SAS Journal of Medicine
Abbreviated Key Title: SAS J Med
ISSN 2454-5112
Journal homepage: https://saspublishers.com

OPEN ACCESS

Medicine

Admission-Seeking Behavior and Determinants of Hospitalization among Dengue Patients in a Tertiary Care Hospital

Dr. Abhizit Pandit[1]*, Dr. Dwijaraz Chakraborty[2], Dr. Aishi Roy[3], Dr. Md. Anamul Haque[4], Dr. Nafisa Nawer Khan[5], Dr. Ananya Lahiri Sristy[6]

[1]Senior Consultant, Department of Medicine, Mugda Medical College Hospital, Dhaka, Bangladesh
[2]Emergency Medical Officer, 250 Bed General Hospital, Dinajpur, Bangladesh
[3]Intern Doctor, Mugda Medical College Hospital, Dhaka, Bangladesh
[4]Senior Consultant, Department of Medicine, Mugda Medical College Hospital, Dhaka, Bangladesh
[5]Trainee Medical Officer, Mugda Medical College Hospital, Dhaka, Bangladesh
[6]Medical Officer, Department of Obstetrics and Gynaecology, Dhaka National Medical Institute Hospital, Dhaka, Bangladesh

DOI: https://doi.org/10.36347/sasjm.2025.v11i12.008 | **Received:** 19.10.2025 | **Accepted:** 11.12.2025 | **Published:** 16.12.2025

***Corresponding author:** Dr. Abhizit Pandit
Senior Consultant, Department of Medicine, Mugda Medical College Hospital, Dhaka, Bangladesh

Abstract **Original Research Article**

Background: Dengue fever continues to challenge healthcare systems in Bangladesh, where hospitalization patterns often reflect both clinical severity and behavioral influences. Understanding determinants of hospital admission can guide rational triage and improve resource allocation. ***Objective:*** To assess admission-seeking behavior and identify clinical, demographic, and behavioral determinants of hospitalization among dengue patients in a tertiary care hospital. ***Methods:*** A cross-sectional study was conducted among 200 serologically confirmed dengue patients admitted to Mugda Medical College Hospital, Dhaka. Data on sociodemographic features, awareness, and care-seeking behavior were collected through structured interviews and hospital records. Logistic regression analyses identified independent predictors of physician-adjudicated necessary admission and delayed presentation. ***Results:*** The majority of patients were young adults (mean age 31.8 years), male (57.5%), and from rural areas (46.5%). Fear of dengue (66%) and media-driven anxiety (31%) were leading reasons for early admission. Warning signs were the strongest determinant of necessary hospitalization (AOR = 7.48, $p < 0.001$), followed by rural residence (AOR = 2.50, $p = 0.045$). Older age (AOR = 0.65 per 10 years, $p = 0.031$), lower education (AOR = 0.12, $p = 0.003$), and knowledge of warning signs (AOR = 0.37, $p = 0.038$) significantly reduced delayed presentation. Despite high awareness of dengue, only 40.5% could identify danger symptoms requiring admission. ***Conclusion:*** Both under- and over-admission patterns were evident, shaped by awareness, anxiety, and access disparities. Strengthening patient education and standardized triage criteria is essential for efficient dengue case management in resource-limited settings.

Keywords: Dengue Fever, Hospitalization Behavior, Warning Signs.

INTRODUCTION

Dengue fever remains one of the most rapidly expanding vector-borne viral infections globally, posing a persistent challenge to health systems across tropical and subtropical regions. Over the past three decades, its incidence has risen dramatically due to the synergistic effects of population growth, unplanned urbanization, increased human mobility, and climatic changes that facilitate mosquito breeding and viral transmission [1, 2]. The World Health Organization estimates that nearly 390 million dengue infections occur each year, of which approximately 96 million manifest clinically [1]. This staggering global burden reflects the transition of dengue from a periodic epidemic disease to an endemic and increasingly urban health crisis. The continuing rise in case counts and hospitalization rates underscores an urgent need to understand admission dynamics, clinical prioritization, and patient behavior surrounding hospital care.

In South and Southeast Asia, dengue has evolved into a major public health emergency, with the region contributing over half of the global disease burden [3]. Bangladesh, in particular, has experienced increasingly frequent and intense outbreaks over the last two decades, with 2019, 2023, and 2024 representing the most severe epidemic years in recorded history [4, 5].

The cyclical nature of these outbreaks has placed immense pressure on tertiary hospitals, especially in densely populated urban centers such as Dhaka, where seasonal surges lead to bed shortages, overcrowded wards, and resource misallocation. Hospital records from recent outbreaks reveal a growing number of admissions that do not necessarily meet the clinical severity criteria, suggesting that factors beyond disease pathology, such as anxiety, misinformation, and social expectations, may be influencing the decision to seek hospitalization [6, 7]. These patterns underline the need to critically examine admission-seeking behaviors within the local context to guide rational triage and efficient hospital resource use.

