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COMPARATIVELY SEROEPIDEMIOLOGY STUDY OF DENGUE INFECTION AMONG THE SUSPECTED CASES: A 3YEAR STUDY AT A TERTIARY CARE HOSPITAL, INDIA.

Medical Microbiology

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ABSTRACT

Introduction: In tropical and subtropical nations, the mosquito-borne viral illness dengue has become a serious hazard and burden to public health systems [1]. Dengue symptoms normally persist for 2–7 days [3]. After almost a week, the majority of people will recover. Within a few hours, dengue symptoms can become life-threatening. An urgent medical situation is severe dengue. 1 in 20 dengue patients will get severe dengue. Shock, internal hemorrhage, and even death can occur as a result of severe dengue. The risk of severe dengue is increased in infants and pregnant women. Investigating the sero-epidemiological prevalence of dengue infection in suspected patients was the goal of the current investigation. **Material and Method:** The current study was carried out in a tertiary care hospital in Gurugram, Haryana, India, from December 2018 to December 2021 over a three-year period in the serology department of the Department of Microbiology. **Result:** We examined 3199 people in total between December 2018 and December 2021 to look for the seroprevalence of dengue infection. As a consequence, we discovered that, using NS1 Ag ELISA and IgM ELISA, respectively, 15.88% and 8.07% of patients were positive. In our investigation, dengue seropositivity was determined to be 23.94 %. **Conclusion:** The severity of the virus can range from subclinical infection, mild dengue, to severe dengue that can occasionally be fatal if not treated effectively. Dengue outbreaks have been observed in numerous regions of the world despite the WHO taking several preventative steps.

KEYWORDS

Aedes, IgM, NS1Ag, Sero-prevalence, Vector etc

INTRODUCTION

In tropical and subtropical nations, the mosquito-borne viral illness dengue has become a serious hazard and burden to public health systems [1]. Through the bite of an infected Aedes species mosquito (Ae. aegypti or Ae. albopictus), dengue viruses are transmitted to people. These mosquitoes can transmit other diseases, including Zika and chikungunya [2]. One of the four closely related dengue viruses—dengue viruses 1, 2, 3, and 4—causes the disease. Because of this, a person may contract the dengue virus more than once over their lifetime [3]. The most common signs of dengue are fever, along with aches and pains (often behind the eyes), nausea, vomiting, and rashes [3]. Dengue symptoms normally persist for 2–7 days [3]. After almost a week, the majority of people will recover. Within a few hours, dengue symptoms can become life-threatening. An urgent medical situation is severe dengue. 1 in 20 dengue patients will get severe dengue. Shock, internal haemorrhage, and even death can occur as a result of severe dengue. The risk of severe dengue is increased in infants and pregnant women. Belly aches, soreness, and fever are warning indicators of severe dengue. vomit (at least 3 times in 24 hours), feeling exhausted, agitated, or worn out [4], bleeding from the nose or gums, vomiting blood, or passing blood in the stool In India, sporadic epidemics have been documented for more than 200 years. Numerous techniques were put into place to help with the management and surveillance of dengue as a result of the scope and severity of two large outbreaks in the 1990s [5]. In particular, the National Vector Borne Disease Management Programme [6], working with the current Integrated Disease Monitoring Programme, created a passive surveillance programme and published recommendations for dengue prevention and control. Over 100,000 cases were recorded between 2018 and 2021, according to the National Vector Borne Disease Control Program of the Indian government [7]. Investigating the sero-epidemiological prevalence of dengue infection in suspected patients was the goal of the current investigation.

MATERIAL & METHODS

The current study was carried out in a tertiary care hospital in Gurugram, Haryana, India, from December 2018 to December 2021 over a three-year period in the serology department of the Department of Microbiology. Overall, 3-5 ml of venous blood drawn from patients suspected of having dengue virus infection was subjected to a rapid immunochromatographic test, followed by an enzyme-linked immunosorbent assay (ELISA) test for the detection of non-structural protein 1 antigen by Dengue NS1 Ag Microlisa and immunoglobulin M (IgM) by Panbio Dengue IgM Capture ELISA (Cat No. E-DEN01M/E-DEN). According to the instructions included with the test kit, the protocol was followed, and the test results were interpreted.

