal disease caused by several serotypes of Leptospira (spirochetes) and transmitted to man under certain environmental conditions.

The disease manifestation ranges in severity from a mild febrile illness to severe and sometimes fatal disease with liver and kidney involvement. Leptospirosis which started as an isolated public health problem of some of the waterlogged areas of Alappuzha and Kottayam districts in the 1990 has become a public health problem of all districts of Kerala during the last decade. This communicable disease is causing the highest number of deaths consistently for the last few years in the state. Although it showed a little decline during the last year, leptospirosis caused more than 100 deaths every year during the past few years. The young male adults especially of the labour class getting affected are an area of serious concern. The presence of a wide range of rodent and non-rodent reservoir hosts along with a favorable environment makes most parts of Kerala vulnerable to leptospirosis.

In India leptospirosis is predominant in South India. The ecological and environmental factors including heavy monsoon seasons, intermittent rains, and waterlogging create a favourable environment for the spread of leptospirosis in Kerala **(figure 3)**. The waterlogged areas force the rodent population to abandon their burrows and contaminate the stagnant water by their urine. Although rats are mainly noted as the carrier host, worldwide, other nonrodent reservoir hosts including cattle, rabbits and other various domestic animals are reported as the carriers of the organism. Epidemiological research studies for identifying the major carrier hosts and common mode of spread is warranted in Kerala settings. This will enable us to design relevant and appropriate control and preventive strategies more effectively

Magnitude of Problem in Kerala:

Leptospirosis which started as an isolated public health problem in some waterlogged areas of Alappuzha and Kottayam district in 1990 has become a public health problem of all the districts of Kerala during the past decade. This communicable disease is causing the highest number of deaths for the last few years in the state. The young male adults, especially of the labour class, getting affected are an area of serious concern affecting the active work force and creating economic issues..

CHOLERA

Cholera is an acute diarrhoeal disease caused by *Vibrio cholera* O1 (classical or El tor) and O139. Cases ranges from symptoms of severe infection. The majority of infections reported are mild or asymptomatic. Typical cases are characterized by sudden onset of profuse effortless watery diarrhea followed by vomiting, rapid dehydration, muscle cramps and suppression of urine.

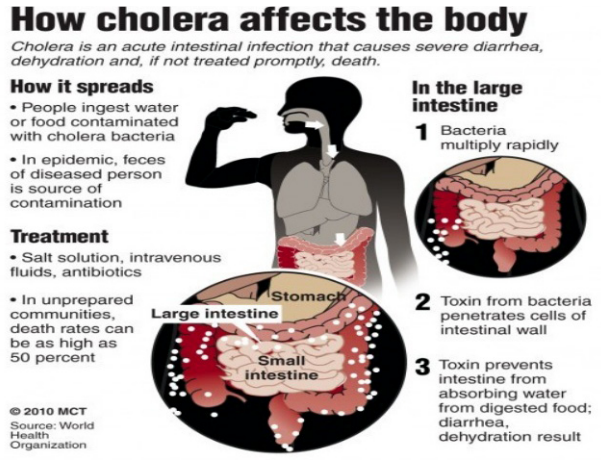

Figure 4. **How Cholera affects the body**

Unless rapid replacement of fluid and electrolyte the case fatality may be as high as 30-40%. Cholera is an extremely virulent disease that can cause severe acute watery diarrhoea **(figure 4)**. It takes between 12 hours and 5 days for a person to show symptoms after ingesting contaminated food or water.[2] Cholera affects both children and adults and can kill within hours if untreated.

Most people infected with *V. cholerae* do not develop any symptoms, although the bacteria are present in their faeces for 1-10 days after infection and are shed back into the environment, potentially infecting other people.

Among people who develop symptoms, the majority have mild or moderate symptoms, while a minority develops acute watery diarrhoea with severe dehydration. This can lead to death if left untreated.

Magnitude of Problem in Kerala:

Cholera has reappeared in Kerala after a gap of 4 years. This time, many cases have been reported from Malappuram, Thrissur, Kozhikode and Palakkad district. The disease was last reported in 2012. There were isolated cases in 2009 and 2012.

