



## TRENDS OF SOME COMMON VIRAL AND BACTERIAL DISEASES IN A TERTIARY CARE HOSPITAL: ONE YEAR OF TESTING DATA FROM MEDICAL COLLEGE LEVEL VIRAL RESEARCH AND DIAGNOSTIC LABORATORY (VRDL), DR. RAJENDRA PRASAD GOVT. MEDICAL COLLEGE KANGRA AT TANDA, HIMACHAL PRADESH.

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### ABSTRACT

**Background:** Viral and research diagnostic laboratories are the network of laboratories for managing epidemics and natural calamities which operates through 3-tier system pan India. Previously, the emphasis was only on viral diseases and outbreak but now also equally focusing on bacterial and other pathogen detection. The primary goal of this study is to highlight the sero-prevalence of some common viral and bacterial diseases tested in tertiary care centre with retrospective samples w.e.f. 01 January 2021 to 31st December 2021. **Materials and Methods:** The samples were collected from indoor and outdoor patients attending tertiary care centre. The samples were received in the Department of Microbiology, DRPGMC Tanda, Himachal Pradesh. The testing was done as per instructions provided with kit's manuals. **Results:** Among the viral diseases, the positivity was 8.47%, 7.39%, 3.41%, 1.34%, 1.64% and 4.64% for Dengue NS1, Dengue IgM, Hepatitis-A IgM, Hepatitis-E IgM, Hepatitis-B Ag and Influenza respectively. While in bacterial diseases the positivity was 20.46% and 17.64% for *Leptospira* and Scrub typhus respectively. Among the age groups the age of 21-40 years was most prone to infections with 44.26% positivity. Similarly, gender specific statics showed that the male populations have more chances of infections than female. **Conclusion:** The summary of one year of testing have provided the disease load of common diseases and further analysis for two or more years may provide a clear picture of disease burden in and around of this tertiary care hospital.

**KEYWORDS :** Viral Research & Diagnostic Laboratories, Sero-prevalence, tertiary care hospital, retrospective data.

### INTRODUCTION

Viral infections are common on every part of the sphere. Due to variability in climatic factors and uneven population distributions, various viral outbreaks are being observed seasonally in India. Network of viral research and diagnostic laboratories (VRDL) pan India is supposed to provide diagnosis and surveillance of viral infections [1]. Establishment of both serological and molecular diagnostic facilities in medical college level VRDL at Dr. Rajendra Prasad Govt. Medical College and Hospital, Kangra at Tanda, Himachal Pradesh have also led to look into the epidemiological trends of some bacterial and viral diseases.

Among various viruses, Dengue and Chikungunya is vector borne and repeat almost same pattern every year while Hepatitis-A and Hepatitis-E are enterically transmitted and have uneven pattern of infections throughout the year [2]. Further, understanding the distribution patterns of Scrub typhus is also of utmost importance because most of the population in and around this tertiary care hospital as well as adjacent districts are confined to villages and involved in agriculture and forest activities [3]. In addition to this, the estimation/screening of Hepatitis-B and Hepatitis-B & D co-infection is also needed in due course of time to strongly improve the blood banking and transfusion systems in health care set up.

Further, influenza virus infections are also of health concerns and introduction of covid-19 pandemic chapter after December 2019 have severely affected the influenza diagnosis. Because of the overlapping symptoms and priority of testing to covid-19, the disease burden of influenza infection cannot be under estimated. One or two peaks of influenza infection are observed in a year [4] and further continue monitoring is expected for the same.

Keeping in mind the above scenario, it is of prime importance to keep track record of the trends and statics of emerging/re-emerging viral and bacterial infection, so that advanced

methods of testing as well as an ease to develop treating strategies may be adopted by higher health authorities. Further compilations of data will add on the surveillance programme more effectively.

### MATERIAL AND METHODS

This study analyzed the retrospective testing done at VRDL, Dr. Rajendra Prasad Govt. Medical College Kangra at Tanda, Himachal Pradesh. The seroprevalence of Dengue, Scrub typhus, Hepatitis-A, Hepatitis-E, Hepatitis-B, Hepatitis-D, *Leptospira*, Herpes Simplex virus 1, Cytomegalovirus and real time PCR for Influenza testing were evaluated. The data was evaluated between the periods of 1<sup>st</sup> January 2021 to 31<sup>st</sup> December 2021.

