ORIGINAL ARTICLE

Utilization of Local Remedies among Dengue Patients Admitted to the Emergency Department of a Tertiary Care Center: An Observational Study

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Received on: 09 December 2024; *Accepted on:* 30 December 2024; *Published on:* 31 January 2025

Abstract

Background: Dengue viral infection (DVI) affects ~ 400 million people annually, with ~ 100 million cases causing clinical illness. Limited therapeutic options often lead patients to adopt alternative remedies. This study evaluates the prevalence and impact of such remedies on outcomes in patients admitted to a tertiary care emergency department.

Materials and methods: A single-center, observational study was conducted from July 2022 to September 2023, including 170 patients aged >12 years with severe DVI or DVI with warning signs, as per the World Health Organization (WHO) criteria. The use of local remedies such as goat's milk, papaya leaves/extract, neem leaves, giloy juice, and alternative medicine was documented. Outcomes, including mortality and hospital stay duration, were compared between remedy users and non-users.

Results: The mean age of participants was 36 years, with 60% males and 50% from rural areas. 35.29% used local remedies, with goat's milk (23.52%) and papaya leaves/extract (15.29%) being the most common. The median duration of remedy use was 2 days. Mortality was 6.67% in remedy users and 8.4% in non-users ($p = 0.28$). The median hospital stay was 4 days for both groups, with no significant outcome differences.

Conclusion: One-third of DVI patients used local remedies, with goat's milk being the most prevalent. However, no significant impact on mortality or hospital stay was observed.

Keywords: Dengue viral Infection, Goat's milk, Local remedies, Papaya extract.

Indian Journal of Critical Care Medicine (2025): 10.5005/jp-journals-10071-24896

Highlights of the Study

- One-third (35.29%) of dengue patients admitted to the emergency department reported using local remedies, with goat's milk (23.5%) and papaya leaf extract (15.3%) being the most common.
- No statistically significant differences in mortality or hospital stay duration between users and non-users of local remedies.
- Despite the popularity of these remedies, their efficacy and safety remain inconclusive, highlighting the need for larger studies.

Introduction

Dengue, a disease of significant global impact, is estimated to cause ~ 400 million infections annually, with ~ 100 million (25%) resulting in clinical illness.[1,2] However, our arsenal against dengue viral infection (DVI) is outnumbered. Only a few vaccines have shown benefits, and only a handful are available.[3] No drug has yet been approved for dengue, further limiting our options.

In such a scenario, patients and families of affected turn toward alternative medications and remedies for the management of DVI.[4] Several studies have shown the benefit of alternative medications and local remedies for treating DVI. Papaya extract has been demonstrated to have an incremental effect on platelet count in patients of dengue, and the antiviral properties of goat's milk against dengue virus have been shown *in vitro*.[5,6] This study aimed to evaluate the types of remedies used by DVI patients admitted to our institute's emergency services and their impact on patient outcomes.

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How to cite this article: Rajpal A, Pannu AK, Behera A, Sharma N, Hanumanthappa MK. Utilization of Local Remedies among Dengue Patients Admitted to the Emergency Department of a Tertiary Care Center: An Observational Study. Indian J Crit Care Med 2025;29(2):148–150.

Source of support: Nil

Conflict of interest: None

Materials and Methods

This observational, single-center study was conducted in 170 patients above 12 years of age admitted to the emergency medical services of a tertiary care center, a region with a significant prevalence of dengue, from July 2022 to September 2023. The Institute Ethics Committee approved the study (No: INT/IEC/2022/SPL1743). Dengue was defined per the World Health Organization (WHO) diagnostic criteria.[7] Patients with severe dengue or dengue with warning signs were included.[8] Exclusion criteria included patients who did not consent and those with coexisting alternate diagnoses presenting with a tropical fever, who were either diagnosed with a specific tropical illness or did not satisfy the WHO diagnostic criteria for DVI.[7]

Table 1: Use of local remedies in the study population and their relation with mortality

Use of local remedies	*Total (n = 170)*	*Survivor (153)*	*Non-survivor (17)*	*p-value*
Use of any remedy (one or more)	60 (35.29)	56 (36.6)	4 (23.52)	0.28
Alternative medication	7 (4.1)	6 (3.92)	1 (5.88)	0.704
Papaya leaves/extract	26 (15.29)	23 (15.03)	3 (17.64)	0.785
Neem leaves	1 (0.5)	1 (0.6)	0	–
Goat's milk	40 (23.52)	38 (24.83)	2 (11.76)	0.223
Giloy juice	7 (4.1)	6 (3.92)	1 (5.88)	0.704
Kiwi seeds	1 (0.5)	1 (0.6)	0	–

