

Correlation Between Acute Dengue Severity and Persistent Post-Dengue Symptoms among Adult Patients: A Prospective Observational Cohort Study in a Tertiary-Care Hospital in Bangladesh

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Abstract

Original Research Article

Background: Dengue infection is a major cause of acute febrile illness and may be followed by persistent symptoms that affect recovery and daily functioning. This study aimed to assess the correlation between acute dengue severity and persistent post-dengue symptoms among adult patients. **Methods:** This prospective observational cohort study was conducted in the Department of Medicine, Magda Medical College, from July 2025 to December 2025. In total 90 adult patients with laboratory-confirmed dengue infection. Participants were enrolled during the acute phase and categorized as having dengue without warning signs, dengue with warning signs, or severe dengue according to standard clinical criteria. Socio-demographic, clinical, laboratory and hospitalization data were recorded and patients were followed to assess persistent post-dengue symptoms. Data were analyzed using SPSS version 25 and associations were assessed using appropriate statistical tests. **Results:** Dengue with warning signs was the most common severity category (42.2%), followed by dengue without warning signs (37.8%) and severe dengue (20.0%). Persistent post-dengue symptoms were observed in 65.6% of participants, with fatigue (43.3%), generalized weakness (37.8%), myalgia (30.0%) and arthralgia (26.7%) being the most frequent complaints. Persistent symptoms increased with acute disease severity, occurring in 38.2% of patients with dengue without warning signs, 71.1% with warning signs and 94.4% with severe dengue. The association between acute dengue severity and persistent post-dengue symptoms was statistically significant ($p < 0.001$). **Conclusion:** Persistent symptoms were common following dengue infection and showed a significant association with greater acute disease severity. Patients with warning signs and severe dengue may benefit from continued follow-up and supportive care.

Keywords: Dengue; disease severity; post-dengue symptoms; persistent fatigue; prospective cohort.

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INTRODUCTION

Dengue fever is one of the common diseases spread by mosquitoes and is one of the causes of acute febrile disease in tropical and subtropical parts of the world [1]. Dengue is acquired from the dengue virus and it is mainly transmitted by mosquitoes. Dengue can range in symptoms from uncomplicated febrile illness to dengue with warning signs or severe dengue with plasma leakage, severe bleeding, organ involvement, or shock. Acute illness is affected by various factors such as the host, immune system, viral factors and complications [2].

Though the emphasis during the clinical

presentation is usually on the acute phase and prevention of dangerous complications, the patient might not always have an instant recovery from the dengue infection [3]. There are many patients who continue to suffer from symptoms even when the fever and other manifestations of the disease have disappeared. The post-dengue symptoms may comprise of prolonged fatigue, weakness, myalgia, arthralgia, headaches, inability to engage in physical exercise, sleeping disorders and inability to concentrate on tasks [4]. Such symptoms can continue beyond apparent clinical recovery and may affect physical, psychological, social and occupational functioning [5].

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Prolonged fatigue is one of the most commonly occurring symptoms after dengue infection [6]. The exact mechanisms causing these symptoms have yet to be fully determined but can include prolonged immune activation, inflammatory reaction, temporary organ dysfunction, muscle involvement, changed metabolic state, and physiological stress due to acute infection [7]. Musculoskeletal symptoms and decreased functional capacity might further prevent the patient from resuming their everyday activities. This might lead to a higher burden of persistent problems for both the patient and the healthcare system and might not always be detected by the follow-up visit [8].

The association between the degree of severity of acute dengue infection and the occurrence of persistent symptoms is especially clinically important [9]. Patients with more severe acute symptoms might experience more physiological stress, higher inflammatory reaction, and organ involvement and thus be predisposed to having a longer recovery time [10]. Nevertheless, persistent symptoms can still occur even in cases where patients have relatively mild acute dengue infections [11]. Consequently, knowledge about whether acute dengue severity is related to the presence and persistence of post-dengue symptoms will be beneficial in identifying those individuals who need more attention in terms of follow-up care after the recovery period [12].

Identification of the pattern related to prolonged recovery will facilitate patient counseling and follow-up care after discharge. Thus, this study was conducted to determine the relationship between acute dengue severity and persistent post-dengue symptoms in adult individuals, as well as the pattern and duration of symptoms after recovery.