The World Health Organization's revised classification of dengue established clear clinical indicators for hospital admission, such as presence of warning signs, severe plasma leakage, bleeding manifestations, comorbidities, pregnancy, and old age etc., as essential thresholds for inpatient care [8]. Subsequent multicenter evaluations have shown that overreliance on minor warning signs or unstandardized interpretations often leads to over-admission without improving outcomes [8, 9]. In countries such as Singapore, rational application of these WHO admission guidelines has enabled hospitals to reduce dengue-related admissions by nearly 30% without adverse clinical effects [10]. Conversely, in resource-limited settings like Bangladesh, an overly cautious admission approach frequently results in congestion within tertiary care facilities, compromising quality of care for genuinely severe cases [5]. The combination of diagnostic uncertainty, patient anxiety, and limited outpatient monitoring options contributes to this systemic inefficiency, particularly during peak epidemic periods.

The complexity of dengue admission behavior extends beyond clinical indicators. Studies across South and Southeast Asia indicate that patients' perceptions, prior experiences, and socioeconomic realities play significant roles in determining when and where they seek care. For many families, previous dengue episodes or media coverage of fatalities generate heightened anxiety, prompting early hospital admission even for mild febrile illnesses [11]. Conversely, low health literacy, financial barriers, and perceived mildness of symptoms delay care-seeking among others, often leading to late presentation with severe disease manifestations [12, 13]. Qualitative studies from endemic regions reveal that individuals frequently engage in self-medication or first consult informal healthcare providers, reflecting both accessibility constraints and trust deficits within formal health systems [13, 14]. Such divergent health-seeking pathways highlight the bidirectional problem of early and unnecessary admission on one hand, and delayed hospital presentation on the other, each carrying distinct implications for dengue morbidity and healthcare system strain.

Socioeconomic disparities and behavioral determinants are therefore integral to understanding dengue hospitalization patterns. Lower-income households, constrained by opportunity costs and transportation barriers, are more likely to delay seeking care until disease severity escalates [12]. In contrast, middle-income urban families may pursue early hospitalization as a form of preventive assurance, often reinforced by community narratives or physician recommendation in private clinics. Public fear, amplified by media reporting during epidemic waves, further skews health-seeking behavior toward inpatient admission irrespective of clinical necessity [11]. These psychosocial and structural factors collectively contribute to uneven hospital utilization, posing a challenge for evidence-based triage and policy formulation.

Despite the growing volume of dengue epidemiological data, there remains a paucity of research that integrates clinical, behavioral, and socioeconomic determinants of hospital admission in Bangladesh. Existing national studies have predominantly focused on epidemiological surveillance and virological patterns rather than patient-level decision-making processes [4, 6]. Consequently, understanding the determinants of hospitalization, whether clinical, economic, or perceptual, has become crucial for designing targeted interventions that balance patient safety with rational healthcare utilization.

The present study aims to address this gap by examining admission-seeking behavior and identifying determinants of hospitalization among dengue patients in a tertiary care hospital in Bangladesh. By linking clinical criteria with behavioral and socioeconomic factors, this research seeks to delineate patterns of justified and potentially avoidable admissions, offering evidence-based insights for strengthening triage protocols and optimizing dengue case management in resource-limited healthcare settings.

METHODS

This prospective cross-sectional study was conducted over a six-month period from April to September 2025 in the Dengue Ward of the Department of Medicine at Mugda Medical College Hospital, Dhaka, Bangladesh. A total of 200 patients were recruited using consecutive sampling as they were admitted to the designated dengue treatment unit during the study period. Patients of all ages and genders were eligible for inclusion if they had a confirmed diagnosis of dengue infection based on serological tests detecting IgM, IgG, or both, and provided informed written consent to participate. Individuals who tested negative for both IgM and IgG were excluded from the study to ensure diagnostic accuracy. After admission, trained medical personnel collected data using a structured questionnaire and hospital records, including sociodemographic characteristics, clinical features, laboratory parameters,

and healthcare-seeking patterns prior to presentation. The study focused on admission-seeking behavior and determinants of hospitalization, with clinical need for admission verified according to the WHO 2009 dengue severity classification and presence of warning signs. All patient information was coded to maintain confidentiality, and the study adhered to ethical standards outlined by the hospital ethics committee. Descriptive and analytical statistics were planned to assess associations between clinical indicators, behavioral factors, and hospitalization status. Continuous variables were summarized as means and standard deviations or medians with interquartile ranges, while categorical data were presented as frequencies and percentages. Associations between relevant variables were assessed using chi-square tests or Fisher's exact test when appropriate, and significance was set at $p < 0.05$.