SCRUB TYPHUS

Scrub typhus is a re-emerging zoonotic bacterial infection known as the 'tsutsugamushi triangle' of South and Southeast Asia, the Asian Pacific rim and Northern Australia. The infection is called Scrub typhus **(figure 5)** because it generally occurs after exposure to areas with secondary (scrub) vegetation. It

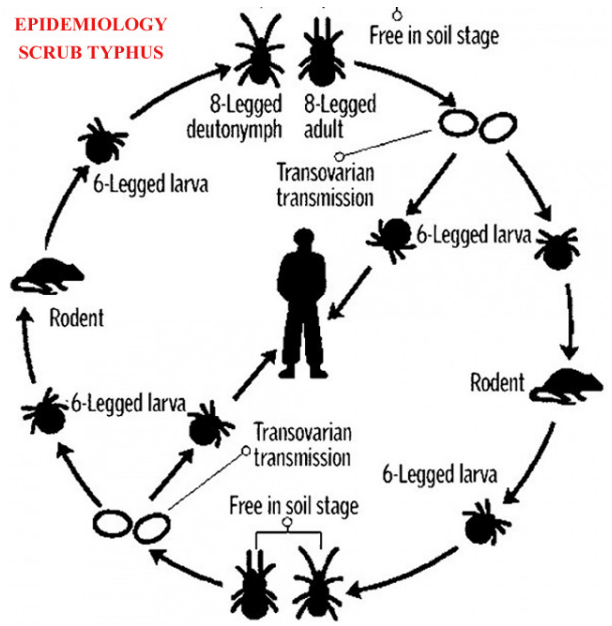

Figure 5. **Epidemiology of Scrub Typhus**

is an obligate intracellular bacterium that infects various cells including endothelial cells and phagocytes, causing vasculitis. The organisms proliferate on the endothelium of small blood vessels releasing cytokines which damage endothelial integrity, causing fluid leakage, platelet aggregation, leading to the formation of micro infarcts (Rajapakse et al., 2011). After incubation period of 10 to 12 days fever, headache, myalgia, cough and gastrointestinal symptoms develops. The clinical manifestations can range from sub-clinical disease to multiorgan failure. A necrotic eschar at the inoculating site of the mite is pathognomic of Scrub typhus. The chigger bite is painless and may become noticed as a transient localized itch. Scrub typhus is usually associated with rash, myalgia and diffuse lymphadenopathy. The classic features include an eschar at the site of chigger bite, regional lymphadenopathy and a maculopapular rash. Eschar is usually seen in axilla, groin, neck and inguinal region. The eschar begins as a small papule that enlarges, undergoes central necrosis, and eventually acquires a blackened crust with an erythematous halo that resembles a cigarette burn. Eschar can cause various complications like jaundice, renal failure, pneumonitis, acute respiratory distress syndrome (ARDS), septic shock, and meningoencephalitis. Scrub typhus should be differentiated from malaria, dengue, leptospirosis and typhoid fever. The clinical manifestation of leptospirosis and scrub typhus is non-specific and both diseases will present as fever, headache, skin rash, myalgia and conjunctival congestion. The presentation of Scrub typhus can be variable, often non-specific, but with potentially severe multiorgan dysfunction. Leucopoenia and abnormal liver function tests are commonly seen in the early phase of the illness. Pneumonitis, encephalitis, and myocarditis occur in the late phase of illness (Sindhura et al., 2014). The Weil-Felix agglutination test is helpful in establishing presumptive diagnosis of diseases caused by members of typhus and spotted fever groups of Rickettsiae. Scrub typhus can be a very serious infection that often presents with non-specific symptoms, making it difficult to differentiate from other infections. History of mite bite is often absent since the bite does not inflict pain and the mites are almost microscopic to be seen by a naked eye. The gold standard test is indirect immunofluorescence, but the main limitation of this method is the availability of fluorescent microscopes (Bhutia and Pradhan, 2013). It is now known that there is enormous antigenic variation in Orientia tsutsugamushi strains and immunity to one strain does not confer immunity to another strain.

Scrub typhus has emerged as an important cause of febrile illness. A necrotic eschar at the inoculating site

of the mite is pathognomonic of Scrub typhus. Scrub typhus is a zoonosis and is a widespread disease in Asia and Pacific Islands. Fever is the most common symptom of Scrub typhus and in endemic areas; it is one of the causes of Fever of unknown origin. In order to understand the clinical spectrum and its prevalence, a retrospective study was conducted in patients admitted with acute febrile illness in Govt. Medical College, Thiruvananthapuram over a period of 1 year. A total of 1268 serum samples were screened for Scrub typhus by IgM enzyme-linked immunosorbent assay. About 217 patients were positive among which 118 were male and 99 were female. The seroprevalence of Scrub typhus was 17.11%. There were antigenic cross reaction with IgM leptospirosis for 11 cases and IgM dengue for 2 cases. Effective management and early administration of antibiotics will help to prevent the complications and mortality associated with Scrub typhus. Empirical therapy with Doxycycline may be life saving when clinical suspicion is high. There is enormous antigenic variation in Orientia tsutsugamushi strains and immunity to one strain does not confer immunity to another. Indirect immunofluorescence antibody assay and indirect immunoperoxidase test are the gold standard diagnostic tests for Scrub typhus. Doxycycline (200 mg/day) is the treatment of choice for Scrub typhus. Other antibiotics useful for the treatment of this infection are azithromycin, chloramphenicol, rifampicin and quinolones among others.