METHODOLOGY & MATERIALS

This prospective observational cohort study was conducted in the Department of Medicine, Mugda Medical College, from July 2025 to December 2025. A total of 90 adult patients with laboratory-confirmed

dengue infection were included using consecutive sampling. After enrolment during the acute phase of illness, participants were clinically assessed and categorized according to dengue severity as dengue without warning signs, dengue with warning signs, or severe dengue based on standard clinical criteria. Demographic characteristics, signs and symptoms, laboratory tests, platelet count, treatment details, need for hospitalization, and period of hospital stay were obtained through a standard data collection form. Subjects were then followed up prospectively to investigate the presence and duration of post-dengue syndrome symptoms like fatigue, body weakness, muscle pain, joint pain, headaches, low exercise capacity, insomnia, difficulty concentrating, and other related symptoms.

The inclusion criteria involved adult subjects aged 18 years old and above who had been diagnosed with laboratory-confirmed dengue fever, willing to give their informed written consent, and available for follow-up. Adult subjects with existing medical conditions that could cause persistent fatigue, musculoskeletal symptoms, neurological symptoms, and other forms of disability independently, with existing chronic fatigue and chronic pain syndromes, concurrent infections, pregnancy, and those who refused or were not available for follow-up were excluded from the study.

Data were collected through personal interview, physical examination, review of the medical records, and follow-up investigation. All collected data were verified for validity and reliability. The analysis was done using Statistical Package for the Social Sciences (SPSS) version 25.0. Descriptive statistics were expressed as frequency, percentage, mean and standard deviation as appropriate. The association between acute dengue severity and persistent post-dengue symptoms was assessed using the Chi-square test or Fisher's exact test where applicable. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Table I: Socio-demographic Characteristics of the Study Participants (n=90)

Variables	Frequency (n)	Percentage (%)
Age group (years)		
18–25	19	21.1
26–35	28	31.1
36–45	21	23.3
46–55	13	14.4
>55	9	10
Sex		
Male	52	57.8
Female	38	42.2
Residence		
Urban	61	67.8
Rural	29	32.2
Educational status		
Primary or below	17	18.9

Variables	Frequency (n)	Percentage (%)
Secondary	26	28.9
Higher secondary	24	26.7
Graduate and above	23	25.6
Occupation		
Service holder	27	30
Business	16	17.8
Homemaker	20	22.2
Student	15	16.7
Other	12	13.3

Table I presents the socio-demographic characteristics of the 90 study participants. The largest age group was 26–35 years, comprising 31.1% (n=28) of the cohort, followed by those aged 36–45 years (23.3%, n=21). Males constituted the majority, accounting for 57.8% (n=52) of the participants, while females represented 42.2% (n=38). In terms of residence, nearly two-thirds (67.8%, n=61) of the patients resided in urban

areas, with the remaining 32.2% (n=29) from rural localities. Regarding educational attainment, secondary-level education was most common (28.9%, n=26), followed by higher secondary (26.7%, n=24) and graduate or above (25.6%, n=23). Service holders were the predominant occupational group (30.0%, n=27), followed by homemakers (22.2%, n=20).

Table II: Acute Clinical and Laboratory Characteristics of Dengue Patients (n=90)

Variables	Frequency (n)	Percentage (%)
Dengue severity		
Dengue without warning signs	34	37.8
Dengue with warning signs	38	42.2
Severe dengue	18	20
Common presenting symptoms		
Fever	90	100
Headache	68	75.6
Myalgia	72	80
Arthralgia	51	56.7
Nausea/vomiting	39	43.3
Abdominal pain	29	32.2
Skin rash	26	28.9
Bleeding manifestation	17	18.9
Lowest platelet count during acute illness		
≥100,000/mm ³	25	27.8
50,000–99,999/mm ³	31	34.4
20,000–49,999/mm ³	22	24.4
<20,000/mm ³	12	13.3
Hospital admission		
Required admission	49	54.4
Managed without admission	41	45.6
Length of hospital stay among admitted patients (n=49)		
≤3 days	21	42.9
4–5 days	18	36.7
>5 days	10	20.4

Multiple responses were possible for presenting symptoms.

Table II summarizes the acute clinical and laboratory characteristics of the 90 dengue patients. Regarding disease severity, the majority had dengue with warning signs (42.2%, n=38), followed by dengue without warning signs (37.8%, n=34), while 20.0% (n=18) presented with severe dengue. Fever was universally present (100%), with myalgia being the most

common accompanying symptom (80.0%, n=72), followed by headache (75.6%, n=68) and arthralgia (56.7%, n=51). The lowest platelet count during acute illness was most frequently in the range of 50,000–99,999/mm³ (34.4%, n=31), while 13.3% (n=12) had profound thrombocytopenia below 20,000/mm³. More than half of the patients (54.4%, n=49) required hospital admission and among those admitted, the majority had a hospital stay of ≤3 days (42.9%, n=21) or 4–5 days (36.7%, n=18).

