

RESEARCH ARTICLE

SEASONAL PREVALENCE OF INFECTIOUS DISEASES IN NORTHERN TERRITORY OF INDIA

¹Dr. Aruna and ²Dr. Sony Singh

¹MBBS, MD (Pathology), Consultant, SSB Heart and Multispecialty Hospital, Faridabad

²MBBS, MD (Microbiology), Associate Consultant, SSB Heart and Multispecialty Hospital, Faridabad

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ABSTRACT

Infectious diseases are recognized for the maximum mortality as well as morbidity of humans and animals. The higher prevalence of infectious diseases is found in low- and middle-income countries (LMICs). This is due to poor sanitization and hygienic condition which is favorable for the growth of pathogenic microorganisms. The present study focused on the current status of major infectious diseases in Northern India. Overall results indicated that the prevalence of selected diseases still remains similar to previous studies with several changes in their severity. This study finally concluded that in Northern territory of India has poor sanitary conditions. Moreover, only a few scientific studies addressing the various issues related to these infections and there is urgent need for numerous studies that provide the actual state of infections.

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INTRODUCTION

Infectious diseases continue to afflict and kill humans and animals, with new pathogens appearing and existing pathogens reemerging or mutating. (Van den Driessche, 2017). Pathogenic microorganisms such as viruses, bacteria, protozoa, parasites, and fungi cause these infection and spreads via direct or indirect contact with unsanitary settings. (Prüss-Ustün *et al.*, 2014; Ram & Thakur, 2021). Living conditions in low- and middle-income countries (LMICs) are predicted to deteriorate, increasing the prevalence and severity of infectious diseases in these nations (Prüss-Ustün *et al.*, 2014; Kaur, & Upadhyay, 2018; Kim *et al.*, 2018). In 2016, the World Health Organization (WHO) ranked infections such as lower respiratory infections, diarrheal illnesses, and tuberculosis among the top ten causes of death worldwide. The majority of the disease burden has been documented in LMICs. (World Health Organization, 2018). India is not an exception in this regard. However, unlike in other LMICs, infectious diseases continue to predominate, and noncommunicable diseases (NCDs) are rising without replacing the country's contagious disease burden. (Yadav & Arokiasamy, 2014). For example, South Asia bears a disproportionate share of the global burden of typhoid fever, with India having the highest incidence (Mogasale *et al.*, 2014; John *et al.*, 2016; Stanaway *et al.*, 2019).

In 2017, the Global Burden of Disease Study estimated the incidence of typhoid/paratyphoid in India to be 586 cases per 100 000 person-years (Kim *et al.*, 2019; Cao *et al.*, 2021). However, because there have been few population-based studies in India, these numbers are mostly derived from regional data. A few studies, such as Visaria, 2004; Banerjee & Dwivedi, 2016; Paul & Singh, 2017, used nationally representative sample survey data to examine the prevalence of infectious diseases and their associations with background variables. These studies do not examine the economic cost of infectious disease expenses, particularly out-of-pocket expenditure and the primary source of finance. Therefore the primary aim of the present hospital-based study is to identify the prevalence of different infections in North India.

METHODOLOGY

Present study was carried out in the OPD and IPD patients with collaboration with the laboratory services at SSB Heart and Multispecialty Hospital, Faridabad, Haryana, India, from February to October 2022. Serum and other respective samples from subject enrolled in outpatient and inpatient department were collected and subjected for further analysis. The selections of subjects were done on the basis of symptoms e.g. fever, headache, malaise, anorexia, nausea, vomiting, diarrhea and abdominal pain etc.

RESULTS

Acute diarrhea: During the defined period, 460 cases were found with acute diarrhoea in the tertiary care center.

***Corresponding author: Dr. Aruna- MBBS,**

MD (Pathology), Consultant, SSB heart and multispecialty hospital, Faridabad.

Among of them maximum samples i.e. 85 were examined in the month of April 2022 followed by the July, August and June i.e. 72, 64 and 61, respectively while only 10 cases were recorded in October 2022 (Fig 1).

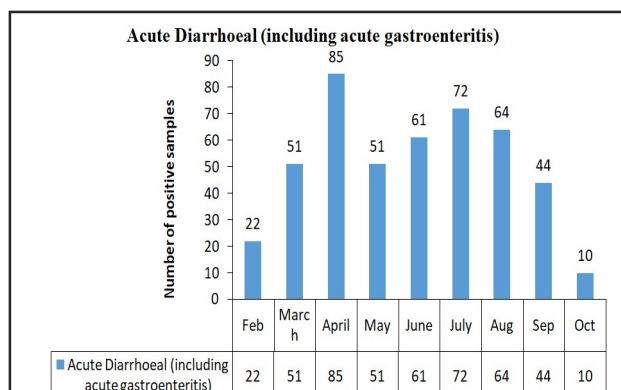


Figure 1. Prevalence of acute diarrhoea in tertiary care unit located in Northern region of India

Bacillary dysentery: A total of 5 subject were found positive in case of bacillary dysentery out of which highest positive cases was recorded in feb 2022 while only 3, 2 subjects were found positive in April (Fig 2). Furthermore, no case of bacillary dysentery was found in rest of the month.