RESULTS

Table 1: Sociodemographic and baseline clinical characteristics of admitted dengue patients (n = 200)

Sociodemographic characteristics	Category	Value
Age group (years)	<18	20 (10.0%)
	18–29	84 (42.0%)
	30–44	48 (24.0%)
	45–59	34 (17.0%)
	≥60	14 (7.0%)
	Mean ± SD	31.8 ± 16.8 years
Gender	Male	115 (57.5%)
	Female	84 (42.0%)
	Other	1 (0.5%)
Residence	Rural	93 (46.5%)
	Urban	85 (42.5%)
	Semi-urban	22 (11.0%)
Education level	College level	107 (53.5%)
	Postgraduate level	26 (13.0%)
	Undergraduate level	23 (11.5%)
	Primary level	20 (10.0%)
	No formal education	19 (9.5%)
	Other	5 (2.5%)
Occupation	Student	74 (37.0%)
	Homemaker	37 (18.5%)
	Business / self-employed	18 (9.0%)
	Service / salaried job	19 (9.5%)
	Manual worker	14 (7.0%)
	Farmer	14 (7.0%)
	Teacher	8 (4.0%)
	Not specified	8 (4.0%)
	Unemployed	5 (2.5%)
	Health professional	3 (1.5%)
Monthly income category (BDT)	10,001–20,000	116 (58.0%)
	20,001–40,000	37 (18.5%)
	>40,000	31 (15.5%)
	≤10,000	16 (8.0%)
	Mean ± SD	30162.9 ± 25116.4 BDT

Among the 200 admitted dengue patients, the mean age was 31.8 ± 16.8 years, and most patients were young adults, with 42.0% belonging to the 18–29 years age group. Children under 18 years accounted for 10.0%, while older adults aged ≥60 years represented 7.0% of total admissions. Males constituted the majority of cases (57.5%), followed by females (42.0%), while only 0.5% identified as other gender. Nearly half of the patients resided in rural areas (46.5%), whereas 42.5% were from urban communities and 11.0% from semi-urban regions. In terms of education, more than half had college-level education (53.5%), followed by postgraduate (13.0%) and undergraduate (11.5%) backgrounds; only 9.5% had no formal education. Students formed the largest occupational category (37.0%), followed by homemakers (18.5%), and small proportions were business/self-employed (9.0%), service workers (9.5%), manual workers (7.0%), farmers (7.0%), and teachers (4.0%). Monthly income analysis showed that most patients belonged to the 10,001–20,000 BDT category (58.0%), followed by 20,001–40,000 BDT (18.5%) and >40,000 BDT (15.5%), with a mean income of 30,162.9 ± 25,116.4 BDT. Overall, the findings indicate a predominance of young, rural, and college-educated

individuals among hospitalized dengue cases, with a relatively low- to middle-income economic profile.

Table 2: Clinical and laboratory characteristics among admitted dengue patients (n = 200)

Clinical and laboratory characteristics	Category	Value
NS1 result on admission	Positive	138 (69.0%)
	Negative	42 (21.0%)
	Not done	20 (10.0%)
IgM result on admission	Positive	121 (60.5%)
	Negative	51 (25.5%)
	Not done	28 (14.0%)
Platelet count (per µL)	<50,000	70 (35.0%)
	50,000–99,999	96 (48.0%)
	≥100,000	34 (17.0%)
	Mean ± SD	67,863.2 ± 43,733.6
Hematocrit (%)	<30	28 (14.0%)
	30–34.9	84 (42.0%)
	35–39.9	39 (19.5%)
	≥40	49 (24.5%)
	Mean ± SD	35.9 ± 6.4
Admission indication†	Altered mental state	34 (17.0%)
	Bleeding	88 (44.0%)
	Hypotension	127 (63.5%)
	Persistent vomiting	87 (43.5%)
	Respiratory distress	56 (28.0%)
	Mild case	29 (14.5%)
	No warning signs	29 (14.5%)

* Multiple admission indications per patient were possible; percentages do not sum to 100%.

Among the 200 admitted dengue patients, NS1 antigen testing was positive in 69.0% of cases, while 21.0% tested negative and 10.0% did not undergo NS1 assessment at admission. IgM antibody results showed positivity in 60.5% of patients, whereas 25.5% were negative and 14.0% were not tested. Platelet evaluation revealed that 35.0% of patients had severe thrombocytopenia with counts <50,000/µL, nearly half (48.0%) fell within the 50,000–99,999/µL range, and 17.0% had counts ≥100,000/µL, with an overall mean platelet level of 67,863.2 ± 43,733.6/µL. Hematocrit levels indicated that 42.0% of patients fell between 30–34.9%, 24.5% had values ≥40%, and 14.0% were below 30%, yielding a mean hematocrit of 35.9 ± 6.4%. Based on admission indications, hypotension was the most frequent clinical reason for hospital presentation (63.5%), followed by bleeding manifestations (44.0%), persistent vomiting (43.5%), and respiratory distress (28.0%). Altered mental state was noted in 17.0% of cases, while 14.5% of patients presented as mild cases without warning signs.