Table III: Persistent Post-Dengue Symptoms During Follow-Up (n=90)

Persistent symptoms*	Frequency (n)	Percentage (%)
Persistent fatigue	39	43.3
Generalized weakness	34	37.8
Myalgia	27	30
Arthralgia	24	26.7
Headache	19	21.1
Difficulty in concentration	16	17.8
Sleep disturbance	14	15.6
Reduced exercise tolerance	22	24.4
Persistent loss of appetite	13	14.4
No persistent symptoms	31	34.4
Duration of persistent symptoms		
No persistent symptoms	31	34.4
≤2 weeks	21	23.3
3–4 weeks	18	20
5–8 weeks	12	13.3
>8 weeks	8	8.9

Multiple persistent symptoms could be reported by the same patient.

Table III presents the persistent post-dengue symptoms reported during follow-up among the 90 participants. Overall, 65.6% (n=59) of patients experienced at least one persistent symptom, while 34.4% (n=31) reported complete resolution with no ongoing complaints. The most frequently reported persistent symptom was fatigue, affecting 43.3% (n=39) of patients, followed by generalized weakness (37.8%,

n=34), myalgia (30.0%, n=27) and arthralgia (26.7%, n=24). Other notable symptoms included reduced exercise tolerance (24.4%, n=22), headache (21.1%, n=19), difficulty in concentration (17.8%, n=16), sleep disturbance (15.6%, n=14) and persistent loss of appetite (14.4%, n=13). Regarding symptom duration, among those with persistent symptoms, the majority experienced symptoms lasting ≤2 weeks (23.3%, n=21) or 3–4 weeks (20.0%, n=18), while 13.3% (n=12) had symptoms persisting for 5–8 weeks and 8.9% (n=8) reported symptoms lasting beyond 8 weeks.

Table IV: Association Between Acute Dengue Severity and Persistent Post-Dengue Symptoms (n=90)

Acute dengue severity	Persistent symptoms Present n (%)	Persistent symptoms Absent n (%)	p value
Dengue without warning signs	13 (38.2)	21 (61.8)	
Dengue with warning signs	27 (71.1)	11 (28.9)	
Severe dengue	17 (94.4)	1 (5.6)	
Total	57 (63.3)	33 (36.7)	<0.001

Table IV demonstrates the association between acute dengue severity and the presence of persistent post-dengue symptoms among the 90 study participants. A clear gradient was observed, with the proportion of patients reporting persistent symptoms increasing progressively with greater acute disease severity. Among patients with dengue without warning signs, only 38.2% (n=13) developed persistent symptoms, whereas 61.8% (n=21) remained symptom-free. In contrast, among those with dengue with warning signs, 71.1% (n=27) experienced persistent symptoms compared to 28.9% (n=11) who did not. Notably, among patients with severe dengue, the vast majority (94.4%, n=17) developed persistent post-dengue symptoms, with only one patient (5.6%) reporting no persistent complaints. Overall, 63.3% (n=57) of the total cohort experienced persistent symptoms, while 36.7% (n=33) did not. This association was highly statistically significant ($p < 0.001$).

DISCUSSION

The present prospective observational cohort study evaluated the relationship between acute dengue severity and persistent post-dengue symptoms among 90 adult patients. The findings demonstrated that persistent symptoms were common following recovery from acute dengue and were significantly associated with the severity of the initial illness. Overall, 63.3% of the participants experienced at least one persistent post-dengue symptom, with fatigue being the most common complaint, followed by generalized weakness, myalgia and arthralgia. A progressive increase in persistent symptoms was observed across the spectrum of acute disease severity and the association between acute dengue severity and post-dengue symptoms was highly statistically significant ($p < 0.001$).

The bulk of participants involved in the present study were young and middle-aged adults, with the highest frequency of participants aged 26-35 years (31.1%), followed by those aged 36-45 years (23.3%). Male participants represented 57.8% of the total participants. This trend conforms to the trend seen in many adult dengue studies, where economically productive age groups make up a large percentage of the affected individuals. Thomas *et al.*, discussed the clinical features of adult dengue patients and revealed the wide range of clinical presentations of dengue infections among adults [13]. Likewise, Lytton *et al.*, highlighted the fact that adult dengue infection often did not have serious presentation even though patients can have diverse warning symptoms and clinical presentations [14].