METHODOLOGY

Secondary data was collected from District Health Services website, www.dhs.com, about the monthly wise number of cases of malaria, dengue, leptospirosis, cholera and scrub typhus and also its prevalence in each district of Kerala, for the years 2013-2015.

Study Design: Record based descriptive study.

- *Data storage:* Data was entered into Microsoft excel and Microsoft word
- *Data analysis:* data was analyzed using appropriate statistical software; Quantitative data were expressed in terms of mean and standard deviation. Qualitative variables using frequency and proportions. Bivariable analysis was done to find out the factors responsible for the variation in disease trend.
- *A major outcome variable:* trend in communicable diseases which include dengue, malaria, leptospirosis, cholera and scrub typhus.
- *Ethical consideration:* permission was taken from Head of Department, Community Medicine, Government Medical College Trivandrum.

RESULTS

MALARIA

Situation of Malaria at a Glance

The total number of malaria cases reported in the year 2013 were 1634 which showed a increase of 1751 (7%) in the year 2014 **(figure 6).** And in the following year 2015 there was a decrease of 11.5% that is 1549 cases.

Monthwise Distribution of Malaria

2013-The months where the number of cases exceeded 100 included April, May, June, July, August, September, October, November, December **(figure 7).** The rest of the months, namely January, February and March had cases between 50-100. In 2014- Peak cases were

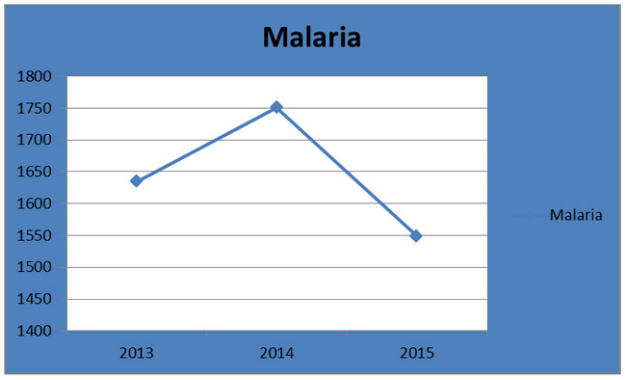

Figure 6. **Situation of Malaria at a Glance**

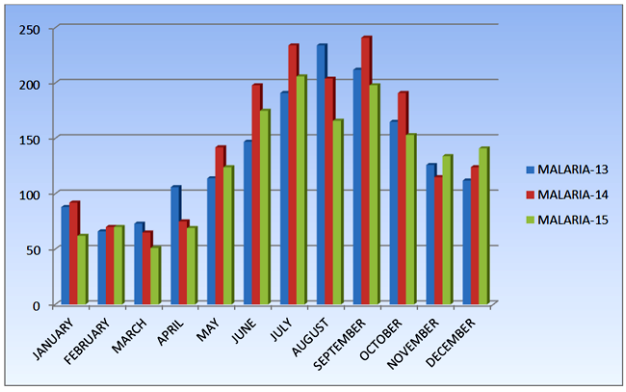

Figure 7. **Monthwise Distribution of Malaria**

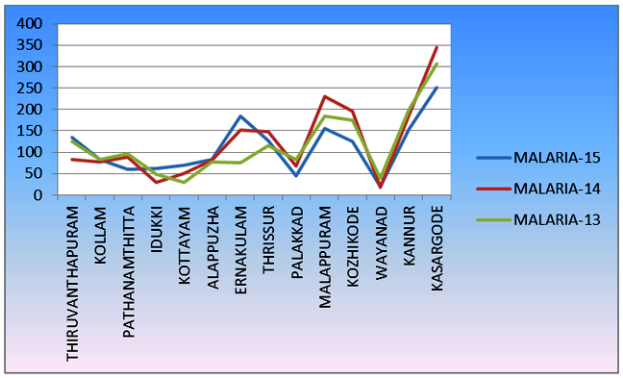

Figure 8. **Districtwise Distribution of Malaria**

reported in July and September.

