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Timeliness of Treatment Seeking and Public Health Response for Suspected Dengue Cases in Sentinel Sites of Western Province, Sri Lanka

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Abstract

Dengue remains a significant public health challenge in Sri Lanka, with over 50,000 cases reported annually. This study was conducted in the Western Province to evaluate the treatment-seeking behaviour of suspected dengue patients and the timeliness, coverage, and public health response to their notifications.

A cross-sectional descriptive study was conducted using a checklist and an interviewer-administered questionnaire through telephone interviews. All eligible patients recorded in the NaDSys web-based system for one month from 15th February were the sampling frame. A total of 361 patients participated in the study. Data was analyzed using the Statistical Package for the Social Sciences, and continuous variables were presented as means with their standard deviations. Categorical variables were presented as proportions and percentages. The ethical clearance was obtained from the Ethics Review Committee of the National Hospital of Sri Lanka.

The mean age of the study population was 28.7 ± 19.1 years, with the majority (61.8%) in the 18-64 age category. Most patients sought their first medical advice from government hospitals (47.4%), followed by general practitioners (31.0%) and private sector hospitals (19.0%). In contrast, 74.5% sought medical attention within 48 hours of symptom onset, and a concerning 6.0% delayed treatment for more than 72 hours. Most (79.2%) were admitted within three days of fever onset. Around 40% had done a Full Blood Count before admission, mainly on the advice of a clinician.

Notifications were done on average, 1.5 days after admission, with 68% of notifications on the next day of admission. The range Public Health Inspector (PHI) did not conduct field visits for 17.5% of cases. However, during all field visits, PHI provided guidance and advice with information, education, and communication (IEC) materials, which were used in most instances (60.4%). Fogging was conducted following the field visit in 63.8% of cases.

The study highlights delays in treatment-seeking behaviour among a subset of dengue patients, with 6% delaying medical attention for more than 72 hours, potentially increasing the risk of complications. While notification timeliness was relatively efficient, gaps in field visits by PHIs were noted, impacting vector control efforts. Strengthening early dengue awareness, ensuring timely responses, and reinforcing vector control measures by the PHI are essential to improving prevention and management in Western Province.

Keywords: Dengue, treatment-seeking behavior, notification timeliness, vector control

1. Introduction

Dengue, a mosquito-borne viral disease, has experienced a dramatic 30-fold increase in global incidence over the past 50 years, emerging as a public health challenge in tropical and sub-tropical regions, including Sri Lanka (WHO, 2022a). The worldwide expansion of dengue serotypes has further exacerbated the complexity of controlling the disease (Messina et al., 2014). In 2017, Sri Lanka has faced its largest dengue outbreak, with over 180,000 reported cases. This case surge has resulted in a significant social and economic burden on the country (NDCU,2022; Tissera et al., 2020).

In Sri Lanka, dengue has been a notifiable disease since 1996, with a paper- and e-based surveillance system. A real-time web-based surveillance system has been implemented across over 130 district sentinel hospitals (Epidemiology Unit, 2022). In 2024, the initially implemented DenSys e-surveillance system was replaced by the NaDSys Disease surveillance system. The NaDSys has enhanced functionalities, including automatically generating reports, making it more user-friendly. It covers 152 key hospitals across Sri Lanka (National Dengue Control Unit, Ministry of Health ,Nutrition and Indigenous Medicine, 2019)

All suspected dengue cases are to be notified upon admission. Sentinel hospitals adhere to a paper and web-based system (Figure 1).

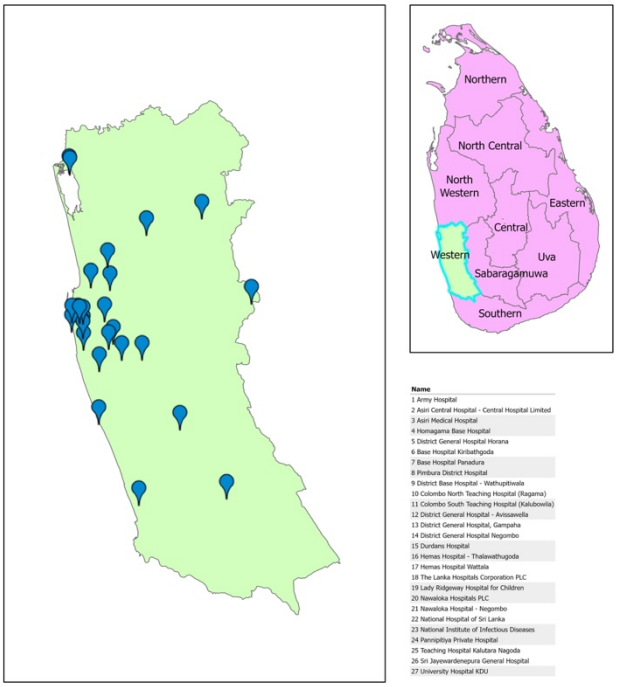

Fig 1: List of sentinel hospitals in Western Province

Source: National Dengue Control Unit via google maps

The notification is received by the Medical Officer of Health (MOH) and assigned to the Public Health Inspector (PHI) of the patient's residence, who conducts a field investigation (Figure 2).

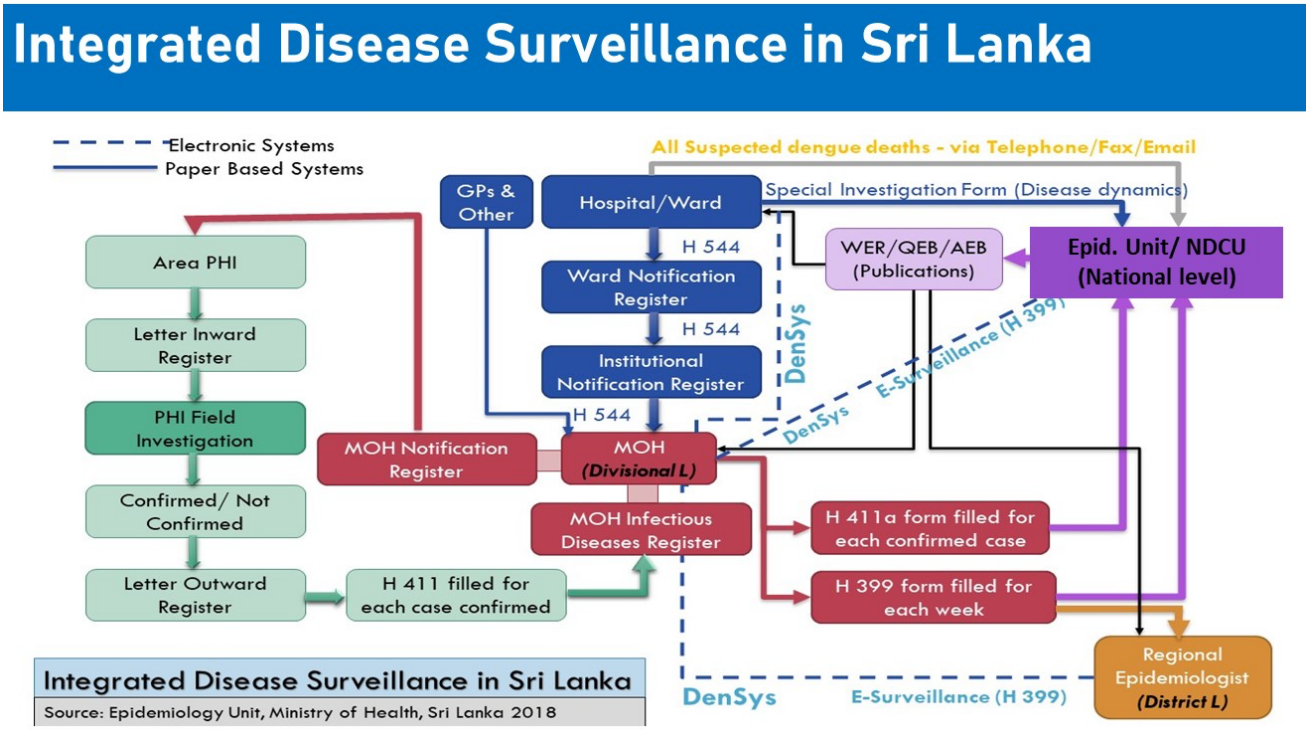

Figure2: Dengue Surveillance within the Integrated Disease Surveillance in Sri Lanka

This investigation includes patient detail verification, awareness, premise inspection, and vector control. Notification, investigation, and response must be promptly targeted for successful control (Epidemiology Unit, Sri Lanka, 2020)

Sri Lanka relies on disease surveillance for targeted preventive actions, with timely notification crucial for swift investigation and intervention by the PHI to prevent further spread. Evaluating the timing of dengue notifications and the field investigation is vital to measure the effectiveness of outbreak prevention efforts. During the field investigations, the PHI is responsible for implementing control measures, with health education being a key component. In endemic areas, targeted fogging is conducted to rapidly curb the transmission (National Dengue Control Unit, Ministry of Health ,Nutrition and Indigenous Medicine, 2019e, 2019) This study assessed whether the PHI effectively carried out these critical activities.

Currently, notifications are generated for suspected dengue patients, primarily those admitted to healthcare facilities. It is important to assess their treatment-seeking behaviours, including whether they sought medical care before admission. It is important to assess their first preference for seeking treatment, as these areas may require strengthening. Additionally, assessing the time between symptom onset and

seeking medical care is crucial, as delays can lead to complications and increase disease transmission. Therefore, this study assessed the timeliness of treatment seeking among dengue patients and the timeliness and coverage of their notification and field-level response. Western Province was selected as the site, accounting for nearly 50% of suspected dengue cases reported in the country.

2. **Literature Review**

Dengue is emerging as one of the most rapidly spreading infectious diseases of the 21st century (WHO, 2022a), posing a significant global public health challenge. Messina et al. (2014) highlighted the global expansion of dengue serotypes leading to hyperendemicity, reinforcing its status as a growing infectious disease of significant public health concern worldwide.

Dengue has no specific treatment nor a safe vaccine for public use, making seeking timely health care crucial for effective disease management and individual prevention (WHO,2009). Diagnostic delays are a major contributor to the morbidity and mortality of infectious diseases and can lead to adverse health outcomes (Suneja et al., 2022). Hence, identifying the timeliness of health-seeking behaviour, treatment initiation, and case reporting is crucial for assessing factors responsible for delays.

A systematic review by Ng et al. (2022) reported that multiple complex factors influence healthcare-seeking behaviour in dengue patients. The most frequently cited reasons for delay in health-seeking include knowledge of dengue, access to healthcare, quality of health service, and resource availability.

In Sri Lanka, the healthcare utilization patterns play a significant role in determining treatment-seeking behavior for dengue patients. The public sector provides over 90% of inpatient and 45% of outpatient care nationwide. In comparison, the private sector accounts for over 50% of outpatient visits but covers only a small portion of inpatient care (Rajapaksa et al, 2021). Above treatment seeking behavior suggests that while a significant proportion of dengue patients may initially seek outpatient care in the private sector, severe cases requiring hospitalization are predominantly managed by state health services, highlighting the critical role of the public sector in dengue case management.

A study conducted in Jaffna district to assess the health seeking behavior for five selected diseases (flu, inflammatory problems, gastrointestinal problems, dermatological

issues and urinary tract infection) showed that most patients received institutional treatment (55%). At the same time, self-medication accounted for 45% (P. Kalki et al, 2017). This trend raises concerns regarding dengue, as individuals who initially self-medicate may delay seeking medical attention, increasing the risk of severe complications and further disease transmission.

Notification of notifiable disease has been an integral part of the disease surveillance system in Sri Lanka since 1897, based on the Quarantine and Prevention of Diseases Ordinance introduced in 1897 and subsequent amendments (Government of Ceylon, 1960). Notification is done by the medical practitioner attending to any patient suspected of having any notifiable disease. Dengue was designated as a notifiable disease in Sri Lanka in 1996 (Tissera et al., 2020). Therefore, timely notification of dengue patients to the relevant authority is important for early action (Epidemiology Unit,2011). Elisabeth Reijn et al. (2011) also consider timely reporting of infectious disease cases to public health authorities essential to elicit an effective public health response. They have assessed the Dutch national notification system for shigellosis, Enterohemorrhagic Escherichia coli/Shiga toxin-producing Escherichia coli infection, typhoid fever, measles, meningococcal disease, and hepatitis A virus (HAV) infection for timeliness in reporting. The study has found that the percentage of infectious diseases reported within one incubation period varies widely between diseases. The lowest proportion was for shigellosis (0.4%), and the highest reporting was for HAV infection (90.3%) within one incubation period.

Surveillance is a systematic collection, analysis, interpretation, and dissemination of data for appropriate action (Ministry of Health, 2010). Field investigation of dengue patients by PHI is essential for implementing appropriate measures to prevent further transmission and to control the disease. To be effective, it must be comprehensive and conducted on time.

3. Materials and Methods

The study was a cross-sectional descriptive study. All dengue patients reported through the web-based surveillance system in Western Province who are residents of the same region were the sampling frame. During routine telephone follow-ups with dengue patients, the eligible patients who provided consent were contacted and included in the study. Suspected dengue patients who were diagnosed with another disease upon discharge were excluded from the study. Suspected dengue patients reported from 5th February to 15th March 2024 were selected and contacted within two weeks

to one month after notification. This approach ensured a minimum two-year period for the range PHI to conduct field investigations while also minimizing recall bias. In children below 18 years of age, informants (father, mother, or guardian) served as the primary source of information.

Information was obtained through a checklist for the extraction of secondary data from NaDSys. In the meantime, an interviewer-administered questionnaire was used for telephone interviews. The above questionnaire contained socio-economic, demographic, and disease information, treatment-seeking behavior, and visits by PHII. The date of admission and notification was obtained from the checklist.

Of the 1481 sampling frame, 386 were randomly selected. Dengue patients are routinely contacted by NDCU, and during these instances, the eligible patients were informed about the study. Those who provided consent were subsequently contacted by the research team. The confidentiality is strictly maintained, and individual patient information was not shared with the Public Health Staff in the area

The ethical clearance was obtained from the Ethics Review Committee of the National Hospital of Sri Lanka, Colombo. Permission to conduct the study was obtained from the Director of NDCU, Ministry of Health, Sri Lanka.

4. Results

A response rate was 93.5% (361/386). The majority were 18-64 years (n=223, 61.8%) and 5-17 years 26.3% (n=95) respectively. There was a male predominance (n=205, 56.8%) in the study group

Table 1: Socio-demographic details of participants

Variable	No.	%*
Age (in years): Mean, standard deviation (minimum, maximum) (n=361)	28.7, 19.1 (1, 75)	
Age groups (n=361) in years		
Less than 5	24	6.6
5 - 17	95	26.3
18 - 64	223	61.8
65 and above	19	5.3
Sex (n=361)		
Male	205	56.8
Female	156	43.2
Ethnicity (n=361)		
Sinhala	300	83.1
Sri Lankan Moor	40	11.1
Sri Lankan Tamil	21	5.8
Religion (n=361)		
Buddhism	258	71.5
Catholic	47	13.0
Islam	40	11.1
Hindu	16	4.4
Marital Status (n=257)		
Married	108	29.9
Single or Not relevant	249	69.0
Monthly Income of Family (n=359)		
Rs 25,000 to 50,000	37	10.3
Rs 50,001 to 75,000	194	54.0
Over Rs 75,000	128	35.7

*Percentage was calculated for the total sample of 361

Table 2: Participants by Hospital and place of residence

Description	No.	%
Admission by type of hospital (n=361)		
National Level Hospitals	126	34.9
Teaching Hospitals	68	18.8
District General Hospital	21	5.8
Base Hospital (BH)	108	29.9
Private Hospitals	28	7.8
Military Hospitals	10	2.8
Place of Residence of the patient		
CMC	110	30.5
Colombo RDHS	139	38.5
Gampaha RDHS	46	12.7
Kaluthara RDHS	66	18.3

Nearly 39% (n=139) of respondents were residents of the Regional Director of Health Services (RDHS) Colombo, and 31% of respondents live in the Colombo Municipal Council (CMC) area. National level hospitals (n=126,34.9%), followed by BHs (n=108,29.9%), appeared to be the choice of treatment for the majority of respondents, with private hospitals contributing 7.8% (n=28).

Table 3: Treatment-seeking Behavior of Participants

Description	**No (n=361)**	**%**
Place of first treatment		
Specialist Clinician	12	3.3
Family doctor/ General Practitioner (GP)	112	31.0
Government Hospital	171	47.4
Private Hospital	66	18.3
Duration Between Symptom Onset and First Medical Visit		
At the onset of fever	93	25.8
Within 24 hours	76	21.1
Within 24 – 48 hours	100	27.7
Within 48-72 hours	70	19.4
Within 72 – 120 hours	22	6.1
Time between the onset of fever and admission		
At the onset of fever	8	2.2
Within 24 hours	24	6.6
Within 24-48hours	126	34.9
Within 48-72 hours	128	35.5
Within 72-120 hours	75	20.8

Nearly half (n=171, 47.4%) have taken first treatment from a government hospital. However, a considerable number of patients (n=112, 31%) have gone to their family doctor/ GP, and nearly 19% (n=66) of respondents have gone to private sector hospitals.

Although advised to seek medical attention within 48 hours of fever, around 6% (n=22) of patients took over 72 hours to do so. However, a majority (269, 74.5%) had their first visit within 48 hours.

A total of 35.5% (n=128) respondents got admitted to the hospital within 48-72 hours of the onset of fever, followed by 126 (34.9%) respondents within 24-48 hours. A considerable number of respondents (n=75, 20.8%) have been admitted after 72-120 hours.

Only 40.2% (n=145) have done investigations prior to admission, and all have done FBC. Further, 20 respondents (5.5%) have undergone both the Full Blood Count and NS1 Antigen test. A majority has not done any investigation prior to admission (n=216, 59.8%).

Nearly 17% (n=24) of the respondents have done an investigation on their own, without consulting a doctor; however, the majority (n=113, 77.9%) have consulted a doctor to review investigation results.

Table 4: The Investigations conducted for dengue

Description	No	%
Investigation done for dengue before admission (n=361)		
Yes	145	40.2
Full Blood Count (FBC) only	125	34.6
NS1 and Full Blood Count together	20	5.5
No	216	59.8
Investigations done with instructions from doctor/hospital (n=145)		
Yes	121	83.4
No	24	16.6
Have you consulted a doctor to review your investigation results (n=145)		
Yes	113	77.9
No	32	22.1
When were the first investigations done (n=145)		
At the onset of fever	32	22.1
Within 24 hours	38	26.2
Within 24 – 48 hours	67	46.2
Two to three days	8	5.5

Table 5: Distance to medical practitioner/ hospital from home

Distance	No	%
Less than 1 km	90	24.9
1 km to 5 km	225	62.3
Over 5 km*	46	12.8

*Maximum distance - 7km

Nearly 13% (n=46) live more than 5km away from a hospital/ medical practitioner.

Table 6: Timeliness of notification in days

Description	No	%
Time between admission and notification (n=349)		
Mean, Minimum, Maximum (days)	1.48, 0, 8	
Time between admission and notification (n=349)		
Same day (0 days)	27	7.7
Day 1	210	60.2
2 - 5 days	111	31.8
Over 5 days	1	0.3

The majority were notified within one day of the admission (n=210, 60.2%), which is vital for targeted public health action.

Table 7: Completeness and timeliness of field investigations by PHI

Description	No	%
PHI visited the respondent's home (n=361)		
Yes	298	82.5
No	63	17.5
Timeliness of visit (n=298)		
While at the hospital	27	9.1
Within 3 days of discharge	233	78.2
Within 4 – 7 days of discharge	38	12.7
Activities conducted during the field investigation (n=298)		
PHI provided instructions- Yes	298	100.0
PHI provided any IEC material		
Yes	180	60.4
No	118	39.6
Fogging was carried out in the area within one week after investigation by PHI*		
Yes	190	63.8
No	108	36.2

*Fogging cannot be directly attributed to the investigated case, as it may be conducted for the cluster of cases in the area. However, fogging within one week of investigation was included to account for the possibility that the current case may have influenced the decision.

Field investigations by PHI are vital for field-level public health action. However, nearly 18% (n=63) of respondents were not visited by PHI. Of the respondents who were visited by PHI, the majority (n=233, 78.2%) were visited within 3 days of discharge from the hospital, which is the timeline that has been identified as the ideal time for a PHI's visit by the NDCU. All the respondents interviewed (n=298, 100%) revealed that PHI provided instructions on dengue prevention, and around 180 (60.4%) were given Information Education and Communication (IEC) material as well. A total of 63.8% (n=190) of respondents said fogging was conducted in their areas one week following the investigation.

Discussion

Dengue control depends on early detection, timely reporting, and prompt investigation of cases. The National Action Plan for Prevention and Control of Dengue in Sri Lanka identifies early detection and real-time reporting of cases as one of its strategic objectives. In the absence of a fully-fledged forecasting system based on entomological and climatological variables,

disease surveillance is used to predict outbreaks. The preventative action at ground level is also reliant on timely notification of cases. Hence, the current system is a platform for action and a tool for outbreak prediction.

The process follows a structured reporting system, ensuring the timely notification of all cases (Epidemiology Unit, Ministry of Health, 2011). Sri Lanka's grassroots-level public health structure, powered by a dedicated workforce of MOH and PHI, is instrumental in operationalizing the system. However, financial, logistical, and human resource constraints may impact its effectiveness, particularly during periods of high disease burden. Additionally, s ynergy between the curative and preventative arms of the public health system is vital for an integrated and effective response.

Treatment-seeking behaviour for dengue is influenced by multiple factors, including accessibility, affordability, and knowledge (Elsinga et al., 2015). The choice of first healthcare contact, timing of visits, and frequency of healthcare utilization may vary across communities, as observed in our study. Additionally, distance to health care providers and compliance with medical advice significantly impact treatment-seeking patterns. This highlights the crucial role of both institutional and individual-level factors in shaping disease transmission dynamics. Best practices, as well as existing gaps, within the healthcare system and among individuals, play a significant role in determining timely diagnosis, case reporting, and public health response.

The majority were 18-64 years of age (n=223, 61.8%), corresponding to the demographic profile of dengue patients in the country (NDCU, Ministry of Health, Nutrition and Indigenous Medicine, 2019e, 2019). According to NDCU, the 18-64 years age cohort constitutes nearly 65% of total dengue patients in 2023, signifying high vulnerability of the economically active population. It's a characteristic observed for decades in Sri Lanka (Malavige, 2006). Further, the age-wise distribution of dengue patients in this study portrays the vulnerability of school-aged children. Around 26% (n=95) are school-aged children (5-17 years), similar to national figures of 25% in 2023. Many researchers have elicited similar findings throughout South and South-East Asia, where economically productive and active age groups bear the greatest burden (Pinheiro & Corber, 1997) due to increased vulnerability of being exposed to mosquito bites at high-risk sites such as work sites and schools, as a probable reason. Moreover, day-to-day activities, particularly outdoor activities of these age cohorts, correspond with the peak

biting times of the vector, further increasing the vulnerabilities (Bhatia et al., 2013).

Gender distribution of the study also resembles national figures with evident male predominance, although the female population is not lagging, indicating a shift towards more equal exposure status to the disease (Fernando et al., 2017). Given the contribution of the working male population to the country's economy and as the breadwinner for the family, such predominance would be detrimental to the economic progress of the country and the income sustainability of individual families. However, contrary to findings of previous research (Zellweger et al., 2017), high- and middle-income cohorts had comparatively high representation in the current study.

Nearly half of the respondents (n=171, 47.4%) of the present study prefer government/state sector hospitals for first contact, similar to previous research (Russell, 2005). Family physician as first contact doctor is also prominent, with 31% (n=112) seeking treatment from a family physician at the disease onset. Preference in state sector hospitals may be due to the ability to receive services free of charge and the public trust acquired through maintenance of relatively high recovery and a lower case fatality rate (CFR). However, inclination towards the private sector is also considerable (n=66, 19%), as affordability may be higher in middle-income and high-income cohorts represented in the study.

The majority consulted a medical practitioner within 48 hours of the onset. However, 22 (6.1%) respondents have not sought treatment even after 72 hours of fever. Similar trends were observed in several countries where patients were reluctant to visit a doctor due to socio-economic reasons (Elsinga et al., 2015). Such behaviour can influence disease outcomes negatively (Sujatha et al., 2021). The present study revealed that more than 70% (n=254) of respondents got admitted to a hospital within 24-72 hours of fever. Given the complexities associated with dengue, such behaviour could prevent complications and facilitate observation for warning signs. From a public health perspective, this reflects and reinforces the importance of decades-long health campaigning and engagement among the public on timely referral that would facilitate early detection and prevention of complications of the disease. Moreover, from a health systems perspective, it reflects on the improvements in health care accessibility over the years, which has positively augmented the treatment-seeking behavior of the population.

In this study, around 40% (n=145) have done an investigation prior to admission with FBC as the investigation of choice. The preference

for FBC as an initial investigation is well-documented in both local and international research (de Souza et al., 2013). Further, from a systems perspective, recent price control and setting up ceilings of maximum prices on FBC by the Government of Sri Lanka and the wide availability of the test might have facilitated the selection of FBC as the investigation of choice. However, the majority have not taken an investigation prior to admission (n=216, 59.8%). As the majority of respondents sought help within 48 hours of onset, the cost of repeated tests may have influenced their decision. Studies have observed in South-East Asia and Latin American regions that the costs of investigations are a hindrance to disease diagnosis (Sa et al., 2005). Timing of investigations is also important, as seen in the results, where half of the respondents (n=67, 46.2%) who have done an investigation have done so within 24-48 hours of onset. This is a significant achievement compared to patterns observed elsewhere (Elsinga et al., 2015).

In this study, around 13% (n=46) lived over 5 km from the healthcare facility. It could adversely affect their ability to reach specialized care (Adhikari et al., 2019). Accessibility is vital; however, families tend to prioritize other urgent needs over spending money to travel to the institution (Khun & Manderson, 2007). This finding is more important in relation to the ongoing primary health care reform in Sri Lanka, where basic health care facilities will be clustered and structured referral pathways made, so that isolated and hard-to-reach population cohorts have access to basic health care.

Timely notification is crucial to initiate fieldwork. In the present study, the majority of notifications were made within 1 day of the admission (n=210, 60.2%). However, nearly 32% (n= 111) of cases have been notified two to five days after admission. Similar findings were reported in several studies conducted in Sri Lanka, where the majority of cases were notified within three to five days of admission (Liyanage et al., 2019).