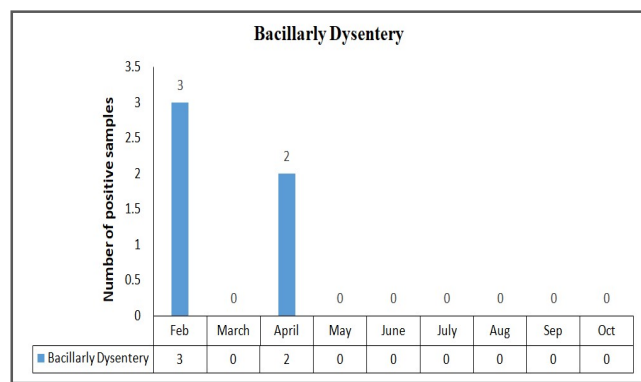


Figure 2. Prevalence of bacillary dysentery in tertiary care unit located in Northern region of India

Viral hepatitis: In case of viral hepatitis, only 59 suspected cases were found positive with maximum cases i.e. 15 in April 2022 followed by June, July and August i.e. 10, 9 and 9, respectively (Fig 3).

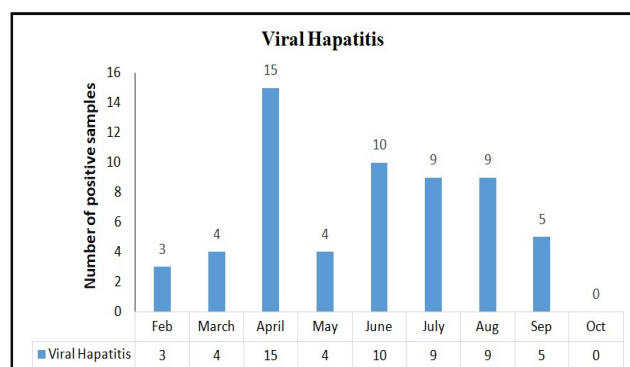


Figure 3. Prevalence of viral hepatitis in tertiary care unit located in Northern region of India

Enteric fever: In case of enteric fever, a total of 182 samples were recorded positive during February to October 2022 out of which maximum 39 cases were found in September followed by July and august (Fig 4).

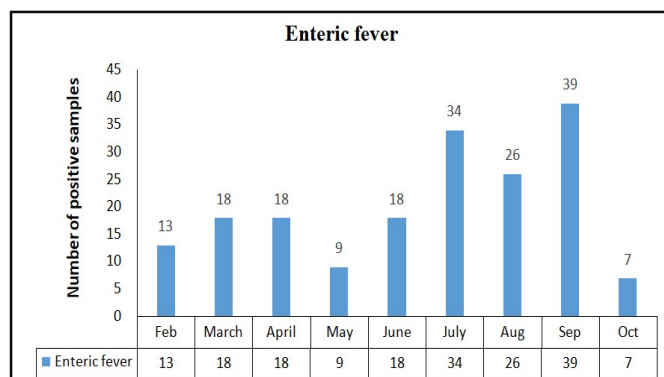


Figure 4. Prevalence of enteric fever in tertiary care unit located in Northern region of India

Dengue: A total of 45 sample were recorded positive during the study tenure. Among of them maximum test were found positive in September followed by August and October (Fig 5).

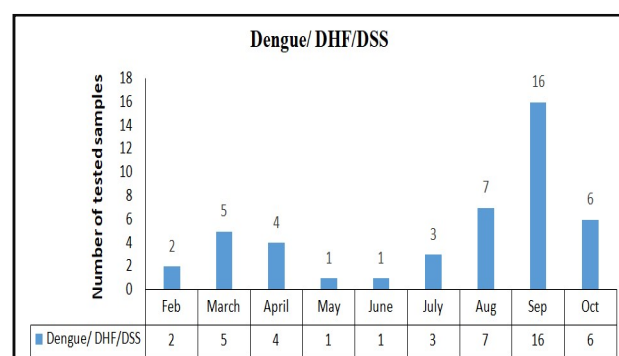


Figure 5. Prevalence of dengue in tertiary care unit located in Northern region of India

Fever of unknown origin: In case of fever of unknown origin, a total of 70 subject were enrolled during January to August with maximum in April (Fig 6). However, no case was recorded in month of September and October 2022.