2015-Peak cases were seen in June, July, August, and September.

Districtwise Distribution of Malaria

In the years 2013 and 2014 most of the cases seen were in Kasargode, Kannur, Kozhikode and Thrissur, in the descending order, ranging between 150-350 cases. But the cases declined in 2015 among the above said districts, except in Ernakulam cases were seen to increase to 184 cases as opposed to 76 in 2013 and 152 in 2014 **(figure 9).**

Deaths due to Malaria

In 2013 no deaths were reported due to disease. In 2014 there were 2 deaths in Malappuram and one each in Kollam, Idukki, Thrissur and Kannur. In 2015, a total of 4 deaths occurred, one each in Kollam, Idukki, Malappuram and Kozhikode

DENGUE

Situation of Dengue at a Glance

In the year 2013 dengue cases reported were 7938 which decreased by 67.9% as compared to the cases in 2014 which totalled to a number 2548. And in the next year (2015) number of cases increased to 4114 that is an increase of 61.45% **(figure 9)**.

Monthwise Distribution of Dengue

In 2013 cases were seen in the range of 1000-2000, possibly an outbreak, with most cases reported during the monsoons (May, June, July, August). Compared to 2013, the year 2014 saw a drop in the number of cases ranging from 300-400. But 2015 again saw a rise in the number of cases upto 900 cases **(figure 10)**.

Districtwise Distribution of Dengue

Maximum number of cases were seen in Trivandrum,

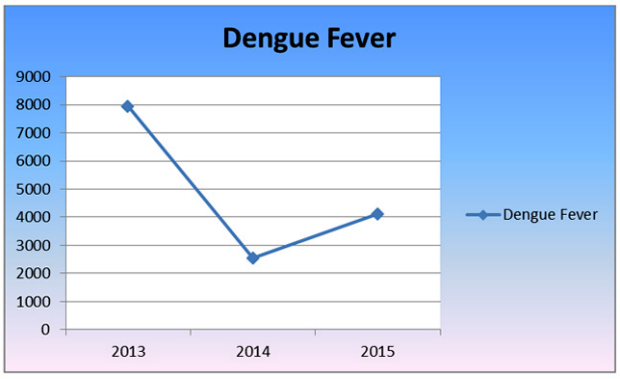

Figure 9. **Situation of Dengue at a Glance**

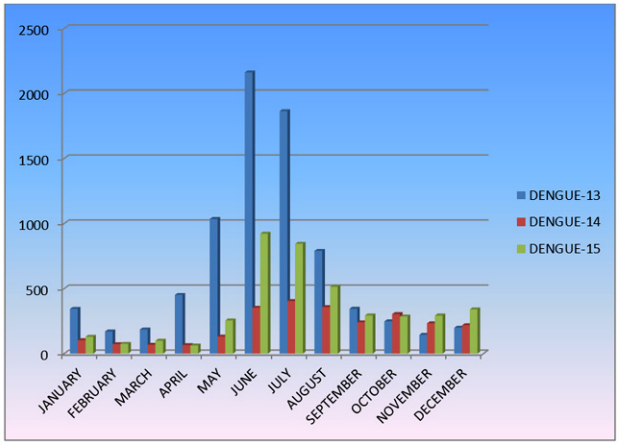

Figure 10. **Monthwise Distribution of Dengue**

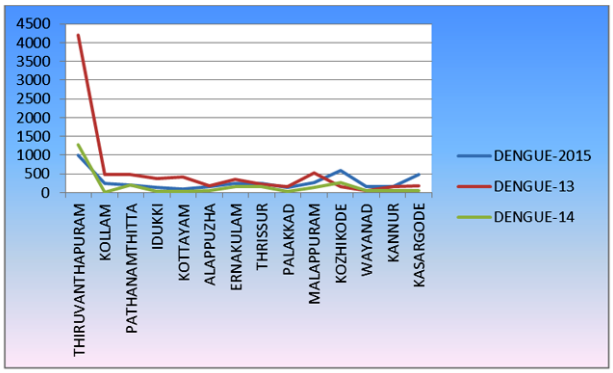

Figure 11. **Districtwise Distribution of Dengue**

Table 1. Deaths due to Dengue

Districts	2013	2014	2015
Trivandrum	5	3	9
Kollam	1	1	3
Pathanamthitta	7	0	0
Idukki	3	0	3
Kottayam	4	0	2
Alappuzha	1	1	1
Ernakulam	1	0	0
Thrissur	0	4	0
Palakkad	3	1	0
Malappuram	3	1	2
Kozhikode	0	0	5
Wayanad	0	0	0
Kannur	1	0	0
Kasargode	0	2	4
Total	29	13	29

4192 in 2013, 1280 in 2014 and 991 cases in 2015 **(figure 11).** No other district showed such a high number of cases except in Malapuram and Kozhikode with almost 500 cases **(table 1)**.

