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Research Article

Description of Clinical, Laboratory Profiles and Models of Dengue Fever in Nangarhar University Teaching Hospital During an Outbreak

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Abstract

Background: Four different strains of the virus cause dengue fever, and these are DEN1, DEN2, DEN3, and DEN4. the man was given by insects (Aedes). comes in two differences: dengue hemorrhagic fever and dengue fever. A person who has acquired one of the serovars will never acquire that serotype again, but he or she loses immunity to the other three serotypes and is then more prone to contracting dengue hemorrhagic fever. At Nangarhar University Teaching Hospital, we studied the Clinical and laboratory Profiles and models of Dengue Fever.

Materials and Methods: This study used retrospective hospital-based research. Clinical and analytical data from 141 patients who sought treatment at a Nangarhar University teaching hospital between July 2022 and February 2023 after being diagnosed with dengue infection were analyzed. Because our research was retrospective, we collected the files of dengue fever patients and studied the clinical, and laboratory examinations and the model of dengue fever. All laboratory examinations of dengue fever patients were performed free of charge at Nangarhar University Hospital. In Nangarhar University Hospital, the RDT (rapid dengue test strip) test is used to diagnose dengue fever. This test is also called dengue combo, which is determined by this NS1, IGM, and IgG test. CBC laboratory examinations were also studied in the files of the patients, and the WBC and thrombocyte counts of the patients were also studied. The variables that we studied are Dengue fever clinical features, laboratory tests (NS1, IGM and IgG, WBC and thrombocytes count), age and gender of patients. and dengue fever models. Both men and women were included in this research, but Other infectious diseases were not included in the study. The data is analyzed by Excel and SPSS version 26.

Result: There were 141 cases of dengue fever, with 114 (80.85%) males and 27 (19.85%) females. When they were divided into age groups, 81 (57.44%) of the patients were between the ages of 40 and 21, with 69 (48.93%) males and 12 (8.82%) females. There were 3 (2.20%) 60-year-olds, 2 (1.47%) of whom were men, and 1 (0.73%) of whom were women. About the symptoms, 141 patients (100%) experienced fever, 130 patients (92.19%) had myalgia, 120 patients (85.10%) had headaches, 3 patients (2.12%) had nausea and vomiting, and 2 patients (1.41%) had rash. individuals with dengue fever underwent laboratory investigations; NS1 124(87.94%) and IGM49 (34.79%) individuals tested positive. Patients with IgG (45.61%) tested positive. The dengue fever model indicated that 141 patients had the infection114 (80%) of the patients were males and 27 (19%) were females. The thrombocyte count in this model was ≥150000–50000, and the WBC count was 18500–2000.There were 27 (19.14%) in the DHF model, with 6 (4.25%) were women and 21 (14.89%) men. In this model, there were between 18500 and 3100 cases of thrombocytopenia and less than 20,000 WBC. One patient, a guy, had the DSS model; his thrombocyte count was 13000 and his WBC count was 6000. Approximately 80% of the dengue fever prevalence was in rural areas of Nangarhar and 20% in the population of Jalalabad city. case fatality rate (CFR) was 1.41%

Conclusion: From this research, it seems that all dengue fever patients have fever, the incidence of dengue fever is high in men, and there are more accidents in the age group of 20–40 years old. In the laboratory diagnosis of the patients, NS1 is mostly positive, and in terms of the dengue fever model, the DHF and DSS models are more fatal. Failure to prevent it will cause the death of patients.؛The prevalence of dengue fever is higher in rural areas than in urban areas.

