ORIGINAL RESEARCH PAPER
Volume - 15 | Issue - 05 | May - 2026 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A TRIPLE THREAT: EPIDEMIOLOGICAL LANDSCAPE OF MALARIA, DENGUE, AND CHIKUNGUNYA IN A TERTIARY CARE INSTITUTE IN WESTERN INDIA

Clinical Microbiology

Dr. Shital Ghogale* Associate Professor, Department of Microbiology, Symbiosis Medical College for Women and Symbiosis University Hospital and Research Centre, Symbiosis International (Deemed University), Pune, India-412115*Corresponding Author

Dr Ketaki Pathak Professor, Department of Microbiology, Symbiosis Medical College for Women and Symbiosis University Hospital and Research Centre, Symbiosis International (Deemed University), Pune, India-412115

Dr Neetu Gupta Professor, Department of Microbiology, Symbiosis Medical College for Women and Symbiosis University Hospital and Research Centre, Symbiosis International (Deemed University), Pune, India-412115

Mr Parvez Akhatar Department of Microbiology, Symbiosis Medical College for Women and Symbiosis University Hospital and Research Centre, Symbiosis International (Deemed University), Pune, India-412115

Dr Kalpana Angadi Professor and HOD, Department of Microbiology, Symbiosis Medical College for Women and Symbiosis University Hospital and Research Centre, Symbiosis International (Deemed University), Pune, India-412115

ABSTRACT

Background: Malaria, Dengue, and Chikungunya are major vector-borne diseases in India with overlapping clinical features, posing diagnostic challenges and contributing significantly to morbidity [1,2].**Methods:** A retrospective cross-sectional study was conducted on 2686 patients presenting with acute febrile illness. Dengue, Malaria and Chikungunya were diagnosed using point-of-care tests (POCT). Clinical features were analyzed, and statistical associations were assessed.**Results:**Dengue demonstrated the highest prevalence (4.50%), followed by malaria (0.26%) and chikungunya (0.19%). Fever was present in all cases. Joint pain and muscle pain were significantly associated with chikungunya ($p < 0.001$), while bleeding manifestations were significantly associated with dengue ($p < 0.001$). Chills were strongly associated with malaria ($p < 0.001$).**Conclusion:** Dengue remains the predominant vector-borne infection. POCT enables rapid diagnosis, while integration with molecular diagnostics is essential for improving early detection and surveillance.

KEYWORDS

Dengue, Malaria, Chikungunya, Poct, Seroprevalence

INTRODUCTION

Vector-borne diseases continue to pose a significant public health burden globally and in India [1]. Dengue, Malaria, and Chikungunya frequently co-circulate and present with overlapping symptoms such as fever, headache, and myalgia, complicating early diagnosis [2,3].

Dengue has emerged as one of the fastest-growing arboviral infections worldwide, driven by urbanization, globalization, and climate change [4]. Malaria incidence has declined due to effective national control programs, though it remains clinically significant [5]. Chikungunya is characterized by severe arthralgia and episodic outbreaks [6].

Point-of-care tests (POCT) provide rapid and accessible diagnostic solutions in resource-limited settings, while molecular techniques offer higher sensitivity during early infection [7,8].

Objective

To determine the prevalence and clinical correlates of Dengue, Malaria, and Chikungunya among patients presenting with acute febrile illness.

Methods

A retrospective cross-sectional study was conducted at a tertiary care hospital in Pune, India.

A total of **2686 patients presenting with acute febrile illness** were included. Dengue, Malaria and Chikungunya diagnosis were performed using POCT kits. Clinical features including fever, headache, joint pain, rash, muscle pain, fatigue, nausea/vomiting, bleeding manifestations, and chills were recorded. Statistical analysis was performed using appropriate tests. Due to small subgroup sizes, **Fisher's exact test was applied where necessary**. A p-value < 0.05 was considered statistically significant.

Table 1: Prevalence of Vector-Borne Diseases (N = 2686)

Disease	Confirmed Cases	Prevalence (%)
Dengue	121	4.50
Malaria	7	0.26
Chikungunya	5	0.19

Table 1 shows that Dengue constituted the majority of infections, whereas malaria and chikungunya showed markedly lower prevalence, indicating declining or sporadic transmission patterns.

Table 2: Clinical Features Among Patients

Symptom	Dengue (n=121)	Malaria (n=7)	Chikungunya (n=5)	p-value
Fever	121 (100%)	7 (100%)	5 (100%)	1.000
Headache	97 (80.16%)	6 (85.71%)	4 (80.00%)	0.912
Joint Pain	16 (13.22%)	1 (14.28%)	5 (100%)	<0.001
Rash	32 (26.44%)	0 (0%)	2 (40.00%)	<0.001
Fatigue	104 (85.95%)	6 (85.71%)	4 (80.00%)	0.950
Muscle Pain	36 (29.75%)	1 (14.28%)	5 (100%)	<0.001
Nausea/Vomiting	72 (59.50%)	5 (71.42%)	3 (60.00%)	0.780
Bleeding	23 (19.00%)	0 (0%)	1 (20.00%)	<0.001
Chills	0 (0%)	6 (85.71%)	0 (0%)	<0.001

Table 2: shows that Fever was universally present across all infections. Joint pain and muscle pain were strongly associated with chikungunya, while bleeding manifestations were significantly linked to dengue. Chills were predominantly observed in malaria, consistent with classical clinical presentation.