In the present study, warning dengue was the most common presentation with a proportion of 42.2%, followed by non-warning dengue (37.8%), while severe dengue accounted for 20.0% of patients. All participants were febrile, whereas myalgia (80.0%), headache (75.6%) and arthralgia (56.7%) were other common presentations. Abdel-Monem *et al.*, also reported that dengue may present with a broad range of systemic manifestations, particularly fever, headache, musculoskeletal pain and other constitutional symptoms [15]. The predominance of fever and musculoskeletal symptoms in the present study is therefore consistent with the recognized clinical presentation of acute dengue infection.

Thrombocytopenia was another important finding in the current study, with 34.4% of patients having a lowest platelet count between 50,000 and 99,999/mm³, while 13.3% developed profound thrombocytopenia below 20,000/mm³. More than half of the patients required hospital admission. These findings reflect the substantial clinical burden associated with acute dengue. Tejo *et al.*, emphasized that severe dengue may involve significant plasma leakage, bleeding, shock and organ dysfunction requiring intensive monitoring and supportive management [16]. Similarly, Chanchaoenthana *et al.*, suggested that dysregulated biological and inflammatory processes may contribute to progression toward severe dengue, supporting the concept that a more intense systemic response during acute infection may influence subsequent recovery [17].

Persisting symptoms were seen commonly in follow-up in the present cohort. Fatigue was noted in 43.3% of patients, whereas 37.8% of patients reported generalized weakness, myalgia in 30.0% and arthralgia in 26.7%. These results corroborate with those of Perera *et al.*, who have studied persisting fatigue symptoms post dengue and found that persisting fatigue is one of the important consequences in adult patients after acute dengue [18]. The high incidence of fatigue and weakness in the present study implies that the recovery from acute

febrile period may not always imply full functional recovery.

The musculoskeletal symptoms in the present study were also confirmed by Zambrano *et al.*, who had evaluated rheumatic symptoms post dengue and found that joint and musculoskeletal symptoms persist in follow-up [19]. In the present study, 26.7% of patients presented with arthralgia and 30.0% with myalgia, which means that musculoskeletal symptoms may persist even after the acute infection period. Reduced exercise tolerance was seen in 24.4% of the subjects, and this could be due to the combined effect of fatigue, weakness and persisting musculoskeletal symptoms.

Neurological and neurocognitive symptoms were present in a smaller but clinically important proportion of the participants. Headache persisted in 21.1%, while 17.8% reported difficulty in concentration and 15.6% experienced sleep disturbance. Guzman and Martinez, as well as Fong *et al.*, highlighted that dengue infection may be associated with both central and peripheral nervous system manifestations [20,21]. Although the present study did not focus specifically on severe neurological complications, the persistence of headache and concentration difficulties may represent part of the broader spectrum of post-dengue neurological or neurocognitive sequelae. Rosca *et al.*, further emphasized the diversity of neurological and movement-related manifestations reported following dengue infection [22].

One of the most important outcomes of this research has been the strong correlation between the severity of the acute infection and the presence of persistent symptoms. In particular, persistent symptoms have been observed in 38.2% of the patients diagnosed with dengue with no warning signs, and in 71.1% and 94.4% of patients with warning signs and severe dengue, respectively. It seems that the clearly established gradient according to the severity of the disease, in combination with the statistically significant correlation between the two variables ($p < 0.001$), provides evidence of the possibility of extended period of convalescence in patients with acute infection that is associated with a higher level of severity. It is evident that severe dengue involves higher levels of systemic involvement and physiological stress; the role of this factor in the development of persistent complications is discussed by Tejo *et al.*, [16].

In general, the negative effects of dengue in the post-acute period can be demonstrated on the example of Lim *et al.*, who found that dengue infection resulted in increased healthcare utilization and related costs [23].

Limitations of the study

This study had several limitations, including a relatively small sample size. Persistent symptoms were mainly assessed through patient-reported complaints,

which may be subject to recall bias. In addition, other factors that could influence prolonged symptoms may not have been completely controlled.

CONCLUSION

Persistent post-dengue symptoms were common among adult patients, with fatigue, generalized weakness, myalgia and arthralgia being the most frequent complaints. The occurrence of persistent symptoms increased significantly with greater acute dengue severity, highlighting the importance of continued follow-up and supportive care, particularly for patients with severe disease.

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