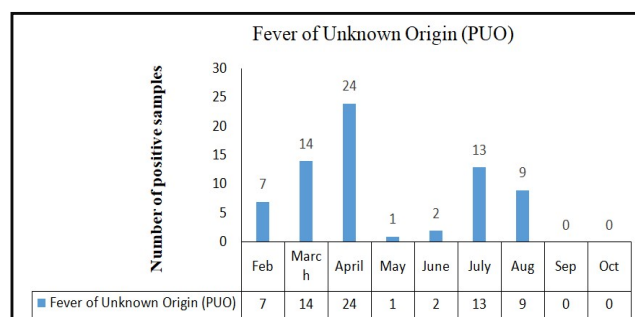


Figure 6. Prevalence of fever of unknown origin in tertiary care unit located in Northern region of India

Acute respiratory infection with influenza like illness: A total of 233 cases were recorded with acute respiratory infection with influenza like illness (Fig 7). Among of them

maximum cases i.e. 60 were found in September while only 7 and 2 cases were recorded in July and June, respectively.

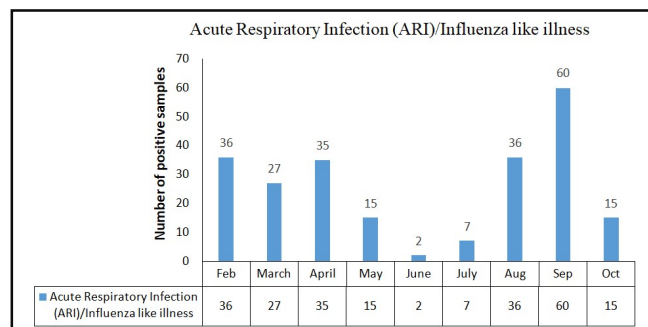


Figure 7. Prevalence of Acute Respiratory Infection (ARI)/Influenza like illness in tertiary care unit located in Northern region of India

Pneumonia: The higher prevalence of pneumonia were observed during the defined study period, a total of 218 cases were found between February to October 2022 (Fig 8). Among of them maximum cases i.e. 33 found in february 2022 .

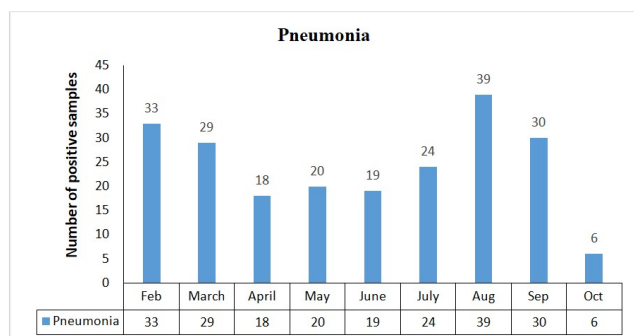


Figure 8. Prevalence of pneumonia in tertiary care unit located in Northern region of India

Leptospirosis: A Maximum positive cases were found in April 2022 while 3, 3, 3 patient were found with leptospirosis in month March, May and June 2022 (Fig 9).

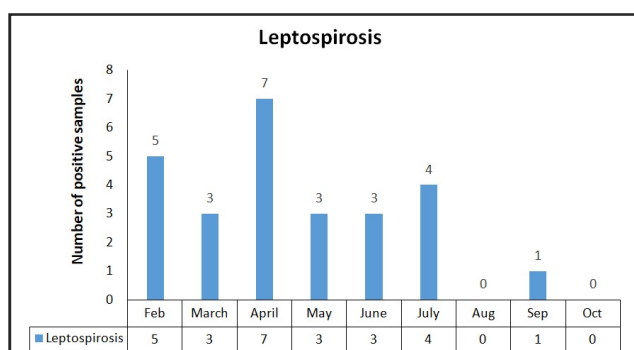


Figure 9. Prevalence of leptospirosis in tertiary care unit located in Northern region of India

Other Medical conditions: In the whole study tenure only 5 patient were enrolled with acute encephalitis out of which 2, patient were found in February and September while only 1 patient was enrolled in March 2022. Similarly, only 1 and 1 cases with meningitis cases were found in March and September 2022.

On the other Hand, , 2 cases of malaria were found in the month of April. In case of acute flaccid paralysis, only 3 cases was enrolled during the study. Moreover, a total of 2 cases of dog bite were in February and June 2022 while similar number of patient were enrolled in tertiary care unit with snake bite in July and October 2022.