DISCUSSION

The present study highlights dengue as the predominant vector-borne disease in the study population, followed by Malaria and Chikungunya. These findings are consistent with both national and global epidemiological trends.

Globally, Dengue has demonstrated a dramatic rise in incidence over recent decades. **Martina et al.** [4] described dengue as a rapidly expanding arboviral infection influenced by urbanization and environmental changes. Similarly, the World Health Organization has

reported a substantial increase in dengue burden worldwide [7]. The prevalence observed in this study aligns with endemic transmission patterns reported by **Patankar et al.** [1] and **Dhivya Lakshmi et al.** [2].

The low prevalence of malaria reflects successful implementation of control strategies. **Mutheneni et al.** [5] reported declining malaria trends in India, consistent with the findings of this study. Despite reduced prevalence, malaria remains clinically important due to its potential severity.

Chikungunya exhibited low prevalence, consistent with its episodic outbreak pattern. **Pialoux et al.** [6] described chikungunya as a re-emerging infection with cyclical transmission dynamics. Despite low prevalence, the high proportion of joint pain underscores its clinical impact.

Clinical overlap among these infections remains a diagnostic challenge. Fever, headache, and fatigue were non-specific findings, consistent with reports by **Kularatne et al.** [9] and **Gupta et al.** [3]. However, specific symptoms provided important diagnostic clues.

Joint pain and muscle pain were strongly associated with chikungunya, in agreement with **Simon et al.** [10], who reported severe arthralgia as a hallmark feature. Bleeding manifestations were significantly associated with dengue, consistent with findings by **Kashyap et al.** [11], highlighting the role of thrombocytopenia. Chills were predominantly associated with malaria, as described by **Kochar et al.** [12].

Point-of-care testing plays a crucial role in rapid diagnosis, particularly in resource-limited settings. However, as emphasized by the World Health Organization [7], POCT has limitations in early infection. Molecular diagnostics, as described by **Schwartz and Albert** [8], offer higher sensitivity and should complement POCT for improved diagnostic accuracy.

Overall, a combined approach incorporating rapid diagnostics, molecular techniques, vector control, and surveillance is essential for effective management of vector-borne diseases.

CONCLUSION

Dengue remains the most prevalent vector-borne disease in this cohort, followed by malaria and chikungunya. Despite overlapping clinical features, specific symptoms aid in differentiation. POCT remains essential for rapid diagnosis, and integration with molecular diagnostics is crucial for strengthening disease surveillance and control strategies.

REFERENCES

1. Patankar MC, Patel BV, Gandhi VP, Shah PD, Vegad MM. Seroprevalence of dengue in Gujarat. Int J Med Sci Public Health. 2014;3:16–18.
2. Dhivya Lakshmi S, Nanthini Devi P, Saikumar C. Seroprevalence of dengue. Int J Curr Microbiol App Sci. 2018;7:43–51.
3. Gupta E, Ghosh S. Coinfection with chikungunya and dengue viruses. Emerg Infect Dis. 2016;22(4):681–683.
4. Martina BE, Koraka P, Osterhaus AD. Dengue virus pathogenesis. Clin Microbiol Rev. 2009;22(4):564–581.
5. Mutheneni SR, Upadhyayula SM, Kumar KP, Kadiri MR. Malaria prevalence in India. Am J Trop Med Hyg. 2014;91(6):1088–1093.
6. Pialoux G, Gaüzère BA, Jauréguiberry S, Strobel M. Chikungunya infection. Lancet Infect Dis. 2007;7(5):319–327.
7. World Health Organization. Dengue: guidelines for diagnosis, treatment, prevention and control. Geneva: WHO; 2009.
8. Schwartz O, Albert ML. Biology of chikungunya virus. Nat Rev Microbiol. 2010;8(7):491–500.
9. Kularatne SA, Gawarammana IB, Kumarasiri PR. Epidemiology, clinical features, laboratory investigations and early diagnosis of dengue fever in adults: a descriptive study in Sri Lanka. Ceylon Med J. 2005;50(2):65-6.
10. Simon F, Javelle E, Cabie A, Pradines B, Huart D, Tolou H. Chikungunya infection. Curr Infect Dis Rep. 2011;13(3):218-28.
11. Kashyap RS, Chisnhallkar SR, Ramteke SS, et al. Dengue complications: pathogenesis, clinical manifestations and management. CNS Neurol Disord Drug Targets. 2022;21(8):667-679.
12. Kochar DK, Saxena V, Singh N, Dixit P, Toppo A, Batra A. Clinical features of children hospitalized with malaria--a record analysis from Punjab (India) during 1991-1996. Trop Doct. 1998;28(3):145-9.