

An Interventional Cohort Study in Dengue Prevalent Area by Using Nilavembu Kudineer and Awareness Programme

G. S. Lekha*¹, A. Kanagarajan², N. Kasirajan,³ Mithun,⁴ Deepa.J.P⁵,
Subha Sukumar,⁶ Surya. C. S,⁷ Anzari. A,⁸ Abhilmohan,⁹

*1 Research officer, 2 Assistant Director (Siddha), 3 Research Associate, Siddha Regional Research Institute (SRRI), Thiruvananthapuram, Kerala, India.

4,5,6,7,9 Medical Officer, NHM Thiruvananthapuram. 8 Siddha Physician/Director, IMPCOPS, Thiruvananthapuram, Kerala, India.

Abstract

Background: Dengue Fever is the most important vector-borne viral disease in tropical and subtropical areas. The Capital of the Kerala state, Thiruvananthapuram district is endemic to Dengue Fever because of the climatic and environmental factors. **Aim & Objectives:** The aim of the study is to create awareness in Dengue prevalent areas and the objectives are the implementation of preventive measures in selected areas and intervention with Nilavembu Kudineer in cases with clinical manifestation & others (Preventive aspect).

Materials & Methods: The Prospective Interventional study in Dengue prevalent area of Thiruvananthapuram District was initiated with the Baseline Pre-interventional Survey to assess the awareness and attitude of population in that area. Then followed by the distribution of Nilavembu Kudineer for the Prevention of Dengue and for the revival of Cases with some clinical manifestation (Post-Dengue Cases also) and creating of awareness in the public by the supply of pamphlets regarding Dengue in Medical Camps. The assessment in Post-Interventional Survey and observational study of clinical manifestations in four point ordinal Scale are subjected to statistical analysis (paired t-test). **Results:** The Baseline Pre-interventional Survey and awareness programme resulted in increasing the awareness regarding Dengue and its vector control. The strategy was able to bring about a significant change ($p < 0.01$) in the attitude and practice of the people with respect to Dengue prevention and control measures. Moreover the Medical Intervention with Nilavembu Kudineer showed effective reduction in clinical manifestations like fever, malaise, body pain, head ache, cough and joint-pain found to be statistically significant ($p < 0.05$) and the improvement of health status of individuals taken Nilavembu Kudineer in preventive aspect. **Conclusion:** Public health interventions like the distribution of Nilavembu Kudineer and awareness programmes can impede the outbreak of Dengue like illness in endemic areas.

Keywords: Dengue, Nilavembu Kudineer, endemic, Pre-interventional Survey, Post-interventional.

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I. Introduction

Dengue Fever is currently the most important vector-borne viral disease causing high morbidity and mortality. Repeated epidemics of Dengue and Dengue hemorrhagic fever affect millions of individuals each year in tropical and subtropical areas of the world.

Over 18,700 cases of Dengue have been reported in our country this year 2017 with the Union Health Ministry attributing early onset of monsoon as one of the factors for spurt in cases ahead of the vector-borne disease season. The maximum number of cases has been reported in Kerala and is followed by Tamil Nadu with 4,174 cases till 2nd July 2017. As per Kerala Health Department statistics, 9,606 cases with 17 deaths have been reported in the state till July 4 2017 among which 1173 were from Thiruvananthapuram.^[1]

Kerala is one of the endemic states of Dengue Fever in India. Since 2006, the state has witnessed a rise in the yearly Dengue cases. *A.egypti*, the primary vector of Dengue, has adapted to breeding in water-storage areas and has very good capacity to breed in the annual humid climate in Kerala.^[2]

In Capital City of Kerala – Thiruvananthapuram, there is an alarming rise in Dengue Fever cases. The study on physio-environmental correlates with Dengue Fever in Thiruvananthapuram district concludes the significant correlation of Dengue cases with climatic variables and entomological surveillance data.^[2] The prediction of potential outbreaks earlier and the control thereby using preventive measures is the need of hour.

