

CLINICAL PROFILE AND DISCHARGE CRITERIA COMPLIANCE OF HOSPITALIZED DENGUE PATIENTS IN PAKISTAN: AN AUDIT-BASED COHORT STUDY

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ABSTRACT

OBJECTIVES

To evaluate the clinical profile of hospitalized dengue patients and assess compliance with standardized discharge criteria at a secondary care hospital in Rawalpindi, Pakistan.

METHODOLOGY

A retrospective clinical audit was conducted at Alkhidmat Raazi Hospital in 2024, including 130 patients with laboratory-confirmed dengue infection. Data on demographics, length of stay, ICU admissions, type of dengue, diagnostic modality, and fulfillment of the seven discharge criteria were collected and analyzed.

RESULTS

The mean age of patients was 40.43 ± 15.85 years, with 68.5% being male. The average hospital stay was 3.67 ± 1.56 days, with no significant difference between genders ($p = 0.525$). ICU admission was required in 9.23% of cases. Most patients (90.8%) had Dengue Fever, and NS1 antigen testing was the primary diagnostic modality. Discharge criteria were fully met in 81.5% of patients. The most commonly unmet criterion was a rising platelet trend (11.5%), followed by absence of fever without antipyretics (3.8%).

CONCLUSION

The study demonstrates a high level of adherence to discharge protocols, reflecting sound institutional practices. Structured discharge assessments can play a crucial role in enhancing patient outcomes and improving healthcare efficiency during dengue outbreaks in Pakistan.

KEYWORDS: Dengue, Hospitalization, Patient Discharge, Clinical Audit, Pakistan

INTRODUCTION

Dengue fever remains one of the most significant mosquito-borne viral diseases globally.¹ It is a substantial public health challenge, particularly in tropical and subtropical regions.² The World Health Organization estimates that approximately 390 million dengue infections occur annually, with around 96 million manifesting clinically and resulting in varying degrees of severity.² Dengue virus infection can range from a mild febrile illness to severe, life-threatening forms such as Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS).³ Early diagnosis, clinical monitoring, and appropriate patient management are crucial in reducing morbidity and mortality associated with this disease.³ As a dengue-endemic nation, Pakistan has experienced frequent outbreaks in recent years, which have had a significant effect on the country's healthcare system.⁴ In 1994, the first laboratory-confirmed dengue case in Pakistan was reported from Karachi.⁵ According to the National Institute of Health-Pakistan, in 2021, there were 52,929

cases and 224 deaths from dengue.⁶ In 2022, there were roughly 79,007 confirmed cases and 149 deaths.⁶ The dengue virus has spread more widely throughout Pakistan, particularly during the monsoon and post-monsoon seasons, due to a combination of factors such as climate, rapid urbanization, and insufficient vector control.⁴ High dengue caseloads are commonly reported in major cities like Karachi, Lahore, Rawalpindi, and Islamabad, which puts a strain on clinical services and hospital capacity.⁷ Dengue continues to cause significant morbidity and sporadic mortality despite continuous public health efforts, highlighting the need for localized studies to better understand the clinical profiles and management outcomes of affected patients in Pakistani healthcare settings.⁸ Dengue infection has a wide range of clinical symptoms, including high fever, headache, retro-orbital pain, myalgia, arthralgia, rash, and bleeding.⁹ The severity of illness varies significantly among patients due to factors such as age, gender, host immune response, and comorbidities.⁹ Although the majority of patients improve with supportive care, a specific group advances to severe

dengue.¹⁰ Severe Dengue may lead to plasma leakage, hemorrhaging, and organ dysfunction, requiring intensive care management.¹⁰ It is essential for clinicians to assess dengue patients against stringent discharge criteria to guarantee clinical stability and reduce the risk of post-discharge deterioration.¹¹ Before discharge, it is important to check that key indicators like stable hemodynamics, adequate urine output, no warning signs, and a recovery of platelet count are all present. To avoid problems, it is essential to have safety nets in place, including structured follow-up plans, educating patients about red-flag symptoms, and providing clear instructions for emergency care.¹² Following evidence-based discharge protocols lowers the number of readmissions that could have been avoided and makes dengue management outcomes better.¹³ This study aims to provide a comprehensive evaluation of dengue patients, focusing on demographic characteristics, clinical severity, hospitalization duration, and ICU admission rates, with the primary objective of assessing adherence to standard discharge criteria to prevent premature discharges. It also seeks to identify gaps in compliance with these standards and examine associated outcomes. Given the substantial impact of dengue outbreaks on Pakistan's healthcare system, these findings will help refine clinical guidelines, strengthen patient care pathways, and support evidence-based decision-making in hospital settings.