Table 3: Admission-seeking behaviour, awareness, and reasons for delay or early admission among admitted dengue patients (n = 200)

Characteristic	Category	Value
Care-seeking timing	Days from symptom onset to first healthcare contact	9.7 ± 10.9 days
	Days from symptom onset to hospital admission	11.3 ± 11.2 days
First action after symptom onset†	No action	65 (32.5%)
	Took medicine at home	124 (62.0%)
	Visited pharmacy	84 (42.0%)
	Visited village doctor	40 (20.0%)
	Visited government OPD	26 (13.0%)
	Visited private clinic	25 (12.5%)
Awareness and information	Heard about dengue before	192 (96.0%)
	Aware that dengue can be fatal	140 (70.0%)
Source of dengue information‡	Television	104 (52.0%)
	Social media	42 (21.0%)
	Family or friends	31 (15.5%)
	Healthcare provider	23 (11.5%)

Characteristic	Category	Value
Knowledge of symptoms indicating hospital admission‡ (symptoms recognized)	Fever	101 (50.5%)
	Bleeding	50 (25.0%)
	Vomiting	36 (18.0%)
	Rash	16 (8.0%)
	Hypotension	8 (4.0%)
	Weakness	2 (1.0%)
	Headache	2 (1.0%)
	Any warning sign (bleeding, hypotension, vomiting, weakness)	81 (40.5%)
Reasons for hospital visit‡	Fever	98 (49.0%)
	Bleeding	34 (17.0%)
	Vomiting	29 (14.5%)
	Rash	16 (8.0%)
	Hypotension	3 (1.5%)
	Weakness	5 (2.5%)
	Headache	9 (4.5%)
	Family or relative advice	8 (4.0%)
Reasons for delaying hospital visit‡	Thought illness was minor	99 (49.5%)
	Lack of money	81 (40.5%)
	Travel problems	62 (31.0%)
	Waited for test results	56 (28.0%)
	No one to accompany	26 (13.0%)
	Family obligations	22 (11.0%)
	Other reasons	14 (7.0%)
Reasons for early or anxiety-driven admission‡	Fear of dengue	132 (66.0%)
	News or media driven concern	62 (31.0%)
	Previous family history of dengue	60 (30.0%)
	Work, college or school pressure	33 (16.5%)
	Doctor or relative advised admission	39 (19.5%)
	Wanted to be safe	28 (14.0%)
	Other reasons	8 (4.0%)

† Multiple first actions could be reported; percentages do not sum to 100%.
‡ Multiple responses were allowed; percentages do not sum to 100%.

Admission-seeking patterns showed considerable delay among dengue patients, with an average of 9.7 ± 10.9 days from symptom onset to first healthcare contact and 11.3 ± 11.2 days before hospital admission. Early symptom management prior to seeking hospital care was common, as 62.0% of patients first took medicine at home, 42.0% sought advice from a pharmacy, and 20.0% consulted a village doctor; notably, 32.5% took no immediate action after symptom onset. Awareness levels were high, with 96.0% having heard of dengue and 70.0% knowing it could be fatal, and the primary source of dengue information was television (52.0%), followed by social media (21.0%). Despite general awareness, only 40.5% could identify any warning sign that necessitates hospital admission, and very few recognized severe markers such as hypotension (4.0%) or bleeding (25.0%). Fever was the most commonly perceived reason to visit a hospital (49.0%), while bleeding (17.0%) and vomiting (14.5%) were less frequently recognized as urgent symptoms.

Among reasons for delayed hospitalization, nearly half of the patients believed the illness was minor (49.5%), while financial difficulty (40.5%), travel barriers (31.0%), waiting for test results (28.0%), and absence of an accompanying caregiver (13.0%) also contributed to late care-seeking. In contrast, early or anxiety-driven admission was primarily motivated by fear of dengue (66.0%), media-based concern (31.0%), and previous family history of dengue (30.0%). Additional triggers included pressure from school or work (16.5%) and advice from doctors or relatives (19.5%).