For serological testing, whole blood was collected from outdoor as well as indoor patients attending the tertiary care hospital at Dr. Rajendra Prasad Govt. Medical College & Hospital Kangra at Tanda, Himachal Pradesh. The serum was separated by centrifugation at 3500 rpm for 5 to 10 minutes. The testing was performed as per instructions provided within the kit's manual with appropriate controls set up.

For the real time PCR of influenza testing, nasopharyngeal and throat swabs were collected in viral transport medium and transported to laboratory for testing. The testing was carried out as per guidelines provided by resource centre for VRDL at National Institute of Virology (NIV) Pune, Maharashtra, India.

### RESULTS

In the present study total of 9,481 cases were tested for different viral/bacterial diseases and among them 427 were found positive (Table-1). Trends of positivity were higher for *Leptospira* (20.46%) and Scrub typhus (17.64%) followed by Dengue, Hepatitis-A, Hepatitis-B, and Hepatitis-E. Sample size for Herpes Simplex Virus-1 (HSV-1), Influenza, Cytomegalovirus and Chikungunya were very small to depict the exact picture of percentage positivity.

Further, it is evident from the Table-2 that age group of 21 to 40 years old were more prominent to catch a diseases (44.26%) followed by 41 to 60 years old age group (32.31%). In case of Scrub typhus the positivity was almost similar in the both of the above mentioned age groups while in Dengue and Hepatitis-B the former has more positivity than the later.

Gender specific patterns of positivity also depicted the interesting pattern (Table-3). In case of Dengue, 70% positive cases were identified in male population as compared to female (30%). This could be due to more frequent traveling and outdoor activities of males as compared to females. While trends were upturned in case of Scrub typhus and Leptospira where females population have shown more positivity (55.55%) which is obvious because of role of females in rural areas of in and around districts of tertiary care hospital Tanda, Himachal Pradesh. The females show more presence in agricultural activities that could be the reason for getting the infection more as compared to male population. Overall positivity in case of Hepatitis-A and Hepatitis-E was relatively found low (Table-1) and gender specific data suggested 70% infection in males and 30% infections in females in case of Hepatitis-A and 25 % infection in males and 75 % infection in female population for Hepatitis-E. Similarly, Hepatitis-B infections were more prominent in males (67%) as compared to females (41%). On evaluation of co-infections of Hepatitis-B with Hepatitis-D, it was found that no co-infection was found in the samples which were positive for Hepatitis-B.

**DISCUSSION**

The causative agent for Scrub typhus "*Orientia*" is an obligate intracellular, small gram negative bacterium. Prevalence of disease caused by this bacterium is largely remained unexplored in Northern India. A study conducted over 1067 patients suspected with pyrexia of unknown origin (PUO) over a period of three years suggested that the total positivity of 18.6% [5]. While in our study over the period of one year, we observed 17.64 % positivity. Further broader data set showed that case fatality rate of Scrub Typhus was 6.3% and mortality among multi-organ dysfunction syndrome was high as 38.9% [6]. This emphasizes the need for the diagnosis in due course of time and adoption of strategy for treatment.

Leptospirosis is a zoonosis associated with possible fatal consequences has long been under reported disease in India [7]. Studies related to the load of leptospirosis in North India are very few. Studies conducted between years 2004 to 2008 have shown that there is an increase of positivity from 11.7% to 20.5% in four years of study [8]. Same study has depicted its prevalence more in rainy season. In our analysis, only 171 IgM elisa tests could be conducted due to ongoing covid-19 pandemic which restricted the patient to attend hospital between January-2021to December-2021. However, the positivity was still higher i.e. 20.46%. The gender specific data suggested 70% of positive cases were found in female population which is quite obvious because of farm activities and animal care is mostly performed by females in rural villages in Himachal Pradesh.