METHODOLOGY

This retrospective clinical audit was conducted at Alkhidmat Raazi Hospital, a secondary care facility in Rawalpindi, Pakistan, in 2024. The study aimed to assess the demographic and clinical characteristics of dengue patients, the frequency of ICU admissions, the length of hospital stays (LOS), and compliance with standardized discharge criteria. All admitted patients with confirmed dengue infection during the audit period were reviewed. All patients admitted to Alkhidmat Raazi Hospital in 2024 with a confirmed diagnosis of dengue fever were included in the study. A total of 130 consecutive patients meeting the inclusion criteria were enrolled. As this was a clinical audit of all eligible cases during the defined period, no formal sample size calculation was performed. Confirmation was established through NS1 antigen detection or dengue-specific IgG/IgM serological testing. Only those patients with complete documentation, specifically age, gender, diagnosis, and discharge evaluation, were considered eligible. Patients were excluded if they were discharged against medical advice (AMA), left against medical advice (LAMA), or had incomplete medical

records, notably if discharge assessment documentation was missing. Patient data were collected from hospital medical records. The information extracted included age and gender, LoS, ICU admission status, type of dengue (categorized as Dengue Fever, Dengue Hemorrhagic Fever, or Dengue Hemorrhagic Shock), diagnostic modality used (NS1 antigen detection or IgG/IgM serology), and the status of each discharge criterion as per hospital protocol. Two independent reviewers double-checked data entry to ensure accuracy. Each patient was evaluated at discharge against a standardized set of seven clinical criteria to determine stability and readiness for discharge. This criterion was established in accordance with the general guidelines of the World Health Organization and endorsed by the local government's health department. These criteria included a pulse rate of less than 90 beats per minute, pulse pressure greater than 30 mmHg, absence of visible bleeding in the past 24 hours, absence of dyspnea, an increasing trend in hematocrit levels, a rising trend in platelet count, and urine output exceeding 0.5 mg/kg/hour. Patients were considered to meet discharge standards only if all seven criteria were fulfilled. Any partial fulfillment was also recorded for internal quality improvement purposes. Descriptive statistics were used to summarize demographic and clinical variables. Continuous variables, such as age and LoS, were presented as means $\pm$ standard deviation (SD) or medians with range, based on their distribution. Categorical variables were reported as frequencies and percentages. The Mann-Whitney U test was employed to compare the LoS between genders, given the non-parametric distribution of the data. The Chi-square test was used to assess the association between gender and ICU admission. A p-value of <0.05 was considered statistically significant. All statistical analyses were conducted using SPSS version 26.0. Ethical approval was granted by the Institutional Review Board of Alkhidmat Raazi Hospital, Rawalpindi, Pakistan (Ref No: IRB/A/04/24). The study was conducted in accordance with the principles of the Declaration of Helsinki and adhered to all applicable ethical and institutional guidelines.

RESULTS

A total of 130 dengue patients with valid age data were included in this study. The mean age of the cohort was 40.43 ± 15.85 years (range, 15-75 years), with a median age of 40 years. The gender distribution consisted of 89 males (68.5%) and 41 females (31.5%). The mean age for females was slightly higher (40.95 years) compared to males (40.19 years). Baseline characteristics are shown in Table 1.

Table 1: Baseline Demographic and Clinical Characteristics of Patients with Dengue Infection

Characteristic	Total (n = 130)	Male (n = 89)	Female (n = 41)
Age, years			
Mean $\pm$ SD	40.43 $\pm$ 15.8	40.19 $\pm$ 15.2	40.95 $\pm$ 16.5
Gender, n (%)		89 (68.5%)	41 (31.5%)
Length of Stay, days			
Mean $\pm$ SD	3.67 $\pm$ 1.5	3.74 $\pm$ 1.6	3.51 $\pm$ 1.3
ICU Admission, n (%)	12 (9.2%)	06 (6.7%)	06 (14.6%)
Dengue Classification, n (%)			
Dengue Fever (DF)	118 (90.8%)	84 (71.2%)	34 (28.8%)
Dengue Hemorrhagic Fever (DHF)	11 (8.5%)	05 (45.5%)	06 (54.5%)
Dengue Hemorrhagic Shock (DHS)	01 (0.7%)	0	01
Testing Method, n (%)			
NS1 Antigen	118 (90.8%)	79 (66.9%)	39 (33%)
Serology(IgG or IgM)	13 (10%)	10 (77%)	03 (23%)