Table 4: Physician recommendation, patient decision, and concordance of perceived necessity of admission (n = 200)

Characteristic	Category	Value
Admission recommendation and decision	Doctor recommended admission	172 (86.0%)
	Came on own decision/family insistence	166 (83.0%)
Combined admission decision pattern	Both doctor and self/family	146 (73.0%)
	Doctor recommended only	26 (13.0%)
	Self/family insistence only	20 (10.0%)
	Neither specified	8 (4.0%)
Physician assessment of admission necessity	Necessary	127 (63.5%)
	Not necessary	39 (19.5%)
	Uncertain	34 (17.0%)
Patient perception of admission necessity	Absolutely necessary	146 (73.0%)
	Could have been avoided	36 (18.0%)
	Not sure	18 (9.0%)

Panel A. Admission recommendation, decision, and perceived necessity

Most patients were advised inpatient management by physicians, with 86.0% reporting doctor-recommended admission, while 83.0% presented due to personal or family decision. Admission decisions frequently involved both parties, as 73.0% of patients were admitted based on a combined influence from physicians and family, whereas 13.0% were admitted solely on doctor recommendation and 10.0% on patient or family insistence alone. From the clinical standpoint, physicians considered hospitalization to be clearly necessary in 63.5% of cases, while 19.5% were judged as not requiring admission and 17.0% remained uncertain. In contrast, patients expressed a higher level of perceived urgency, with 73.0% believing their admission was absolutely necessary, 18.0% acknowledging it could have been avoided, and 9.0% remaining unsure.

Physician assessment → / Patient view ↓	Absolutely necessary (n = 146)	Could have been avoided (n = 36)	Not sure (n = 18)	Total (row)
Necessary (n = 127)	105 (82.7%)	13 (10.2%)	9 (7.1%)	127 (100%)
Not necessary (n = 39)	22 (56.4%)	12 (30.8%)	5 (12.8%)	39 (100%)
Uncertain (n = 34)	19 (55.9%)	11 (32.4%)	4 (11.8%)	34 (100%)
Total (n = 200)	146 (73.0%)	36 (18.0%)	18 (9.0%)	200 (100%)
Test for Association	$\chi^2(4) = 17.6$, $p = 0.001$			

Panel B. Concordance between physician and patient assessment of admission necessity

The relation between physician evaluation and patient perception revealed significant disparities. Among patients whom physicians classified as requiring admission, 82.7% believed hospitalization was absolutely necessary, whereas even among those categorized as "not necessary," more than half (56.4%) still felt admission was essential. Likewise, a substantial proportion of cases deemed "uncertain" by doctors (55.9%) were perceived by patients as mandatory hospitalization. Overall, only 10.2–32.4% of those with clinically unnecessary or uncertain need recognized the possibility of avoidable admission. Statistical analysis showed a significant association between physician and patient assessments ($\chi^2 = 17.6$, $p = 0.001$), indicating that while the two perspectives were related, clear discordance persisted.

Table 5: Multivariable logistic regression showing determinants of physician-adjudicated necessary admission among dengue inpatients (n = 200)

Predictor	Adjusted OR	95% CI	p-value
Age (per 10-year increase)	1.18	0.85–1.63	0.325
Female sex (vs male)	0.93	0.38–2.26	0.864
Rural residence (vs urban/semi-urban)	2.50	1.02–6.10	0.045
Low education (no/primary vs ≥secondary)	1.77	0.51–6.15	0.369
Low income (≤20,000 BDT vs >20,000)	1.29	0.42–3.98	0.652
Any warning sign present	7.48	2.85–19.67	<0.001
Admitted as mild case	1.07	0.29–3.94	0.914
Platelet <50,000/µL (vs 50,000–99,999)	0.66	0.23–1.95	0.457
Platelet ≥100,000/µL (vs 50,000–99,999)	0.32	0.09–1.12	0.074

Multivariable logistic regression analysis identified the presence of any clinical warning sign as the strongest independent predictor of physician-adjudicated necessary admission, with patients exhibiting warning signs having a 7.48-fold higher likelihood of requiring hospitalization compared to those without such signs (AOR = 7.48, 95% CI: 2.85–19.67, p < 0.001). Rural residence also emerged as a significant determinant, with rural patients being 2.50 times more likely to be assessed as requiring admission than those from urban or semi-urban settings (95% CI: 1.02–6.10, p = 0.045). Age, sex, education, and income did not demonstrate statistically meaningful associations with clinically necessary hospitalization, indicating that demographic and socioeconomic factors alone did not independently drive physician decisions. Laboratory parameters, including platelet levels <50,000/µL or ≥100,000/µL relative to moderate thrombocytopenia (50,000–99,999/µL), were not significantly associated with the assessment of admission need.

Table 6: Multivariable logistic regression showing determinants of delayed hospital admission among dengue inpatients (n = 200)

Predictor	Adjusted OR	95% CI	p-value
Age (per 10-year increase)	0.65	0.44–0.96	0.031
Female sex (vs male)	0.71	0.28–1.80	0.473
Rural residence (vs urban/semi-urban)	1.50	0.58–3.88	0.405
Low education (no/primary vs ≥secondary)	0.12	0.03–0.48	0.003
Low income (≤20,000 BDT vs >20,000)	2.52	0.85–7.43	0.094
Knows any warning sign	0.37	0.14–0.95	0.038
First action: took medicine at home	0.45	0.17–1.17	0.103
First action: visited village doctor	0.60	0.16–2.27	0.455
Reason for delay: thought illness was minor	0.33	0.13–0.83	0.019
Reason for delay: lack of money	1.61	0.55–4.72	0.384
Reason for delay: travel problems	2.56	0.92–7.14	0.073