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1. INTRODUCTION

An infectious illness called dengue fever (break-bone fever) is spread to people by mosquitoes. The majority of the regions are hot and tropical. The majority of cases are asymptomatic, and symptoms include high temperature, headache, body aches, nausea, and rash are the most typical symptoms. Because Nangarhar, in eastern Afghanistan, is hot and on the other side lies the Pakistani border, where many people cross through, Nangarhar experiences a lot of events. This topic is crucial since malaria is a serious illness with a growing incidence that, if left untreated, can lead to sepsis and bleeding. Therefore, it must be identified and treated as soon as possible. With approximately 390 million cases annually, 96 million of which are clinically obvious, and 3.9 billion people at risk globally, dengue is a systemic viral virus that has developed into a serious health burden, especially among tropical and subtropical countries. The World Health Organization (WHO) anticipates that dengue infection will be widespread in more than ten times as many countries as it was in 1970 (Badreddine, 2017). The serologic profiles used to diagnose dengue all contain nonstructural protein antigen (NS1Ag), immunoglobulin M (IgM), and immunoglobulin G (IgG). IgG experienced additional issues, but they weren't statistically significant. However, the diagnosis was validated by dengue serology (Ramabhatta, 2017). Dengue fever (DF) continues to be a danger to public health on an international level. It is an infection triggered by one of the five serovars (DENV 1–5) of the Flaviviridae virus family. The condition has become more common recently in Pakistan (Saba, 2019). As there is no primary care vaccination or specific treatment for dengue fever, an accurate diagnosis is necessary for the introduction of focused preventive care measures to stop the spread of the epidemic and minimize financial damage. Virus isolation, the identification of virus antigen or RNA in plasma, serum, or tissues, and the presence of dengue virus-specific antibodies in serum and other body fluids are commonly used diagnosis methods for establishing dengue infection. Lately, several techniques have been created for the quick laboratory diagnosis of dengue virus, such as centrifugation multiplication to increase virus separation percentage, true PCR for viral nucleic acid identification, free viral non-structure serological tests, and the Elisa assay for detection of anti-dengue virus immunoglobulin M (IgM) or IgG antibodies (Kao *et al.*, 2005). Dengue NS1 antigen, IgM, and IgG are diagnostic serologic investigations for the diagnosis of dengue fever (Sahana,2015). Fever, headache, myalgia, bleeding manifestations, Vomiting, and abdominal pain are the main symptoms of dengue fever (Sahana,2015). The three decades of urbanization, climate warming, and improved global mobility have increased the burden of dengue between 1990 and 2019. In particular, given the sharp rise in dengue cases in the Americas, concerns concerning Southeast Asia and South Asia persist (Yang *et al.*, 2021). 4 August 2022 – A new wave of dengue fever has been confirmed in Afghanistan with a total of 64 cases reported between 12 June and 30 July 2022 from Nangarhar province only, with no associated deaths. Of the 64 reported cases, 47 (73.4%) were female, and all were over 5 years of age. https://www.emro.who.int/afg/afghanistan-news/outbreak-update-dengue-fever-in-afghanistan-4-august-2022.html.

The severe form of dengue fever known as dengue hemorrhagic fever (DHF) affects the patient's hematology and results in an increase in hematocrit, a decrease in white blood cells, neutrophils, and platelets as well as a slight prolongation of the activated partial thromboplastin time, prothrombin time, and thrombin time. (Chuansumrit, 2014). The unintentional spread of the virus in previously disease-free areas, greater rates in endemic areas, or the reappearance of epidemics in areas below control can all increase the risk of getting more severe forms of the illness, such as dengue hemorrhagic fever (DHF) or dengue shock syndrome (DSS). From a mild fever to a potentially deadly DSS. (de Almeida, 2017). Dengue hemorrhagic fever (DHF), an acute form of the dengue viral infection that can cause severe bleeding, organ damage, and possibly death, affects between 15,000 and 105,000 people in Thailand. (Lauer,2018). Widespread adult DHF/DSS was initially identified during the Cuban DHF outbreak in 1981. There have been more adult DHF cases recorded recently, mostly in the Americas.

Science Direct. https://www.sciencedirect.com › medicine-and-dentistry. We looked at the clinical, laboratory, and model profiles of dengue fever at the Nangarhar University Teaching Hospital.

2. MATERIALS AND METHODS

Retrospective, hospital-based research was used in this study. An analysis was done on the clinical and analytical data of 141 patients who were diagnosed with dengue illness and sought treatment at a teaching hospital affiliated with Nangarhar University between July 2022 and February 2023. Since our study was retrospective, we gathered patient files related to dengue fever and examined laboratory tests, clinical findings, and dengue fever models. At Nangarhar University Hospital, all laboratory tests for dengue fever patients were provided at no cost to the patients. The rapid dengue test strip, or RDT test, is utilized at Nangarhar University Hospital to diagnose dengue disease. The NS1, IGM, and IgG tests determine the dengue combo test, which is another name for it. The WBC and thrombocyte count of the patients, as well as the CBC laboratory tests, were examined in the patient files. The clinical features of dengue fever, laboratory tests (NS1, IGM and IgG, WBC and thrombocyte count), patient age and gender, and dengue fever models are the variables that we looked at. This study included both men and women, but it did not contain data on other infectious disorders. Version 26 of SPSS and Excel are used to examine the data.