The average length of hospital stay for all patients was 3.67 ± 1.56 days, with a range of 1 to 10 days. When stratified by gender, females had a mean LoS of 3.51 ± 1.36 days (range 2 to 8 days), and males had a mean LoS of 3.74 ± 1.65 days (range 1 to 10 days). Statistical comparison using the Mann-Whitney U test revealed no significant difference in LoS between genders ($p = 0.525$). Out of the 130 patients, 12 (9.23%) required admission to the ICU. Females, 6 (14.6%), were admitted to the ICU compared to 6 (6.7%) males. The association between ICU admission and gender was not statistically significant (Chi-square test, $p = 0.263$). Among ICU-admitted patients, the mean length of stay was notably longer, at 5.92 ± 1.93 days, with a range of 4 to 10 days. The majority of patients were diagnosed with Dengue Fever (DF) ($n=118$, 90.8%), followed by Dengue Hemorrhagic Fever (DHF) ($n=11$, 8.5%), and one case of Dengue Hemorrhagic Shock (DHS) (0.7%). Dengue testing predominantly involved NS1 antigen detection in 118 patients (90.8%), while 13 patients (10%) underwent serological testing (IgG or IgM). The audit assessed whether patients met all seven clinical criteria prior to discharge. Out of 130 patients, 106 (81.5%) fulfilled all criteria. The most frequently unmet criterion was a rising trend in platelets, observed in 15 (11.5%) patients. Other unmet criteria included being afebrile for 24 hours without antipyretics (5 patients) and combinations such as afebrile status plus a rising platelet trend or concerns regarding pulse pressure. Adherence to discharge criteria is shown in Table 2.

Table 2: Status of Discharge Criteria Fulfillment Among Dengue Patients

Criteria Status	Count	%age
All criteria met	106	81.5
Unmet Criteria	24	18.5
Detailed distribution of unmet criteria		
Rising trend in platelets	15	11.5
Afebrile for 24 hours without Antipyretics	05	3.8
Afebrile + Rising trend in platelets	03	2.3
Afebrile + Pulse pressure >30	01	0.8
Improving trend in hematocrit	01	0.8
No Dyspnea	00	00

Criteria: PR <90 bpm, PP >30 , no bleeding, no dyspnea, rising Hct, rising platelets, urine output >0.5 mL/kg/hr

DISCUSSION

This clinical audit provides a valuable and timely assessment of the implementation of standardized discharge criteria in dengue patients admitted to a tertiary care hospital in Pakistan. While demographic patterns provide important epidemiological context, the central focus of this study was to evaluate the consistency and quality of discharge decision-making. This area carries profound implications for clinical safety, healthcare resource optimization, and public health resilience in dengue-prone regions, such as Pakistan. Among the 130 patients reviewed, 81.5% met all seven discharge criteria before being sent home. This is a reassuring figure that reflects considerable adherence to institutional protocols. These criteria, comprising a stable pulse rate and pulse pressure, absence of bleeding and dyspnea, a rising hematocrit and platelet trend, and adequate urine output, are firmly grounded in WHO recommendations for safe discharge in dengue care.¹⁴ They serve as practical checkpoints to verify clinical stability and reduce the risk of complications after discharge. Although many patients recover uneventfully, the potential for post-discharge deterioration, particularly in patients discharged prematurely, cannot be overlooked, as it may lead to severe complications. The high level of compliance we noted in our study reflects good practice. It means that this facility's discharge protocols are not only in place, but they are also actively guiding clinical practice. It should be noted that almost 18.5% of patients were sent home without meeting all the requirements. A demonstrable rising trend in platelet count was the most