Multivariable analysis examining determinants of delayed hospital admission revealed several significant predictors related to demographic and behavioral factors. Increasing age was associated with a reduced likelihood of delayed admission, as each 10-year increase in age decreased the odds of delay by 35% (AOR = 0.65, 95% CI: 0.44–0.96, p = 0.031). Lower educational attainment showed a strong effect, with patients having no or only primary education being significantly less likely to delay admission compared to those with secondary or higher education (AOR = 0.12, 95% CI: 0.03–0.48, p = 0.003), suggesting earlier care-seeking among those with limited formal schooling. Awareness of any warning sign also reduced the risk of delay by nearly two-thirds (AOR = 0.37, 95% CI: 0.14–0.95, p = 0.038), indicating that recognition of danger symptoms prompted faster hospital presentation. Patients who delayed care because they initially believed the illness was minor were significantly less likely to present late once symptomatic (AOR = 0.33, 95% CI: 0.13–0.83, p = 0.019), suggesting that those who consciously acknowledged mildness may have eventually sought care earlier than others facing economic or logistical constraints. Although not statistically significant, travel difficulty (AOR = 2.56, p = 0.073) and low income (AOR = 2.52, p = 0.094) showed trends toward increasing delay, indicating possible barriers requiring larger-scale evaluation. Sex, rural residence, and initial actions such as home medication or consulting a village doctor did not show meaningful independent associations with delayed admission. Taken together, these findings highlight the role of age, health awareness, and educational level as key drivers of timely hospital presentation among dengue patients, while socioeconomic and logistical constraints may still contribute to delayed care in borderline cases.

DISCUSSION

The present study explored the admission-seeking behavior and determinants of hospitalization among dengue patients admitted to a tertiary care hospital in Bangladesh, revealing important insights into demographic, socioeconomic, and clinical factors influencing admission patterns. The predominance of young adults (mean age 31.8 years) and males, along with a considerable representation of rural residents, aligns with previous regional studies that documented a similar demographic shift of dengue burden toward younger, mobile populations and males who are more likely to be exposed to vector habitats due to occupational and outdoor activity patterns [15, 16]. The finding that over half of the participants were college-educated students further emphasizes the contemporary urban-to-rural expansion of dengue, as educational institutions and community clustering may act as transmission hubs in endemic settings. Comparable findings from Indonesia and Thailand also showed high infection rates among educated youth, reflecting changing exposure patterns associated with urbanization and behavioral factors [17].

Socioeconomic context played a consistent role in hospitalization dynamics. More than half of the admitted patients belonged to the low- to middle-income income group, similar to evidence from other South and

Southeast Asian contexts where limited access to preventive measures, overcrowded housing, and delayed diagnosis were linked to higher hospitalization rates among economically constrained households [18]. NS1 positivity in nearly two-thirds of patients in the present cohort reflected an early phase of acute infection, while IgM positivity confirmed a broad range of recent infections, patterns that parallel surveillance data from other tertiary care settings across Bangladesh and Malaysia [15]. Severe thrombocytopenia was observed in over one-third of cases, a laboratory hallmark of dengue, consistent with the clinical review by Tsheten *et al.*, who reported low platelet count and hemoconcentration as strong predictors of disease progression and clinical severity [19].

Warning signs such as hypotension, bleeding, and persistent vomiting were common reasons for admission in the present study, underscoring the role of WHO-guided clinical triage indicators. However, the admission of a considerable fraction of patients without warning signs suggests partial overutilization of inpatient care. Comparable trends have been documented in other regional studies, where patient anxiety and physician caution led to increased hospital occupancy by mild or non-severe cases [14, 20]. This behavior may reflect low confidence in community-level case monitoring, combined with patient fear and misinformation amplified by social and media influences [11]. Indeed, in the current study, fear of dengue (66%) and media-driven anxiety (31%) emerged as major motivators for early admission, consistent with findings by Anwar *et al.*, who highlighted that awareness alone does not ensure rational care-seeking but may instead promote pre-emptive hospital attendance driven by panic [18].

Physician–patient perception discordance regarding the necessity of hospitalization was another notable finding. Although two-thirds of physicians considered admission necessary, nearly three-quarters of patients perceived it as absolutely essential, and over half of those clinically deemed “not necessary” still believed hospitalization was warranted. Similar misalignment has been reported in studies exploring dengue-related anxiety, where perceived severity often exceeded medical evaluation due to emotional and cognitive biases during epidemics [11]. In multivariable analysis, the presence of any WHO warning sign emerged as the strongest determinant of physician-adjudicated necessary admission, which mirrors prior observations that these signs are the most consistent predictors of severe dengue and justify hospital-based management [19, 21]. Rural residence also independently predicted hospital-justified admission, echoing ecological findings that rural patients often present with greater clinical severity due to diagnostic delay or under-resourced outpatient care [17].