RESULT

We examined 3199 people in total between December 2018 and December 2021 to look for the seroprevalence of dengue infection. As a consequence, we discovered that, using NS1 Ag ELISA and IgM ELISA, respectively, 15.88% and 8.07% of patients were positive. The NS1 Ag ELISA and IgM ELISA both produced negative results in 51.05% and 25.01% of the patients, respectively (Table: 1). The data was further filtered and examined using age-specific criteria (Figure 1). The largest percentage of positive cases, 45.56 percent by NS1Ag and 11.10 percent by IgM ELISA, respectively, came from the age groups of 11 to 20 years old. However, according to NS1 Ag and IgM ELISA, the age groups with the fewest positive instances, or 0.91 percent and 1.04 percent, respectively, were those between the ages of 41 and 50. Figure 2 shows that 48.06 percent of men and 51.94 percent of females test positive with an IgM ELISA kit, compared to 46.26 percent of males and 53.74 percent of females for NS1 Ag. The majority of cases were discovered to be positive by NS1Ag in the months of July to September and by IgM ELISA in the months of October to December, according to the data (Figure 3). The largest percentages of positive cases during the research, 54.96 percent with NS1Ag and 32.25 percent with IgM ELISA, were noted in the years 2019 and 2021, respectively (Table 2 and Figure 4).

Table 1: Distribution of demographics among all samples with probable dengue infection

Type of ELISA Test	Positive Samples (n= 766)	Negative Samples (n=2466)	Total % of Samples
NS 1 Antigen ELISA	508 (15.88%)	1633 (51.05%)	66.93%
IGM Antibody ELISA	258 (8.07%)	800 (25.01%)	33.07%

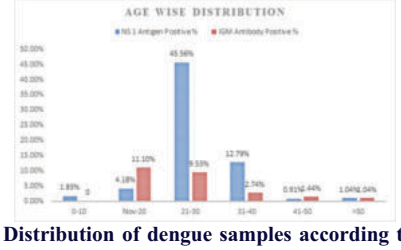

Figure 1: Distribution of dengue samples according to age wise

criteria.

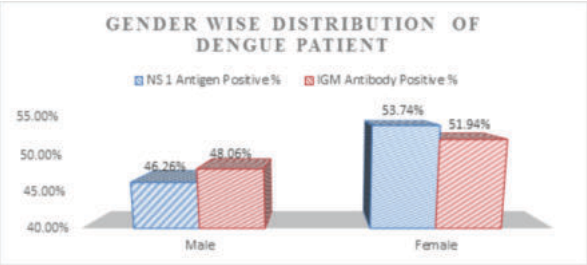

Figure 2: Distribution of positive dengue patients according to gender wise

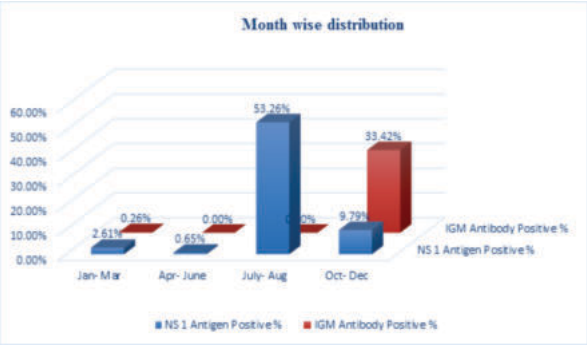

Figure 3: Distribution of dengue-positive samples by month wise

Table 2: Distribution of Dengue ELISA-positive samples on an annual basis

Year	NS 1 Antigen Positive %	IGM Antibody Positive %
2018	9.79%	0.78%
2019	54.96%	0.52%
2020	0.26%	0.00%
2021	0.26%	32.25%