common missing element. Even though platelet count alone does not always predict bleeding risk, a steady rise is widely accepted as a sign of hematologic recovery and is mentioned in national and international guidelines.¹⁵ Discharging patients without this trend, especially when swayed by subjective clinical impressions or bed pressure during outbreaks, may lead to unintended consequences. In healthcare settings with restricted post-discharge monitoring and patient education, such decisions contain considerable risks.¹⁶ This issue is even worse in Pakistan, where dengue outbreaks happen every year, especially during the monsoon season, and put much strain on hospitals.¹⁷ The need to make room for patients during these busy times often leads to quick turnover. If there is no robust system for checking patients out, this can lead to short-term relief but long-term harm to the patient.¹⁸ Compounding this issue is the reality that many patients in Pakistan lack reliable follow-up mechanisms or sufficient awareness of red-flag symptoms, such as persistent vomiting, mucosal bleeding, or increasing fatigue, which are suggestive of severe dengue progression.¹⁹ This highlights the importance of ensuring that patients meet strict discharge criteria before leaving the hospital, as the window for timely intervention may not be available once they return to the community. Educating families on warning signs such as bleeding, persistent vomiting, and lethargy is crucial to reducing readmissions. Our findings reinforce the central role of platelet monitoring in this equation. The rising trend in platelet count, absent in 11.5% of cases in this audit, is not merely a laboratory metric; it is a vital signifier of disease trajectory. Some guidelines may permit discharge based on overall clinical stability, even with stable but low platelet counts.²⁰ However, evidence supports that a rising platelet count, particularly following the critical defervescence phase, indicates a favorable turning point in dengue recovery.²¹ In a resource-constrained setting like Pakistan, where repeat lab testing post-discharge is rare and often unaffordable, hospitals bear the full responsibility of confirming this recovery trend before release. Perhaps one of the most commendable outcomes of this audit is the 100% documentation rate for discharge criteria. This level of record-keeping reflects a strong institutional culture of accountability and demonstrates the integration of audit-based quality assurance into routine clinical practice. In an environment where inconsistent documentation and guideline deviations are standard, this achievement positions the hospital as a potential model for facilities across Pakistan striving to elevate their clinical governance standards. Structured discharge planning is a crucial component of the healthcare system's resilience. Hospitals can keep patients safe and

maximize the use of their limited inpatient resources by establishing clear, evidence-based standards for patient discharge.²² During dengue outbreaks, clinical teams have to make choices about whether to send a patient home to make room for another one or keep a patient longer even though they seem to be getting better. These choices are not only medical, but also ethical and logistical.²³ Evidence-based discharge criteria, like the ones looked at in this study, give an objective method to deal with these problems. Additionally, incorporating discharge protocols into hospital information systems, clinical checklists, or bedside dashboards can further enhance the consistency of the discharge process.²⁴ In Pakistani healthcare settings, digital tools like these are still not very common, but they could help doctors make decisions in real time by sending automated alerts when all discharge parameters are met. Until these kinds of systems are used in the area, printed discharge checklists and daily audit briefings can be good low-cost options.

LIMITATIONS

This study has several limitations that should be acknowledged. Firstly, the study was conducted at a single hospital, which may limit the generalizability of the findings to other healthcare settings. Secondly, the retrospective nature of the audit relies heavily on the accuracy and completeness of existing medical records. Although the documentation was commendably complete in this case, unrecognized biases or errors cannot be entirely ruled out. Additionally, while the study assessed compliance with discharge criteria, it did not track post-discharge outcomes such as readmissions or delayed complications, which would have provided a more comprehensive understanding of the clinical impact of early or incomplete discharges. Lastly, patient perspectives, health literacy, and follow-up adherence were not explored, though these factors may significantly influence dengue recovery and safety after discharge. Future prospective multicentre studies could validate these findings.

CONCLUSIONS

In conclusion, this clinical audit highlights a high level of adherence to discharge criteria among hospitalized dengue patients in a Pakistani tertiary care setting. The findings underscore the value of structured, evidence-based discharge protocols in ensuring patient stability, minimizing complications, and optimizing resource use during seasonal dengue surges. However, lapses particularly around platelet recovery trends indicate the need for reinforced clinical vigilance and system-level safeguards. As Pakistan continues to grapple with

recurrent dengue outbreaks, the institutionalization of standardized discharge practices, supported by clinical audits and education, will be essential in enhancing patient safety and strengthening overall healthcare delivery. These findings can help guide local health authorities in refining hospital discharge policies for dengue care.

CONFLICT OF INTEREST: None

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Abdul Rafay Mehmood Khan - Concept & Design; Data Acquisition; Data Analysis/Interpretation; Drafting Manuscript; Critical Revision; Final Approval

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The authors accept responsibility for all aspects of the work and will ensure that any concerns regarding the accuracy or integrity of any part are properly investigated and resolved.



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