Finally, the logistic regression analysis of delayed admission identified older age and lower education as protective factors, with awareness of warning signs also significantly reducing delay. These results are consistent with evidence that age and symptom recognition influence timely care-seeking, and they reinforce the importance of community-level awareness programs focused on danger sign recognition rather than generic dengue messaging [14]. Although low income and travel barriers showed positive but non-significant trends toward delay, such socioeconomic constraints have been repeatedly identified as key barriers to early care in other South Asian studies [20, 22]. Together, these findings emphasize the dual challenge of under- and over-utilization of hospital services in dengue-endemic settings, underscoring the need for community education on warning signs and strengthened triage systems to ensure appropriate, evidence-based admission decisions.

Limitations of The Study

This study was conducted in a single tertiary hospital, which may limit the generalizability of findings to other regions or healthcare settings with differing patient populations and resources. As a hospital-based cross-sectional design, it may also be influenced by selection bias, since only admitted patients were included. Self-reported behavioral data, such as reasons for delay or early admission, are subject to recall and social desirability biases. Additionally, the study did not explore post-discharge outcomes or the perspectives of healthcare providers in depth, which could have provided a more holistic view of admission dynamics.

CONCLUSION

The study highlights that admission-seeking behavior among dengue patients is shaped by an interplay of clinical, behavioral, and socioeconomic factors. While the presence of WHO warning signs and rural residence were strong predictors of clinically justified admission, early and anxiety-driven admissions were largely influenced by fear, misinformation, and social pressure. Conversely, delay in hospital presentation was mitigated by older age, lower education level, and recognition of warning signs, underscoring the importance of targeted health literacy interventions. These findings reveal both overutilization and underutilization of inpatient care in dengue management, emphasizing the need for rational triage and structured patient education to optimize hospital resource use in endemic settings.

Funding: No funding sources.

Conflict of interest: None declared.

Ethical approval: The study was approved by the Institutional Ethics Committee.

RECOMMENDATION

Public health authorities should strengthen community-level education emphasizing recognition of warning signs and appropriate care-seeking behavior rather than generalized fear-based awareness. Implementation of standardized triage algorithms at primary and secondary healthcare levels can prevent unnecessary referrals to tertiary hospitals. Incorporating behavioral and socioeconomic considerations into national dengue control policies would ensure more equitable healthcare utilization. Finally, multicenter and longitudinal studies are recommended to validate these findings and explore provider-side decision-making patterns that influence admission practices.