Further, India reported 1,64,103 dengue cases during year 2021 as against 2, 05,243 cases in year 2019. However India has maintained case fatality rate of less than one percent but the load of this disease is still there. The disease is endemic in more than 100 countries worldwide and leading cause of hospitalization in India [9]. A four year of data analysis between January-2014 to December-2017 had shown 2,11,432 suspected dengue fever cases were sent for laboratory confirmation, among those 60,096 cases were detected positive (28.4%). The positivity was 47.3% for NS-1 antigen and 46% for IgM antibodies [10].Overall positivity in our one year of study was 7.79% which is lower than other states in India. This could be due to scattered population in rural

villages in Himachal Pradesh. The seropositivity was 8.47% for NS-1 antigen and 7.39% for IgM antibodies.

Hepatitis-B infections are ubiquitous in nature and adopt different patterns in healthy and liver disease individuals. A published data showed that Hepatitis B virus infection in India is 1.46% with an estimation of 17 million chronic carriers [11]. Our data also showed similar trends of positivity with 1.66% in a year of study.

Hepatitis-B vaccination was introduced initially in 2002-2003 under Universal Immunization Program (UIP) and introduced in entire country in 2011-2013[12]. Children born after vaccination may have lower chances of past infection and may have higher prevalence of anti-HBs. Further, co-infection of Hepatitis-D with B have been reported widely worldwide and it require hepana virus like Hepatitis-B for its own replication [13]. The trends of its positivity are now decreasing due to awareness and vaccination and in our case no co-infection of Hepatitis-B and Hepatitis-D was observed.

**Conflict of interest:** None

**Table-1. Distribution of positives cases among suspected cases etiological agents.**

S. No.	Name of agent for which testing were done	Total Cases	Positive Cases (%)
1.	Dengue NS-1Antigen Elisa	401	34 (8.47)
2.	Dengue-IgM Elisa	676	50 (7.39)
3.	Scrub Typhus-IgM Elisa	1020	180 (17.64)
4.	Leptospira-IgM Elisa	171	35 (20.46)
5.	Hepatitis A-IgM Elisa	293	10 (3.41)
6.	Hepatitis E-IgM Elisa	298	04 (1.34)
7.	HBsAg Elisa	6576	108 (1.64)
8.	Influenza-A RTPCR	21	1 (4.76)
9.	HSV-I IgM Elisa	8	0 (0)
10.	Cytomegalovirus IgM Elisa	7	2 (28.57)
11.	Chikungunya-IgM Elisa	10	3 (30)
	Total	9481	427 (4.50)

**Table-2. Trends on positivity among four different age groups**

S.N o.	Name of test/s Done	Age In Years (0-20)	Age In Years (21-40)	Age In Years (41-60)	Age In Years (above 60)
1	Dengue NS-1Antigen Elisa	04	23	06	1
2	Dengue-IgM Elisa	04	25	17	04
3	Scrub Typhus-IgM Elisa	22	67	66	25
4	Leptospira-IgM Elisa	02	19	07	07
5	Hepatitis A-IgM Elisa	05	05	0	0
6	Hepatitis E-IgM Elisa	00	02	02	0
7	HBsAg Elisa	04	47	37	20
8	Influenza-A RTPCR	0	0	01	0
9	HSV-I IgM Elisa	0	0	0	0
10	Cytomegalovirus IgM Elisa	01	0	01	0
11	Chikungunya-IgM Elisa	01	01	01	0
12	Total positivity among different age groups.	43 (10.07%)	189 (44.26%)	138 (32.31 %)	57 (13.34%)

**Table-3. Gender specific case distribution in positive samples**

S.No.	Name of test/s Done	Male (%)	Female (%)
1	Dengue NS-1Antigen Elisa	23 (67.64)	11 (32.35)
2	Dengue-IgM Elisa	36 (72)	14 (28)
3	Scrub Typhus-IgM Elisa	80 (44.44)	100 (55.55)
4	Leptospira-IgM Elisa	11(32.35)	24(70.58)
5	Hepatitis A-IgM Elisa	7 (70)	3 (30)
6	Hepatitis E-IgM Elisa	1(25)	3(75)
7	HBsAg Elisa	67 (62.03)	41(37.96)
8	Influenza-A RTPCR	1(100)	0
9	HSV-I IgM Elisa	0	0
10	Cytomegalovirus IgM Elisa	1(50)	1(50)
11	Chikungunya-IgM Elisa	0	3 (100)
12	Total positives Male Vs Female	227 (53.16)	200 (46.83)

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