The well known Siddha formulation *Nilavembu Kudineer* indicated for fever in Siddha Literature is being studied and distributed in Tamilnadu for the prevention of Dengue and to cure or reduce public health impacts caused by Dengue.

The prospective descriptive study was conducted in inpatients admitted at tertiary care hospital, with suspected Dengue Fever. The case series was conducted at the department of Siddha medicine in collaboration with the general medicine department of MMC Hospital, Chennai, during the November-December months 2013. The study concluded that, on administration of Siddha herbal formulation (*Nilavembu Kudineer*), fever associated with chills and rigors, body aches, bone pain, headache, myalgia, rash, low platelet count, decreased TLC, raised serum ALT and Hemorrhagic manifestations are improved satisfactorily in suspected Dengue virus infection of 24 cases.^[3]

Another Prospective case-control study in subjects of Viral Fever concludes that the Consumption of *Nilavembu Kudineer* as a prophylactic measure prevents significantly the occurrence of Viral fever in all age groups invariably.^[4]

Hence the programme for the distribution of *Nilavembu Kudineer* and creation of awareness regarding Dengue is being planned in the Dengue prevalent areas of Kerala. This plan is to increase awareness about the pandemic viral diseases in Kerala and to implement the measures for the prevention in selected areas and to formulate the intervention in appropriate stage of illness.

The adoption of this strategy in Kerala may strengthen national Dengue prevention and control programmes, the integration of the health sector with other sectors using a multidisciplinary and inter-programmatic approach and the implementation of a Contingency Plan to prevent and control Dengue outbreaks and epidemics.

The objectives of this study are (i) to conduct a baseline pre-interventional survey to know the awareness about Dengue and its vector control among the study population and to document the existing practices regarding the prevention of Dengue. (ii) Implement the awareness programmes and Intervention with *Nilavembu Kudineer* for Dengue prevention and for the management of Clinical manifestations in Post-Dengue Cases also.

II. Materials & Methods

The Dengue Prevalent areas of *Nemom* Block i.e, five Wards of Pallichal Panchayat in Thiruvananthapuram district of Kerala was selected for the study in the month of September 2017.

Study design: Prospective Interventional Cohort study

The subjects who are all willing to participate in the study and intake of medicine are included in the study. Selectively, those who are able to attend the OP consultation in Panchayat of each ward and ready to prepare the decoction in home are only included in the Interventional study.

The Baseline Pre-interventional Survey was conducted to assess the current awareness of Dengue, attitude and practices of mosquito control in the above said wards. Then it was followed by the intervention with *Nilavembu Kudineer* for the Prevention of Dengue and for the revival of Cases with some clinical manifestation (Post-Dengue Cases also included). The clinical manifestations in individuals are assessed weekly once and the prognosis was documented. Then a Post Interventional Survey was carried out after one month in order to analyze the changes that have occurred regarding the awareness, attitude and practices among the people for the control of Dengue in the selected area.

Even though, it was planned to interview all the people of the above said five wards where the participants are included in the study, for both the pre and post interventional surveys on Preventive attitude, due to practical difficulties this was not possible in all areas and houses.

III. Data Collection

Awareness survey in Pallichal Panchayat

The Baseline Pre-interventional survey regarding the awareness knowledge regarding Dengue and its vector control was collected in the month of August 2017 in five wards namely *Edacode Ward, Pravachambalam Ward, Pallichal Panchayat Office Ward, Keleswaram ward, Thaavivila Ward of Pallichal Panchayat*. The awareness regarding Dengue was assessed by asking questions related to the mode of Dengue transmission, climatic conditions favouring its transmission, time of bite, and available methods of prevention and/or vaccine and about fatality of Disease. The baseline Pre-interventional survey details were collected from 500 houses. But the Post-interventional survey details were obtained in follow-up Cases i.e, in 100 houses only due to the practical difficulties.

Awareness Survey – