

Review Article

Impact of Declaring Dengue and Malaria as Notifiable Diseases on Surveillance and Control Efforts in Delhi

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A B S T R A C T

Introduction: Dengue and Malaria are major vector-borne diseases that cause recurrent outbreaks in Delhi and posing significant health challenges. In order to strengthen surveillance and improve outbreak response, the Government of the National Capital Territory of Delhi declared dengue and malaria as notifiable diseases in October 2021¹ mandating all clinical establishments to report confirmed cases to the Municipal Corporation of Delhi (MCD). This paper examines the impact of this policy change on reporting patterns, public health responses, and disease control outcomes.

Methods: A retrospective analysis of secondary surveillance data was conducted for the period 2018-2023. Data were obtained from annual Vector-Borne Disease reports of the Municipal Corporation of Delhi (MCD)² compiled weekly from cases reported through the integrated Health information Platform (IHIP)³ portal and other Hospitals directly reporting to nodal agency ie Municipal corporation of Delhi as earlier. The pre-notification period (2018-2021) was compared with the post-notification period (2022-2023) to evaluate changes in reporting trends, surveillance activities and public health interventions. Data were reorganised and analysed using Microsoft Excel and presented in tabular form.

Results: Following the notification in October 2021, reporting of dengue increased substantially due to mandatory reporting by all healthcare facilities. Reported dengue cases rose to 9,613 in 2021 and 9,266 in 2023, compared with lower numbers during the pre-notification period. Malaria case showed relatively stable reporting trends, with 167 in 2021 increasing to 263 cases in 2022 and 426 cases in 2023. This mandatory reporting led to enhanced surveillance accompanied by intensified vector control measures, increased information, education and communication (IEC) campaigns and stricter legal enforcement against mosquito breeding sources.

Conclusion: Declaring dengue and malaria as notifiable diseases significantly strengthened disease surveillance and reporting mechanism in Delhi. Mandatory reporting improved case detection and enabled timely public health interventions highlighting the importance of policy-driven surveillance systems in the effective and timely containment of vector borne diseases transmission through targeted vector control measures and elimination of mosquito breeding sources.

Keywords: Notifiable diseases, Dengue, Malaria, Disease Surveillance, Health policy

Introduction

Dengue is the most rapidly spreading mosquito-borne disease caused by flavivirus. The disease has become a major health concern in tropical and many subtropical areas¹. Dengue and malaria pose significant public health challenges in Delhi, with recurring outbreaks leading to substantial morbidity and mortality². To address this issue, the Delhi government declared both diseases as notifiable in 2021.³ This policy mandated that all confirmed cases be reported to health authorities, aiming to improve disease surveillance, ensure timely interventions, and strengthen public health responses. The Municipal Corporation of Delhi (MCD) is the nodal agency responsible for the collection and compilation of all the reported vector-borne disease (VBD) cases in Government of the National Capital Territory of Delhi (GNCTD). Based on these records, a focused action plan for anti-mosquito measures is being carried out by Municipal Corporation of Delhi (MCD) annually for the proper implementation of the programme as per the guidelines of National Centre for Vector Borne Diseases Control (NCVBDC)⁴⁻⁶. In addition, public health campaigns, policy documents, and community feedback were reviewed to assess the impact of enhanced reporting on public awareness and disease control efforts. Previous studies conducted in Delhi have provided valuable insights into surveillance, vector control strategies, and community engagement. This comparison builds upon those findings to evaluate the implications of the official notification on the reporting mechanism and public health outcomes.

Methods

A retrospective analysis of surveillance data was conducted using records obtained from the annual Vector-Borne Disease reports of the Municipal Corporation of Delhi (MCD) for the period January 2018 to December 2023. These reports are compiled on a weekly basis using data reported through the Integrated Health Information Platform (IHIP) and from hospitals directly reporting to Municipal Corporation of Delhi (MCD), which serves as the nodal agency for vector-borne disease surveillance in the Government of the National Capital Territory of Delhi (GNCTD).

The study compared the pre-notification period (2018–2021) with the post-notification period (2022–2023) following the declaration of dengue and malaria as notifiable diseases in October 2021. Trends in reported dengue and malaria cases, surveillance activities, public awareness campaigns, and vector control interventions undertaken by the 12 zones of the Municipal Corporation of Delhi were examined.

Inclusion Criteria

- All laboratory-confirmed cases of dengue and malaria reported during the study period after epidemiological investigation by the 12 zones of the Municipal Corporation of Delhi.

- Cases reported between January 2018 and December 2023 through the Integrated Health Information Platform (IHIP) or directly by hospitals to Municipal Corporation of Delhi (MCD).

Exclusion Criteria

- Duplicate case entries identified in surveillance records.
- Suspected cases or cases with incomplete address details.
- Cases belonging to areas outside the jurisdiction of Delhi.

Statistical Analysis

The available data were reorganised and analysed using Microsoft Excel. Annual and quarterly trends in dengue and malaria cases were summarised and presented in tables to compare patterns before and after notification.

Ethical Approval: This study is based on retrospective analysis of secondary surveillance data available with Municipal Corporation of Delhi. This study only analysed the numbers for which ethical clearance was not required. Competent authorities including the Municipal Health Officer and Additional Municipal Health Officer are Co-authors of the study.

Results

Trend in Reported Malaria Cases

The quarterly distribution of malaria cases are presented in Table 1. The analysis of malaria surveillance data from 2018 to 2023 (Table 1) revealed distinct seasonal and temporal variations in reported cases. During the pre-notification period (2018–2021), annual malaria cases ranged from 167 to 713 cases, with the highest number reported in 2019 (713 cases) and the lowest in 2021 (167 cases). Across all years, the majority of cases were reported during the post-monsoon period (July–December), particularly in the third quarter (July–September), indicating a clear seasonal trend.

Following the notification declaring malaria as a notifiable disease in October 2021, there were no significant changes observed in reporting as the total number of reported malaria cases was 167 cases in 2021, 263 cases in 2022 and further 426 cases in 2023.

Trend in Reported Dengue Cases

The quarterly distribution of malaria cases are presented in Table 2. A significant increase in reported dengue cases was observed after the implementation of mandatory notification. During the pre-notification years (2018–2020), annual dengue cases ranged from 1,072 to 2,798 cases. However, a sharp rise in reported cases was noted in 2021 (9,613 cases), coinciding with the introduction of mandatory reporting by all clinical establishments in Delhi. (Table 2)

In the post-notification period, dengue reporting remained consistently high, with 4,469 cases reported in 2022

and 9,266 cases in 2023. A strong seasonal pattern was observed, with the majority of cases occurring during the fourth quarter (October–December) each year. The observed increase in reported dengue cases suggests improved surveillance and case reporting following the notification.

Public Awareness and Community Engagement Activities

IEC activities are summarised in table 3. Public awareness and community engagement activities increased considerably

after the policy change. The number of Resident Welfare Association (RWA) meetings increased from 5.4 thousand in 2018 to 22.2 thousand in 2022 (Table 3), reflecting intensified community participation in vector control activities. Similarly, the distribution of pamphlets and pasting of awareness stickers showed a substantial increase, with pamphlet distribution reaching 6719 thousand in 2023. These activities highlight strengthened information, education, and communication (IEC) efforts following enhanced surveillance and reporting.

Table 1. Year-wise Quarterly Distribution of Confirmed Malaria Cases in Delhi 2018-2023

Year	1st Quarter (Jan–March)	2nd Quarter (April–June)	3rd Quarter (July–Sep)	4th Quarter (Oct–Dec)	Total
2018	3	43	262	165	473
2019	0	44	324	345	713
2020	11	26	139	52	228
2021	4	7	102	54	167
2022	5	22	98	138	263
2023	12	26	283	105	426

Table 2. Year wise Quarterly Distribution of Confirmed Dengue Cases in Delhi, 2018-2023

Year	1st Quarter (Jan–March)	2nd Quarter (April–June)	3rd Quarter (July–Sep)	4th Quarter (Oct–Dec)	Total
2018	10	20	451	2317	2798
2019	6	16	260	1754	2036
2020	6	14	246	806	1072
2021	7	29	305	9272	9613
2022	61	82	794	3532	4469
2023	41	81	3356	5788	9266

Table 3. Year-Wise Information, Education and Communication (IEC) Activities Conducted by Municipal Corporation of Delhi for Public Awareness 2018-2023

Year	Information, Education and Communication Activities		
	Resident Welfare Association (RWA) Meetings (in Thousands)	Distribution of Pamphlets (in Thousands)	Pasting of Stickers (in Thousands)
2018	5.4	2122.9	452.0
2019	5.5	2087.7	467.6
2020	5.7	1792.4	694.5
2021	7.5	3524.6	933.4
2022	22.2	2331.7	837.1
2023	18.4	6719.0	1222.7

Legal Enforcement and Vector Control Measures

“Legal enforcement measures are presented in table 4”. Enhanced surveillance was accompanied by strengthened vector control and regulatory enforcement measures. The number of legal notices issued for mosquito-genic conditions increased from 84.8 thousand in 2020 to 172.5 thousand in 2023, while prosecutions launched increased significantly from 10.4 thousand in 2020 to 74.3 thousand in 2023 (Table 4).

Vector control activities also intensified during the study period. The number of houses sprayed with insecticides increased sharply, reaching 4906.8 thousand houses in 2021, followed by sustained large-scale spraying activities in subsequent years. These findings indicate that mandatory notification facilitated improved surveillance, enabling more targeted public health interventions and enforcement actions.