On receiving notification, timely field investigations and response are essential to prevent outbreaks. In this study, 82.5% (n=298) of respondents were visited by a PHI, the majority (n=233, 78.2%) within 3 days of discharge, similar to findings of other studies (Rajapaksha et al., 2023). A total of 63 (17.5%) were not visited by PHI. This could be due to multiple factors, including duplicate residential addresses and challenges related to accessibility. However, from a systems perspective, this highlights the workload and subsequent burden on grassroots-level health care workers like PHIs, who are often directed to look after multiple areas due to existing

health cadre gaps. Further, these findings emphasize the need for a structured monitoring system and supportive supervision of individual work plans of PHII, to ensure better adherence to established standards and improve compliance.

Health education was conducted by PHI during field visits (100%) in the current study. However, nearly 40% (n=118) of respondents were not given IEC material during the visit. Health education is important for public health response, as lack of education on breeding sites, bite prevention, and early referral were identified as challenges in previous research (Lubos & Lubos, 2018). From a health systems perspective, such low-cost public education methods would facilitate positive preventative behaviours among the public, thereby contributing to the reduction of dengue case load and burden on the system.

Fogging is a commonly used adulticide method in dengue control. However, there have been calls for evidence-based approaches and more targeted, limited fogging due to environmental impact and the potential threat of developing resistance (Bhatia et al, 2013). The majority (n=190, 63.8%) in the present study said that their area was fogged within one week of the field investigation. Public demand, too, may have contributed to such a high frequency.

It is evident from the present research that there are still gaps and challenges in case reporting, case investigations, and targeted response. This study has provided valuable insights on challenges pertaining to case reporting, case investigations, and subsequent response. However, given the system complexities associated with funding, skilled human resources, and sustaining public engagement for prevention, further research is warranted to understand the interplay between these factors. This particular research, with scope limited to Western Province, might not be best suited to address such systemic issues as regional health systems diversities might have a considerable influence. However, this research has also highlighted the importance of sustaining simple and cost-effective interventions such as awareness raising during field investigations, which enables the public to seek help early through informed decision making.

Conclusion

This study assessed the treatment-seeking behaviour, notification, and public health response to dengue in 361 patients from the Western Province. Nearly half of the patients sought initial advice from government hospitals, and 75% of patients sought treatment within 48 hours of fever onset. However, the remaining 25% of patients, who

delayed seeking treatment, require further attention. Over 65% of cases were notified within one day, and nearly all cases were notified within 5 days of admission, signifying timely notification.

Only 298 (82.5%) cases were investigated by PHI. It is a matter of concern, as investigating each case is vital to prevent further spread. However, cases investigated had been timely. PHI had given advice for all investigated households, while 180 (60.4%) had been given IEC material as well. In areas of 190 patients (63.8%), fogging was conducted within one week of investigation. Hence, many activities have been conducted and linked to field investigation, signifying their importance.

Recommendations

It is essential to strengthen government hospitals for dengue detection, as nearly 50% of patients first seek care at these facilities. This would entail a healthcare system-wide improvement with ongoing primary health care reform, strengthening laboratory and treatment facilities at the local and regional levels. Additionally, efforts should be made to improve the percentage of patients seeking medical care within 48 hours of fever onset, as early investigation is crucial to prevent severe outcomes. For such a concentrated and sustained effort, all public engagement methods, including mass media, community groups, and public interest groups, are essential. Such efforts necessitate a whole-of-government and whole-of-society approach. Ensuring that all notified dengue cases are investigated by PHI is also vital, as timely investigations are key to halting further transmission. For such productive human resource management, task prioritization and planning are essential at the grassroots level of health care institutions. Curative sector health staff should be educated on the importance of promptly notifying all dengue cases to facilitate swift public health responses and timely vector control measures. Moreover, public awareness campaigns should be intensified, emphasizing the need for early medical consultation and timely treatment, particularly in high-risk areas. Finally, addressing financial, logistical, and human resource constraints will be critical to ensure the public health system can effectively manage the dengue burden, especially during peak transmission periods.

References

Adhikari, B., Phommasone, K., Pongvongsa, T., Koummarasy, P. Soundala, X., et al. (2019). Treatment-seeking behaviour for febrile illnesses and its implications for malaria control and elimination in Savannakhet Province, Lao PDR (Laos): A mixed method

study. *BMC Health Services Research*, 19(1), 252. https://doi.org/10.1186/s12913-019-4070-9