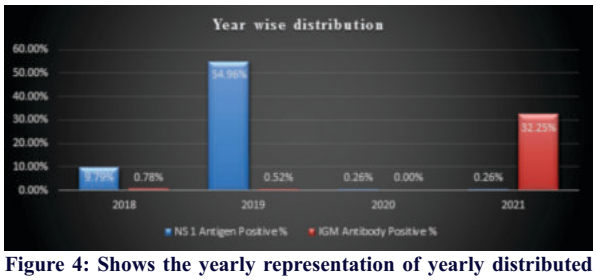

Figure 4: Shows the yearly representation of yearly distributed samples of dengue Positive samples

DISCUSSION

The creation of an effective monitoring system to identify cases and implement control measures against dengue vectors has become necessary due to the striking increase in dengue virus infection and the morbidity and death that accompany it. In the last ten years, dengue has been known to periodically experience spikes in the number of cases. Dengue cycle epidemics are growing more common, and according to the WHO, dengue is hyperendemic in India [8]. In our investigation, dengue seropositivity was determined to be 23.94 percent. Our findings were in agreement with those of Chitkara et al. [9] (20.4%), Garg et al. [10] (19.7%%), Sood [11] (18.9%), and Ghosh et al. [12]. (17.9%). However, compared to our findings, those reported by Lakshmi et al. [13] (33.64%), Rathore et al. [14] (44.4%), Malik et al [15] (52%), Ukey et al. [16] (31.3%), Bhat et al. [17] (32.1%), Gopal et al. [18] (50%), Gupta et al [19]. Different geographic locations with differing climatic circumstances may be to responsible for variations in the prevalence rates reported in various studies, which typically alter the distribution of the vector that transmits dengue virus infection [9].

Among the 766 (23.94%) seropositive patients, the NS1Ag positivity rate was 15.88 % and the IgM positivity rate was 8.07%. ELISA assays revealed that males were more likely to be positive for NS1Ag than females. made up 46.26% and 48.06 % of those who tested positive for NS1 Ag and IgM, respectively, using ELISA assays. While both the NS1 Ag ELISA and the IgM ELISA yielded positive results in 53.74% and 51.94% of females, Padhi et al. [20] reported a similar female predominance (20.2% males and 21.2% females). A few studies, such as those conducted by Lakshmi et al. [13] (50.8% males and 49.2% females) and Kalaivani et al. [21] (50% males and 50% females), revealed nearly equal numbers of males and females. In our study, the majority of patients who tested positive for dengue cases were between the ages of 21 and 30 (45.56% by NS1Ag and 11.10% by IgM ELISA). Results from authors such as Patel and Bhatnagar [22], Garg et al. [10], Kumar et al. [23], and Padhi et al. [20] are used to support our work. According to our study, children and young adults are an active working population who are more likely to be exposed to tropical infections like dengue due to their habit of engaging in strenuous outdoor activities. The high incidences of seropositivity in the age groups of 21 to 30, followed by 11 to 20 years of age, Data analysis was carried out on a monthly basis to assess the seasonal variance of the illness. From October to December, NS1Ag ELISA detected a slow rise in cases, which peaked in the monsoon season of July to September before rapidly declining to zero in the months of April to June. However, IgM ELISA data from the months of October through December also showed an increase in cases. However, during some of the dry months, few instances were consistently seen. The investigations conducted by Patel and Bhatnagar [22], Vijayakarthikeyan [24], Garg et al. [10], Ukey et al. [16], Bhat et al. [17], Kumar et al. [23], Sujatha et al. [25] and Patankar et al. all showed similar patterns across the course of dengue virus illness [26].

CONCLUSION

The severity of the virus can range from subclinical infection, mild dengue, to severe dengue that can occasionally be fatal if not treated effectively. Dengue outbreaks have been observed in numerous regions of the world despite the WHO taking several preventative steps. Newer diagnostic methods, public awareness campaigns, improved education, and adequate vector control monitoring are needed to stop such epidemics. A vaccine that works against all five dengue virus serotypes must be created immediately.

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