Deaths due to Dengue

Case fatality was approximately 0.3% in 2014

LEPTOSPIROSIS

Situation of Leptospirosis at a Glance

Leptospirosis cases reported in the year 2013 were 814 which increased to 1075 (32%) **(figure 12).** But in the following year 2015 there was only a minimal increase of 2% (1098).

Monthwise Distribution of Leptospirosis

In 2013 and 2014 the number of cases climbed during the month of April, May and June, peaking in July and august **(figure 13)**. In 2015 in addition to the peak seen in monsoon there was a peak in winter months October, November, and December.

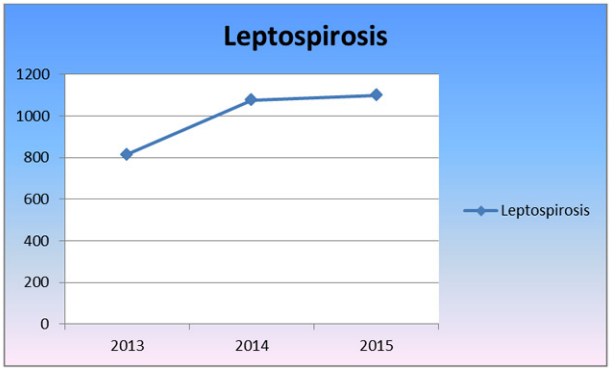

Figure 12. **Situation of Leptospirosis at a Glance**

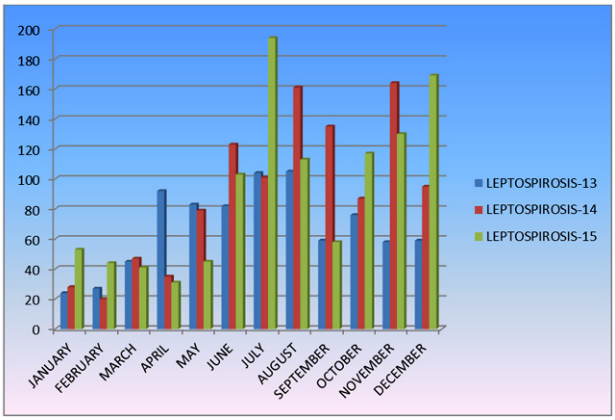

Figure 13. **Monthwise Distribution of Leptospirosis**

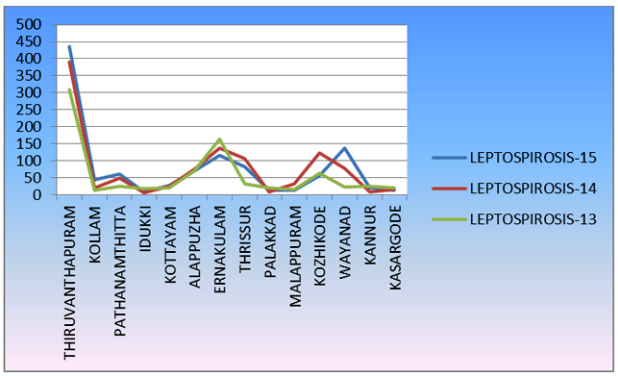

Figure 14. **Districtwise Distribution of Leptospirosis**

Table 2. Deaths due to Leptospirosis

Districts	2013	2014	2015
TRIVANDRUM	1	1	4
KOLLAM	1	0	7
PATHANAMTHITTA	4	5	1
IDUKKI	1	1	4
KOTTAYAM	3	1	1
ALAPPUZHA	3	7	6
ERNAKULAM	0	0	1
THRISSUR	5	14	6
PALAKKAD	4	1	0
MALAPPURAM	3	4	8
KOZHIKODE	2	4	0
WAYANAD	4	3	1
KANNUR	1	0	0
KASARGODE	2	1	4
Total	34	43	43

Districtwise Distribution of Leptospirosis

Maximum number of cases was seen in Trivandrum in all three years of 300-450 range, followed by Ernakulam, Kozhikode, and Thrissur **(figure 14)**.

Deaths due to Leptospirosis

Case fatality was 4% in all three consecutive years **(table 2)**.