Bhatia, R., Dash, A. P., & Sunyoto, T. (2013). Changing epidemiology of dengue in South-east Asia. *WHO South-east Asia Journal of Public Health*, 2(1), 23. https://doi.org/10.4103/2224-3151.115830

de Souza, L. J., Bastos Pessanha, L., Carvalho Mansur, L., Assed de Souza, L., Barbosa Tâmega Ribeiro, M., et al. (2013). Comparison of clinical and laboratory characteristics between children and adults with dengue. *The Brazilian Journal of Infectious Diseases*, 17(1), 27–31. https://doi.org/10.1016/j.bjid.2012.08.020

Elsinga, J., Lizarazo, E. F., Vincenti, M. F., Schmidt, M., Velasco-Salas, Z. I., et al. (2015). Health Seeking Behaviour and Treatment Intentions of Dengue and Fever: A Household Survey of Children and Adults in Venezuela. *PLOS Neglected Tropical Diseases*, 9(12), e0004237. https://doi.org/10.1371/journal.pntd.0004237

Epidemiology Unit, Ministry of Health 2011 (last). (2011). Surveillance Case Definitions for Epidemiology Unit, Sri Lanka. (2020). *Dengue Sentinel Site Surveillance, Epidemiology Unit, Sri Lanka.*

National Dengue Control Unit, Ministry of Health ,Nutrition and Indigenous Medicine, 2019e. (2019). *National Action Plan Prevention and Control of Dengue in Sri Lanka 2019-2023*.

Notifiable Diseases in Sri Lanka, 2nd edition (2nd ed., Vol. 01).

Epidemiology Unit, Sri Lanka. (2020). Dengue Sentinel Site Surveillance, Epidemiology Unit, Sri Lanka.

Fernando, L., Perera, S., Lokanathan, S., Ghouse, M., & Tissera, H. (2017). Impact of Human Mobility on Spread of Dengue in Sri Lanka.

Khun, S., & Manderson, L. (2007). Health seeking and access to care for children with suspected dengue in Cambodia: An ethnographic study. BMC Public Health, 7(1), 262. https://doi.org/10.1186/1471-2458-7-262

Liyanage, P., Rocklöv, J., Tissera, H., Palihawadana, P., Wilder-Smith, A., et al. (2019). Evaluation of intensified dengue control measures with interrupted time series analysis in the Panadura Medical Officer of Health division in Sri Lanka: A case study and cost-effectiveness analysis. *The Lancet Planetary Health*, 3(5), e211–e218. https://doi.org/10.1016/S2542-5196(19)30057-9

Lubos, L., & Lubos, L. (2018). Knowledge, Attitude and Practice regarding Dengue Fever among Mothers in Select Dengue Outbreak Villages in Malaybalay City, Bukidnon. *Liceo Journal of Higher Education Research*, 14. https://doi.org/10.7828/ljher.v14i2.1273

Malavige, G. N. (2006). Patterns of disease among adults hospitalized with dengue infections. QJM, 99(5), 299–305. https://doi.org/10.1093/qjmed/hcl039

National Dengue Control Unit, Ministry of Health ,Nutrition and Indigenous Medicine, 2019e. (2019). National Action Plan Prevention and Control of Dengue in Sri Lanka 2019-2023.

Pinheiro, F. P., & Corber, S. J. (1997). Global situation of dengue and dengue haemorrhagic fever, and its emergence in the Americas. World Health Statistics Quarterly. Rapport Trimestriel de Statistiques Sanitaires Mondiales, 50(3–4), 161–169.

Rajapaksha, R. M. N. U., Abeysena, C., & Balasuriya, A. (2023). 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, 507. https://doi.org/10.1186/s12889-023-15404-5

Russell, S. (2005). Treatment-seeking behaviour in urban Sri Lanka: Trusting the state, trusting private providers. *Social Science & Medicine*, 61(7), 1396–1407. https://doi.org/10.1016/j.socscimed.2004.11.077

Sa, K., Ib, G., & Pr, K. (2005). Epidemiology, clinical features, laboratory investigations and early diagnosis of dengue fever in adults: A descriptive study in Sri Lanka. *The South-east Asian Journal of Tropical Medicine and Public Health*, 36(3), 686–692.

Sujatha, C., Rajan, R., & Krishnankutty, S. (2021). Health Seeking in People Later Diagnosed as Having Dengue Fever during the Epidemic of 2018 in Kerala, India. *Journal of Evidence Based Medicine and Healthcare*, 8, 1–5. https://doi.org/10.18410/jebmh/2021/1

Zellweger, R. M., Cano, J., Mangeas, M., Taglioni, F., Mercier, A., et al. (2017). Socio-economic and environmental determinants of dengue transmission in an urban setting: An ecological study in Nouméa, New Caledonia. *PLoS Neglected Tropical Diseases*, 11(4), e0005471. https://doi.org/10.1371/journal.pntd.0005471