3. RESULTS

The number of dengue fever patients was 141, of which 114 (80.85%) were male and 27 (19.85%) were female. They were categorized according to age, and the number of patients aged 40–21 was 81 (57.44%), of which 69 (48.93%) were men and 12 (8.82%) were women. Among the 60-year-olds, there were 3 (2.20%) of whom 2 (1.47%) were men and 1 (0.73%) were women. The life category is described in Table 1. In terms of

symptoms, 141 (100%) dengue fever patients had fever, 130 (92.19%) had myalgia, 120 (85.10%) had headache, 3 (2.12%) had nausea and vomiting, and 2 (1.41%) had rash, as described in Table 2. According to the laboratory examinations of dengue fever patients, NS1 (124, 87.94%) patients were positive, and IGM49 (34.79%) patients were positive. IgG (45.61%) patients were positive, which is described in Table 3. According to the dengue fever model, 141 patients were infected with dengue fever; 114 (80%) of them were men and 27 (19%) were women. In this model, the WBC count was 18500–2000 and the thrombocyte count was≥150000–50000.

The DHF model was 27 (19.14%), of which 21 (14.89%) were men and 6 (4.25%) were women. The number of WBC in this model was less than 20,000, and the number of thrombocytopenia was 18500–3100. prevalence ratio of DHF (0.04171), and prevalence ratio of DSS (0.0070921). There was 1 patient with the DSS model who was also a man; his WBC count was 6000 and his thrombocyte count was 13000. case fatality rate (CFR) was 1.41%. the dengue fever model is described in Table 4. About 80% of the cases of dengue fever were in Nangarhar rural districts, and 20% of Jalalabad city's population was affected.

Descriptive Statistics

	N	Min.	Max.	Mean	Std. Deviation
Age	141	6	80	31.55	12.974
Valid N (listwise)	141				

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	6	1	.7	.7	.7
	7	1	.7	.7	1.4
	12	1	.7	.7	2.1
	15	1	.7	.7	2.8
	16	4	2.8	2.8	5.7
	17	3	2.1	2.1	7.8
	18	7	5.0	5.0	12.8
	19	2	1.4	1.4	14.2
	20	17	12.1	12.1	26.2
	21	3	2.1	2.1	28.4
	22	4	2.8	2.8	31.2
	23	5	3.5	3.5	34.8
	24	2	1.4	1.4	36.2
	25	5	3.5	3.5	39.7
	26	3	2.1	2.1	41.8
	27	2	1.4	1.4	43.3
	28	2	1.4	1.4	44.7
	30	19	13.5	13.5	58.2
	31	2	1.4	1.4	59.6
	32	3	2.1	2.1	61.7
	33	1	.7	.7	62.4
	34	1	.7	.7	63.1
	35	4	2.8	2.8	66.0
	36	2	1.4	1.4	67.4
	37	2	1.4	1.4	68.8
	38	3	2.1	2.1	70.9
	40	12	8.5	8.5	79.4
	42	2	1.4	1.4	80.9
	43	1	.7	.7	81.6
	44	1	.7	.7	82.3
	45	6	4.3	4.3	86.5
	46	1	.7	.7	87.2
	47	1	.7	.7	87.9
	48	1	.7	.7	88.7
	50	7	5.0	5.0	93.6
	52	1	.7	.7	94.3
	55	2	1.4	1.4	95.7
	59	1	.7	.7	96.5
	60	2	1.4	1.4	97.9
	65	1	.7	.7	98.6
	69	1	.7	.7	99.3
	80	1	.7	.7	100.0
	Total	141	100.0	100.0	

Table 1: Age groups of dengue fever

Age	Number n (%)	Male n (%)	Female n (%)
6-20	37(27.20%)	28(20.58%)	9(6.61%)
21-40	81(57.44%)	69(48.93%)	12(8.82%)
41-60	20(14.70%)	15(11.02%)	5(3.67%)
>60	3(2.20%)	2(1.47%)	1(0.73%)
Total	141(100%)	114(80.85%)	27(19.85%)

This table shows that dengue fever is more prevalent in 21-40-year-olds and males.

Table 2: symptoms of dengue fever

Fever n (%)	Myalgia n (%)	Headache n (%)	Nausea and vomiting	Rash
141(100%)	130(92.19%) %	120(85.10%)	3(2.12%)	2(1.41%)

The table shows that every dengue fever patient has a fever, so the fever is an important symptom of dengue fever.