Table 4. Year-wise Legal Actions and Anti-Mosquito Measures undertaken by the Municipal Corporation of Delhi 2020-2023

Year	Legal Actions and Anti-Mosquito Measures		
	No. of Legal Notices Issued for Mosquitogenic Conditions (in Thousands)	No. of Prosecutions Launched (in Thousands)	No. of Houses Sprayed (in Thousands)
2020	84.8	10.4	1517.4
2021	151.0	27.4	4906.8
2022	122.3	46.0	3378.9
2023	172.5	74.3	4007.2

Discussion

The present study assessed the impact of declaring dengue and malaria as notifiable diseases in Delhi on surveillance and public health response. The findings demonstrate that mandatory notification significantly strengthened the disease surveillance system and improved reporting of dengue cases, while malaria reporting remained relatively stable during the study period.

As per Table 2 there were marked increase in reported dengue cases following the notification in October 2021. During the pre-notification period (2018–2020), the number of reported dengue cases ranged between 1,072 and 2,798 annually. However, a substantial increase was observed in 2021, with 9,613 reported cases, and the number remained high in 2023 (9,266 cases). This increase is likely attributable to improved reporting compliance after the introduction of mandatory notification for all healthcare facilities. Prior to the notification, only selected sentinel hospitals were reporting cases, which may have resulted in underreporting of the actual disease burden. The inclusion of all public and private healthcare facilities in the surveillance system has likely improved case detection and reporting accuracy.

In contrast, malaria reporting did not show a comparable increase after the notification. The number of malaria cases reported during the post-notification period remained within the range observed during the pre-notification period. This may be due to the relatively lower transmission intensity of malaria in Delhi compared with dengue and

the existing surveillance mechanisms that were already capturing most malaria cases through public health facilities.

Seasonal patterns of both diseases were also evident in the analysis. As per table 1, The majority of malaria cases occurred during the monsoon and post-monsoon periods, particularly in the third quarter (July–September). Similarly, As per table 2, dengue cases showed a clear seasonal trend, with a large proportion of cases occurring during the fourth quarter (October–December). These patterns are consistent with the breeding behaviour of vector mosquitoes and climatic conditions favourable for transmission.

The study also highlights the strengthening of public health interventions following the notification policy. Increased reporting enabled early identification of affected areas, allowing health authorities to undertake targeted vector control activities. This included intensified anti-larval measures, insecticide spraying, and elimination of mosquito breeding sites. In addition, information, education, and communication (IEC) activities increased significantly during the study period. The number of Resident Welfare Association (RWA) meetings, pamphlet distribution, and awareness campaigns increased considerably, indicating stronger community engagement in vector control efforts mentioned in Table 3.

As per table 4, Legal enforcement measures also showed a substantial rise during the post-notification period. The number of legal notices issued for mosquito-genic conditions and prosecutions launched against violators increased

significantly. These regulatory actions likely contributed to improved compliance with vector control guidelines and enhanced community participation in preventive measures.

The findings of this study highlight the importance of mandatory disease notification as a critical component of public health surveillance. By ensuring timely reporting of cases, notification policies facilitate rapid response measures, improve outbreak preparedness, and support evidence-based decision making. Similar approaches have been recommended in many urban settings where vector-borne diseases pose a recurrent public health threat.

However, the study has certain limitations. The analysis is based on secondary surveillance data, which may be influenced by variations in reporting practices and diagnostic capacity across healthcare facilities. In addition, external factors such as the COVID-19 pandemic during 2020 may have affected healthcare-seeking behaviour and disease reporting in 2021 and onwards. Despite these limitations, the study provides valuable insights into the impact of policy interventions on disease surveillance and control efforts.

Overall, the declaration of dengue and malaria as notifiable diseases has contributed to strengthening the surveillance system in Delhi and has facilitated more effective public health interventions for the prevention and control of vector-borne diseases.

Challenges and Recommendations

- **Sustaining Vigilance in Non-Peak Seasons:** Continued surveillance is necessary even when cases decline.
- **Strengthening Healthcare Infrastructure:** More diagnostic facilities and trained personnel are required to manage increased reporting.
- **Exploring Technology for Data Collection:** Digital surveillance systems can further streamline case detection and response.

Conclusion

The declaration of dengue and malaria as notifiable diseases in Delhi has significantly strengthened disease surveillance and reporting mechanisms. Mandatory reporting improved case detection and enabled timely public health interventions, including intensified vector control measures, increased community awareness activities, and stronger legal enforcement against mosquito breeding conditions. These findings highlight the importance of policy-driven surveillance systems in the effective prevention and control of vector-borne diseases in urban settings.

- **Enhanced Surveillance:** Increased reporting and data accuracy have enabled a more precise assessment of disease burden.
- **Improved Public Health Response:** Greater awareness, timely vector control measures, and improved hospital

preparedness have helped manage outbreaks more effectively.

- **Stronger Community Engagement:** Public campaigns and legal actions have contributed to better compliance with preventive measures.

Authors' Contribution: Conceptualization, data compilation, analysis and manuscript preparation were carried out by the authors using surveillance record available with the Municipal Corporation of Delhi.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process: Generative artificial intelligence tools were used only for language improvement. No AI tools was used for data analysis or interpretation.

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Conflict of Interest: None declared

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