DISCUSSION

The present study still indicates on the significant presence of infectious diseases in India which is a very serious public health issue. Diarrhoea is still considered as one of the major health problem in adults as well as children in India and it predominantly occurs during the summer months. However, according to Behera and Mishra (2022), the total morbidity and mortality due to the diarrhoea showed a declined trend from 1990 to 2019 in India (Behera & Mishra, 2022). The present study showed that the maximum number positive samples were found in the months of April to August which is the peak summer season. Similar observations were also recorded from the adult population of Mewar University, Rajasthan, India (Ezekiel & NuraYakubu, 2022). According to a number of studies, the incidence of diarrhoea in India mostly occurred due to the consumption of contaminated drinking water (Gupta *et al.*, 2021). Therefore, the use of drinking water with good quality is must to minimize the prevalence of acute diarrhoea in India. Bacillary dysentery, which is primarily transmitted by the fecal-oral route via contaminated food, water, or person-to-person contact (Bhattacharya *et al.*, 2012; Nygren *et al.*, 2013), is an important enteric infectious disease caused by *Shigella* spp. Current study showed higher positive cases of bacillary dysentery in April while in China it was observed that the maximum trend of bacillary dysentery were found in rainy season (Chang *et al.*, 2016). This could be due to differences in geographic and epidemiological patterns. Though shigellosis appears to be endemic in India and has been linked to numerous outbreaks, accurate estimates of morbidity and mortality are lacking. According to the limited information available, *Shigella* is a significant food-borne pathogen in India. MDR shigellae are found all over the country and are rapidly developing resistance to most antibiotics. Thus, among the most important measures to combat shigellosis is the prudent use of antibiotics for *Shigella*. This necessitates a continuous and vigilant surveillance of antibiotic resistance throughout the country in order to update local antibiograms on a regular basis. (Taneja, & Mewara, 2016). In India, viral hepatitis is becoming more common by the day and is regarded as a serious public health issue. The current study discovered that hepatitis cases occurred throughout the year, which could be attributed to poor health and sanitation conditions. Maintaining adequate sanitary and hygienic conditions can aid in addressing the problem of enterically transmitted pathogens such as HAV and HEV. HBV and HCV infection can cause chronic hepatitis, which can lead to complications such as liver cirrhosis and HCC. A multipronged approach of active screening, adequate treatment, universal HBV vaccination, and educational counselling can help reduce the burden of HBV and HCV-related liver diseases in India. (Satsangi & Chawla, 2016). Further, the incidence of enteric fever were also found higher during the rainy season and similar observation was also recorded by (Saad *et al.*, 2018). This might be due to the contamination of water.

In case of dengue, similar to enteric fever higher incidence were recorded in rainy season and similar, findings were also observed by Ganeshkumar *et al* (2018). According to some studies, the observed increase in dengue burden across India may be due to a dengue virus epidemiological shift and climate change. (Mutheneni *et al.*, 2017). Furthermore, fever of unknown origin was prevalent throughout the year, which is a difficult task for clinicians because it interferes with treatment strategies. It is critical to understand local epidemiology because diseases can differ from country to country or region to region, making them geographically distinct. There have been few studies conducted in India, with varying definitions (Rupali *et al.*, 2016). The present study showed higher incidence of acute respiratory infection with influenza like illness in September which contradictory to the study carried out in a tertiary care hospital of Rajasthan, India (Malhotra *et al.*, 2016). There were seasonal variations in virus infection trends, with two peaks per year. The current study found that HRV circulated throughout the year, which was similar to an earlier study (Fujitsuka *et al.*, 2011). However, the seasonal trends of respiratory viruses observed in this study differed from those observed in other studies (Ahmed *et al.*, 2012; Malhotra *et al.*, 2016). The various geographic locations, viral aetiological agents, and research methodologies may be to blame for the variations in the seasonal distribution of various respiratory viruses (Malhotra *et al.*, 2016).

Pneumonia cases saw a dip in the summer months between April to July 2022. This finding is consistent with the research published by Farrar *et al* (2019). On the other hand, the highest number of leptospirosis cases was recorded in April 2022. Several studies also reported similar seasons (Hirschauer *et al.*, 2009; Desvars *et al.*, 2011). It may be because the majority of people in India come into contact with contaminated and stagnant water during the summer. Only 5 patients with acute encephalitis were enrolled during the entire study period. In March and September, only 2 cases of meningitis were discovered. Similar seasons were noted in numerous studies as well (Lauderdale *et al.*, 2014; Ahmed *et al.*, 2022). Malaria cases, on the other hand, were discovered in the months of April and September. Only cases of acute flaccid paralysis were included in the study. Additionally, a large number of dog bite cases occurred between February and June, while a comparable number of patients with snake bites were admitted to a tertiary care facility between July and October. The fact that there were so few positive cases of the aforementioned diseases during the study period may be to blame for this.

CONCLUSION

It was concluded that the occurrence of the aforementioned infections is still present, with a higher occurrence in Northern part of India, possibly as a result of the unsanitary conditions. Still, only a small number of centres have conducted scientific studies addressing the various issues related to these infections. As a result, there is a pressing need for numerous studies that examined the actual state of infections with more modern methods of diagnosis and treatment.

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