SCRUB TYPHUS

Situation of Scrub Typhus at a Glance

68 cases of scrub typhus were reported in 2013 which showed an alarming increase to 433 which in percentage was 536%, which went on to increase, although not at the same rate, was 1149 cases i.e; 165% **(figure 15)**

Monthwise Distribution of Scrub Typhus

The year 2013 saw a very low number of cases of the order 30 in December and negligible in the rest of the year. Unlike this, in 2014 there was a rise in the number of cases wherein, the number 40 was crossed during the months of September, October, November and December. However, in 2015 there was a very high rise in the number of cases reported in January, July, November and December in the range of 160-180 **(figure 16)**.

Districtwise Distribution of Scrub Typhus

Trivandrum district saw the maximum number of cases beginning with 50 in 2013 and reaching 950 in 2015. Other districts with a countable number included Wynad, Malappuram, Kollam and Kozhikode. Isolated

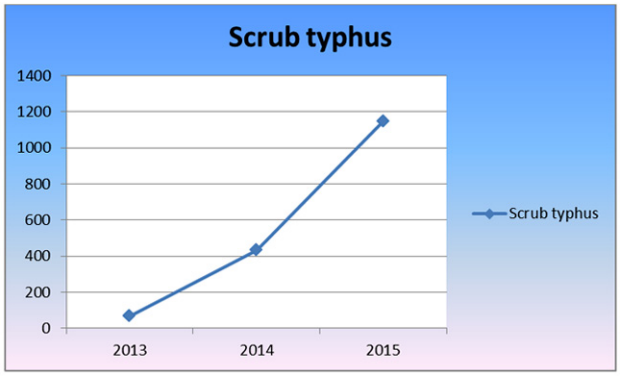

Figure 15. **Situation of Scrub Typhus at a Glance**

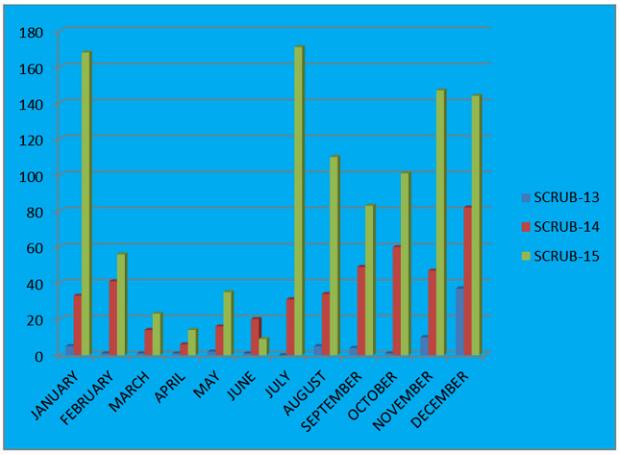

Figure 16. **Monthwise Distribution of Scrub Typhus**

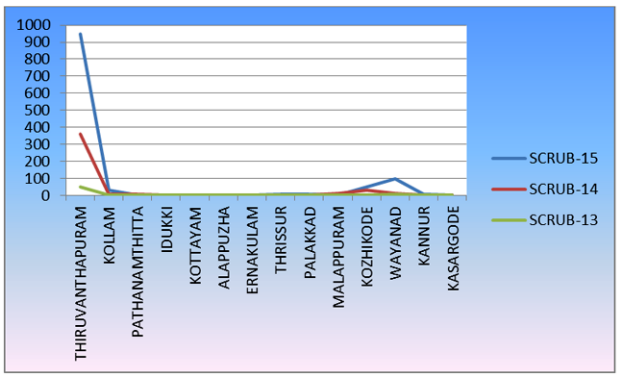

Figure 17. **Districtwise Distribution of Scrub Typhus**

cases were reported from all districts in the years 2013-2015 **(figure 17)**.

Deaths due to Scrub Typhus

In 2013 no deaths were reported due to disease.

In 2014 a total of 6 deaths were reported, of which 3 from Trivandrum, one each from Kollam, Pathanamthitta and Thrissur- case fatality being 1.4%.

In 2015 about 15 deaths were reported, of which 11 was from Trivandrum, 2 from Kollam, and one each from Kozhikode and Wynad. - Case fatality being 1.3%.

CHOLERA

Situation of Cholera at a Glance (figure 18)

Monthwise Distribution of Cholera

In the year 2013, cases of cholera were reported only during the months of April (6), may (8), and July (6).

In the year 2014, cases were reported during the months of June (4), November (2), and December (2) **(figure 19)**.

In the year 2015, only one case was reported in the month of June.