The parenthesis indicates the percentage

The study's main objective was to determine the proportion of study participants using one or more forms of local remedies for managing DVI. The secondary objective was to see the impact of these remedies on eventual patient outcomes. Mortality and duration of hospital stay were used as yardsticks for patient outcomes. Clinical history and examination were done in all study participants. The treating team did all investigations and patient management per the unit's protocol. All the study participants on admission were inquired about any remedies they used for DVI once diagnosed. In cases where patients were not fit to be questioned, the same information was taken from their attendants to the best of their knowledge. IBM Statistical Package for Social Sciences (SPSS) Version 25 was used for data analysis.

Results

The mean age of the study population was 36 years (95% confidence interval, 23–46 years). Almost 60% were males (101 of 170). Half of the study population belonged to rural areas. Nearly, 20% of the study cohort had one or more underlying comorbidities, such as hypertension, diabetes, liver disease, etc., while the rest were previously healthy.

Sixty of the total 170 study participants (35.29%) resorted to using one or more forms of local remedies, mainly believing in the benefit of increment in platelet count in DVI. These remedies included consuming neem leaves, goat's milk, giloy juice, papaya leaves and extracts, and drugs from alternative systems of medicine such as homeopathy and Ayurveda. Goat's milk was the most commonly used remedy (23.5%), while papaya leaves and the extract followed at 15.3%. The median duration of use of these remedies was 2 days (Table 1).

The use of local remedies was compared with the overall outcome of the patients. Out of the 60 participants who used some local remedy, 56 survived. There was no statistical significance between using local remedies and overall mortality. The median duration of hospital stay in participants who used any local remedies was 4 days. It was identical in participants who did not report any such use (Table 1).

Discussion

Few studies have systematically studied alternative medicines in patients with DVI. In our study, the proportion of participants using one or more local remedies for DVI was 35.29%. A study from Malaysia by Ching et al. reported this proportion as high as 85%.[9] This study included a broad spectrum of DVI severity, while the index study included patients with greater severity of DVI.

Goat's milk was the most commonly used remedy in our cohort, at 23.52%. Exosomes in Goat's milk have shown antiviral properties against the dengue virus by inhibiting NS3 expression replication maturation of the viral genome, according to laboratory studies by Yenuganti et al.[6] However, no clinical studies have been conducted on the effects of goat's milk on patients with DVI.

About 15% of patients used papaya leaves and papaya extract. These findings are similar to those of a study by Ching et al., in which 18% of the population reported using papaya extract.[9] With its alkaloids such as *"carpaine," Carica papaya* has shown anti-thrombocytopenic properties in *in vitro* studies by Zunjar et al.[10] A randomized study by Kasture et al. demonstrated that papaya extract in doses of 1100 mg led to increased platelet counts by day 5 of therapy.[5] Multiple mechanisms have been proposed for papaya leaves' action on platelet count in DVI. Prominent ones are stabilizing the platelet membrane against destruction by dengue virus, inhibiting protease involved in viral assembly, and having anti-oxidant effects.[11–13] Regarding toxicities, no acute or subacute adverse events were reported with papaya extract, but long-term events have not been studied.[14]

Alternative systems of medicine are popular among the common folk in India, and seven of our study participants used medicines belonging to these systems. Mahesh et al. reported homeopathy as an alternative therapy for DVI in a case series.[15] However, no large clinical studies stating their efficacy or adverse events are available. Seven of our patients also used giloy (*Tinospora cordifolia*). Singh and Yadav reported its anti-dengue therapeutic potential; however, clinical studies are lacking.[16]

In contrast to previous studies, our study demonstrated no significant change in the duration of hospital stay or mortality in patients using local remedies for DVI.

This was a single-center study, with cases of greater severity included since ours is a tertiary care institute. Patients admitted to the emergency were also included, contributing to Berksonian bias. A relatively smaller sample size limits the generalization of the results of this study to a more significant population. In this study, serial monitoring of platelet counts and their analysis with the consumption of local remedies was not done.

Conclusion

One-third of the study participants resorted to using at least one of the local remedies prevalent in the community for managing dengue; of this, Goat's milk, at 23.52%, was the most commonly used. There were no statistical differences in patient outcomes between the ones using alternative medicines and the rest. This study explains the various practices concerning managing DVI prevalent in our society. It also highlights that local remedies have no significant benefit in treating DVI, although more extensive studies are needed.

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