Table 3: dengue fever serologic profiles

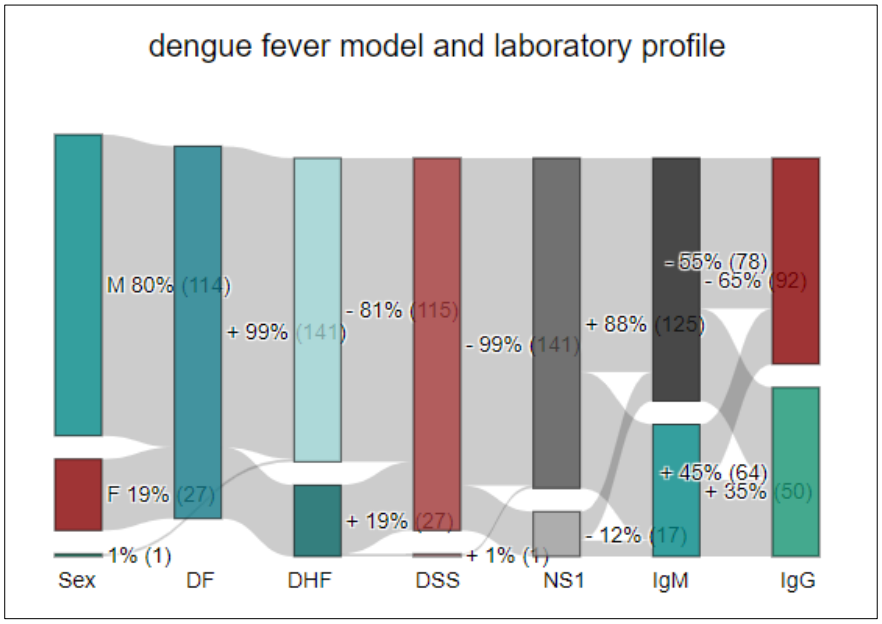
NS1+ve n (%)		IGM+ve n (%)		IgG +ve n (%)	
M	F	M	F	M	F
108(79.41%)	16(11.76%)	40(28.36%)	9(6.61%)	55(39.00%)	9(6.61%)

This table shows that NS1 is positive in more patients, especially in males, and IgG is more positive, it shows that past infection is more than acute infection. IgM shows acute infection, so acute infection is less than past infections

Table 4: Model of dengue fever

Dengue fever model	DF n (%)		DHF n (%)		DSS n (%)	
Gender	M	F	M	F	M	F
	114(80%)	27(19%)	21(14.89%)	6(4.25%)	1(!%)	0(0%)
Thrombocytes count	50000-≥150000		<20000		13000	
WBC	2000-18500		3100-18500		6000	

WBC (white blood cell), DF (dengue fever), DHF (dengue hemorrhagic fever), and DSS (dengue shock syndrome). this table shows that DHF is higher in males.



4. DISCUSSION

Our goal was the clinical, laboratory profiles, and model analysis of dengue fever in the Nangarhar University Teaching Hospital. so, we found that the number of dengue fever patients was 141, of which 80.85% were male and 19.85% were female. the number of patients aged 40–21 was 57.44%, of which 48.93% were men and 8.82% were women. In terms of symptoms, 100% of dengue fever patients had a fever, 92.19%had myalgia, 85.10% had a headache, 2.12% had nausea and vomiting, and 1.41% had a rash. the laboratory examinations of dengue fever patients, NS1 87.94% of patients were positive, and IGM34.79% of patients were positive. IgG 45.61% of patients were positive. the dengue fever model 141 patients. In this model, the WBC count was 18500–2000 and the thrombocyte count was ≥150000–50000. The DHF model was 19.14%, of which 14.89% were men and 4.25% were women. The number of WBC in this model was less than 20,000, and the number of thrombocytopenia was 18500–3100. There was 1 patient with the DSS model who was also a man; his WBC count was 6000 and his thrombocyte count was 13000. case fatality rate (CFR) was 1.41 .Because Nangarhar is a border province close to Pakistan, there are many dengue fever incidents in the border province of Pakistan, and on the other hand, Nangarhar is a hot province, so there are many dengue fever incidents in this place. Why dengue is more common in males? This is because males remain half-dressed most of the time in the day and females remain well-dressed. So, this can be the cause behind it." The high level of NS1 and IgM shows that the incidence of dengue fever is increasing and if the treatment, prevention, and vaccination are not taken care of, it will cause fatal complications.