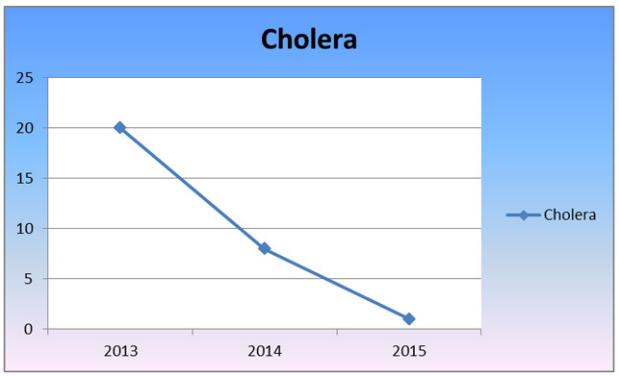

Figure 18. **Situation of Cholera at a Glance**

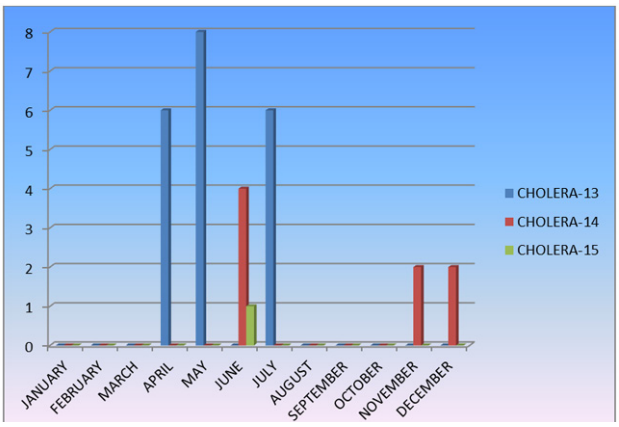

Figure 19. **Monthwise Distribution of Cholera**

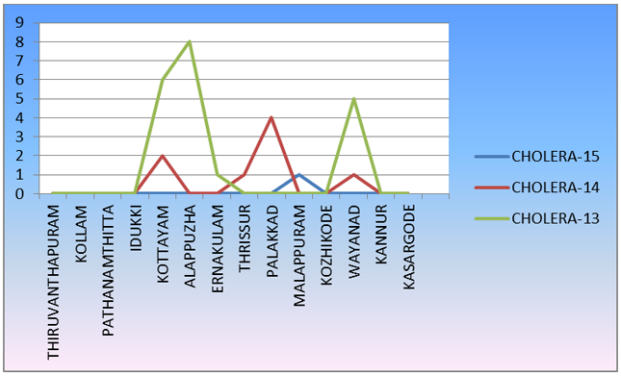

Figure 20. **Districtwise Distribution of Cholera**

The year 2013 showed cholera cases to be a total of 15 which decreased by 46. 6 % (8) in 2014. Next year, a decrease of 87.5% (1) was seen.

Districtwise Distribution of Cholera

2013. Most cases were seen in Alappuzha followed by Kottayam and Wynad, with one case in Ernakulam.

2014. Most cases were seen in Palakkad, followed by Kottayam, with one case in Thrissur and Wynad.

2015. Only one case was seen in Malappuram **(figure 21)**

DISCUSSION

This study aims to trend analysis of the communicable diseases such as Dengue, Malaria, Leptospirosis, Cholera and Scrub Typhus scenario of the state of Kerala in the years 2013 -2015. The unique model of Kerala state is witnessing newer challenges in its public health arena. The rapidly increasing migrant workforce from relatively poorer states of India, rapid urbanization and its consequent stress on public health, unsolved issues of urban waste disposal, re-emergence of many communicable diseases like malaria and of many zoonotic diseases like scrub typhus and vector born disease such as dengue. Scrub Typhus has the major burden among the communicable disease in which the number of cases increases from 18-(2013), 433 (2014), 1098 (2015) respectively, Leptospirosis increases from 2013 (800), 2014 (1075), 2015 (1098). In case of dengue the cases decrease from 2013 (6000) to 2014 (2000) then a slight increase in the year 2015 (4000). Malaria the cases increase from 2013 (1600) to 2014 (1800) decrease to 2015 (1500). In case of cholera the number of cases reduced drastically from 2013 (20) to 2014 (8) to 2015 (1). Outbreak of these communicable disease need investigations by the department of health and family welfare and the local bodies looks this matter seriously, appropriate measures such as vector control

CONCLUSIONS

Kerala State in South India is globally recognized as having unique development indicators in both social and health indicators. Good health indicators were achieved much ahead of other states in the country. But currently, the state is passing through a phase of epidemiological transition, with common vaccine–preventable disease under control, while other epidemic prone communicable diseases and non–communicable diseases posing greater challenges in public health arena. This may be due to the influx of large number of migrant labourers, rapid urbanization, poor sewage and waste disposal, and changing dietary habits.