REFERENCES

1. Bhatt, S., Gething, P.W., Brady, O.J., Messina, J.P., Farlow, A.W., Moyes, C.L., *et al.*, The global distribution and burden of dengue. *Nature*. 496:(7446). 2013. 504–507.
2. Guzman, M.G., Harris, E. Dengue. *Lancet (London, England)*. 385:(9966). 2015. 453–465.
3. Stanaway, J.D., Shepard, D.S., Undurraga, E.A., Halasa, Y.A., Coffeng, L.E., Brady, O.J., *et al.*, The global burden of dengue: an analysis from the Global Burden of Disease Study 2013. *The Lancet. Infectious Diseases*. 16:(6). 2016. 712–723.
4. Hossain, M.S., Noman, A.A., Mamun, S.A.A., Mosabbir, A.A. Twenty-two years of dengue outbreaks in Bangladesh: epidemiology, clinical spectrum, serotypes, and future disease risks. *Tropical Medicine and Health*. 51. 2023. 37.
5. Hasan, M.J., Islam, M., Tabassum, T., Khan, M.M., Islam, M.K., Afroz, R., *et al.*, Clinical and epidemiological characteristics of the dengue outbreak of 2024: a multicenter observation from Bangladesh. *Tropical Medicine and Health*. 53:(1). 2025. 45.
6. Anika, U.S., Islam, M., Mou, F.E.N., Saha, M., Deb, A., Tui, R.R., *et al.*, The 2023 Dengue Outbreak in Bangladesh: Exploring the Epidemiology in Hospitalized Patients. *The American Journal of Tropical Medicine and Hygiene*. 110:(6). 2024. 1165–1171.
7. Mutsuddy, P., Tahmina Jhora, S., Shamsuzzaman, A.K.M., Kaisar, S.M.G., Khan, M.N.A. Dengue Situation in Bangladesh: An Epidemiological Shift in terms of Morbidity and Mortality. *Canadian Journal of Infectious Diseases and Medical Microbiology*. 2019:(1). 2019. 3516284.
8. Ajlan, B.A., Alafif, M.M., Alawi, M.M., Akbar, N.A., Aldigs, E.K., Madani, T.A. Assessment of the new World Health Organization's dengue classification for predicting severity of illness and level of healthcare required. *PLoS Neglected Tropical Diseases*. 13:(8). 2019. e0007144.
9. Leo, Y.-S., Gan, V.C., Ng, E.-L., Hao, Y., Ng, L.-C., Pok, K.-Y., *et al.*, Utility of warning signs in guiding admission and predicting severe disease in adult dengue. *BMC infectious diseases*. 13. 2013. 498.
10. Ang, L.W., Thein, T.-L., Ng, Y., Boudville, I.C., Chia, P.Y., Lee, V.J.M., *et al.*, A 15-year review of dengue hospitalizations in Singapore: Reducing admissions without adverse consequences, 2003 to 2017. *PLOS Neglected Tropical Diseases*. 13:(5). 2019. e0007389.
11. Ng, W.L., Toh, J.Y., Ng, C.J., Teo, C.H., Lee, Y.K., Loo, K.K., *et al.*, Self-care practices and health-seeking behaviours in patients with dengue fever: A qualitative study from patients' and physicians' perspectives. *PLOS Neglected Tropical Diseases*. 17:(4). 2023. e0011302.
12. Herdman, M.T., Maude, R.J., Chowdhury, M.S., Kingston, H.W.F., Jeeyapant, A., Samad, R., *et al.*, The Relationship between Poverty and Healthcare Seeking among Patients Hospitalized with Acute Febrile Illnesses in Chittagong, Bangladesh. *PLOS ONE*. 11:(4). 2016. e0152965.
13. Rajapaksha, R.M.N.U., Abeysena, C., Balasuriya, A. Health seeking behaviours, dengue prevention behaviours and community capacity for sustainable dengue prevention in a highly dengue endemic area, Sri Lanka. *BMC Public Health*. 23:(1). 2023. 507.
14. Ng, T.C., Teo, C.H., Toh, J.Y., Dunn, A.G., Ng, C.J., Ang, T.F., *et al.*, Factors influencing healthcare seeking in patients with dengue: Systematic review. *Tropical Medicine & International Health*. 27:(1). 2022. 13–27.
15. Prattay, K.M.R., Sarkar, M.R., Shafiullah, A.Z.M., Islam, M.S., Raihan, S.Z., Sharmin, N. A retrospective study on the socio-demographic factors and clinical parameters of dengue disease and their effects on the clinical course and recovery of the patients in a tertiary care hospital of Bangladesh. *PLOS Neglected Tropical Diseases*. 16:(4). 2022. e0010297.
16. Faridah, L., Mindra, I.G.N., Putra, R.E., Fauziah, N., Agustian, D., Natalia, Y.A., *et al.*, Spatial and temporal analysis of hospitalized dengue patients in Bandung: demographics and risk. *Tropical Medicine and Health*. 49:(1). 2021. 44.
17. Rahman, M.S., Ekalaksananan, T., Zafar, S., Poolphol, P., Shipin, O., Haque, U., *et al.*, Ecological, Social, and Other Environmental Determinants of Dengue Vector Abundance in Urban and Rural Areas of Northeastern Thailand. *International Journal of Environmental Research and Public Health*. 18:(11). 2021. 5971.
18. Hossain, M.I., Alam, N.E., Akter, S., Suriea, U., Aktar, S., Shifat, S.K., *et al.*, Knowledge, awareness and preventive practices of dengue outbreak in Bangladesh: A countrywide study. *PLOS ONE*. 16:(6). 2021. e0252852.
19. Tsheten, T., Clements, A.C.A., Gray, D.J., Adhikary, R.K., Furuya-Kanamori, L., Wangdi, K. Clinical predictors of severe dengue: a systematic review and meta-analysis. *Infectious Diseases of Poverty*. 10:(1). 2021. 123.
20. Mallhi, T.H., Khan, A.H., Sarriff, A., Adnan, A.S., Khan, Y.H. Determinants of mortality and

prolonged hospital stay among dengue patients attending tertiary care hospital: a cross-sectional retrospective analysis. *BMJ Open*. 7:(7). 2017. e016805.

21. Cavailler, P., Tarantola, A., Leo, Y.S., Lover, A.A., Rachline, A., Duch, M., *et al.*, Early diagnosis of dengue disease severity in a resource-limited Asian country. *BMC Infectious Diseases*. 16:(1). 2016. 512.
22. Ligsay, A.D., Santos, M.L.B., Simbul, E.S., Tambio, K.J.M., Aytona, M.J.M., Alejandro, G.J.D., *et al.*, "We Tried to Borrow Money, but No One Helped." Assessing the Three-Delay Model Factors Affecting the Healthcare Service Delivery among Dengue Patients during COVID-19 Surge in a Public Tertiary Hospital: A Convergent Parallel Mixed Methods Study. *International Journal of Environmental Research and Public Health*. 18:(22). 2021. 11851.