As it was seen that dengue fever incidence is high among men and young people, so another research should be done that it is high in this gender and age group. Dengue is usually a mild illness. However, in about 5% of cases, it can progress to severe disease with associated shock, severe bleeding, or organ impairment. Mortality for dengue can be as high as 13% in untreated patients. Aging is associated with atypical symptoms and higher rates of illness and death due to increased susceptibility to infections in general. Also, the movement of people between the border areas of Afghanistan and Pakistan is increasing, so Dengue Fever in Pakistan is easily transferred to the border areas of Afghanistan. for prevention of dengue fever to Wear sleeves that are long and long skirts, use repellent to repel insects, and keep insects at bay both within and outside of your house. Visit the nearest clinic or emergency hospital as soon as possible if you feel fever, myalgia, headache, warning signals manifest in you or a member of your family, abdominal tenderness and/or pain, having at least three daily vomiting episodes, bleeding from the nose or gums, blood in the vomit or in the stool, feeling drained, restless, or irritable. In the control and prevention of dengue fever, all sections of society, including clerics, mosques, influential people, professors, and all intelligent and literate people, should take part. Dengue has been recognized in 81 children. comprising 26 (32.1%) girls and 55 (67.9%) boys. The presenters were, on average, 8 years old. IgM and IgG were all positive for dengue NS1 antigen in 66.7%, 29.6%, and 18.5% of patients. (Sahana,2015). Among the ages of 5 and 10, children made up almost all of them (42.6%). Most children had fevers and were flushed. Immunoglobulin M (IgM), immunoglobulin G (IgG), and dengue nonstructural protein antigen (NS1Ag) positivity rates were 15.8%, 14.6%, and 78%, in patients (Ramabhatta,2017). A prospective observational study was conducted to determine the initial signs of acute dengue virus infection. Children in Bangkok and Kamphaeng Phet hospitals who had a fever for 72 hours without knowing the reason were checked out. https://academic.oup.com/jid/article/176/2/313/787870 by guest on 06 April 2023 of the 515 patients involved in this research, men comprised the majority (72.81%). Myalgia (90.67%), headache (94.75%), and fever (100%) were the most prevalent symptoms (Deshwal,2015).

The dengue virus has become an important health problem in India. It is higher in younger age groups than among adults. Thus, an accurate evaluation of prevalence in younger age groups is required (Kumar, 2020).

The median age (and 25–75 percentiles) of dengue fever patients during primary and secondary infections were 12 (9–20) and 20 (14–31) years, respectively. The displayed aging-specific risk of clinical dengue increases with age for both primary and secondary infections. https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0001180

A study conducted in New Delhi on August 8, 1997, showed that in 134 patients, there were 92 (67%) cases of DHF and 42 (33%) cases of DSS. (Shah,2004). dengue fever can range from quiet febrile sickness and influenza to dengue hemorrhagic fever (DHF) with or without dengue shock syndrome (DSS). Chokephaibulkit,2013). Poor and irregular communication among community members, leaders, and governmental organizations increased the risk of dengue in the study area. As of this, preventing dengue fever has become challenging and carries a higher risk of fatality. Although the general populace should be aware of dengue prevention strategies and the potential for controlling the sickness through group action, they should be organized at the level of their residential colonies to remove dengue breeding grounds from their surroundings. Community leaders and resource people may be able to help remove dengue vectors due to a lack of collaboration and inactive local leadership. Community involvement in dengue prevention campaigns can help eliminate the vector through local efforts to maintain a clean environment. What part do local government officials play in reducing dengue? States and local governments should make every effort to guarantee that building sites, parks open to the public, and marshy areas in villages and townships are regularly inspected for mosquito breeding. Checking for mosquito eggs should also be done on the kinds of plants by the roadway and on public buildings that can collect water. Community people, leaders, and resource persons can eradicate dengue-breeding sites if they participate in awareness campaigns and exchange knowledge about dengue fever (Zahir,2016). To reduce the incidence of dengue fever, the area should be protected from mosquitoes Live in a home that is well-screened.

At home, use Repellents: Do not let water stagnate anywhere. Sleep with a mosquito net. Maintain an airy and well-lit home. Schedule Your Outings holds for Identify and eliminate mosquito breeding sites, seek early advice from health professionals, ensure self-defense, and support fogging or spraying. Humans contract dengue by biting female Aedes mosquitoes that are infected; these mosquitoes typically bite during the day. On still water, they lay their eggs.

5. CONCLUSION

Our goal in this research is to study the clinical picture of dengue fever, laboratory examinations of patients, and dengue fever models. According to this study, dengue fever appears to affect all cases, with a higher occurrence in men and a higher rate of accidents in the 20–40 age range. The majority of the patients' laboratory diagnoses are positive for NS1, and the DHF and DSS models of dengue fever are more lethal. Patients' deaths will result from not stopping it. The importance of this research is that if dengue fever is prevented, the deadly complications of this viral disease will be prevented. We should try to convey the health teachings to the people through social media and influential people so that people can be protected from this deadly disease.

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CONFLICT OF INTEREST

There are no conflicting opinions.

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AUTHORS CONTRIBUTIONS

This research was carried out by Dr. Saifullah Hadi and Dr. Nassemullah Rahmatzai, and the data was collected by Dr. Nassemullah Rahmatzai and analyzed by Dr. Hadi.

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