Diseases like malaria claiming 2, 4 deaths occur in 2014, 2015. Leptospirosis has established endemicity in most districts. Dengue affects maximum number of cases (4192) reported from Trivandrum district. Scrub Typhus cases increasing each year and maximum 15 deaths were reported in the year 2015. All these situations necessitate comprehensive investigations by a multidisciplinary team comprising (Medical, Nursing, Pharmacy and other Paramedical staff) with the help of local bodies. Providing infrastructure facility like specialized laboratories, medicines and proper awareness about these diseases to public.

RECOMMENDATIONS

1. Regular screening of immigrants is required for early detection and prompt treatment. This had already started a few years ago and was strengthened during the year 2010. Considering the large number of immigrants and non-availability of sufficient staff a special mechanism needed for this. An Immigrant Screening Team (IST) may be for streamlining the activities
2. Health Card: may be issued to all immigrant labourers to ensure screening before registration.
3. Capacity building: of doctors, health workers and laboratory technicians is needed to enhance blood smear collection, to improve quality of slides and to increase the accuracy of laboratory conformation. Training of private doctors is also needed to prevent the unscientific treatment practice.
4. IEC activities: are required to sensitize the immigrants seek free medical care from the nearest health facility and to motivate contractors and supervisors send the immigrant labourers for medical check up as and when needed.
5. Inter sectoral co-ordination meetings and liaison works: with the Labour Department, PRI, other departments, NGO, civil society etc. are essential for better vector control measures.
6. Vector control activities: need to be strengthened against larvae and adult mosquitoes. The common breeding sources in the outbreak areas of Thiruvananthapuram, Malappuram, Kozhikode and Kasaragod are shallow wells and OHT. Manny of them are covered with mosquito nets. Netting of remaining open wells and OHT is needed to

be covered. Two rounds of the IRS have to be continued in these areas. Larvivorus fishes are present in majority of wells here; but closely monitoring and replenishing the fishes is needed as and when required.

7. Monitoring, supervision and reporting have to be further streamlined

END NOTE

Author Information

1. Dr Aparna Ajith, MBBS student, Government Medical College, Trivandrum
2. Dr Tina Sam, MBBS student, Government Medical College, Trivandrum
3. Dr Susmitha K Sudarsan, MBBS student, Government Medical College Trivandrum
4. Dr Antony Stanley, Assistant Professor, Department of Community Medicine, Government Medical College, Trivandrum

Conflict of Interest: None declared

Editor's Remarks: This article was the result of a student study on the epidemiological aspects of several diseases believed to have been eradicated in Kerala. The recent trends are available for analysis. Definitely a must read article for all authorities and professionals involved in Public Health.

REFERENCE

1. District wise situational analysis of communicable diseases for state of Kerala(2006-2010)
2. Integrated Disease Surveillance Program, State Surveillance Unit Data Base, DHS Kerala.
3. Guidelines for Prevention and Control of Leptospirosis. WHO -GOI 2006. p. 3.
4. Communicable diseases, New Delhi1.ReferenceCensus India 2011. [Last accessed on 2014 Oct 05].
5. McKibben B. What is true development? The Kerala Model. [Last accessed on 2014 Oct 09].
6. Panicker PG. Health Transition in Kerala. [Last accessed on 2014 Oct 10].
7. Migrant workers population in Kerala touch 2.5M: The Hindu-BusinessLine article, published on 16 Feb 2013. [Last accessed on 2013 Feb 16].
8. Suchithra M. Stench in my backyard; down to earth. In: Pellow DN, editor. Garbage Wars; Struggle for Environmental Justice in Chicago. Cambridge, MA: MIT Press; 2012.
9. Walsh JF, Molyneux DH, Birley MH. Deforestation: effects on vector-borne disease. Parasitology. 1993;106 Suppl:S55-75.
10. Pray L, Lemon S. Workshop summary, forum of microbial threat. Impact of Globalization on Infectious Disease Emergence. Ch. 2. Washington, D C.: National Academies Press; 2006.
11. Sugathan TN, Soman CR, Sankaranarayanan K. Behavioural risk factors for non communicable diseases among adults in Kerala, India. Indian J Med Res. 2008 Jun;127(6):555–63.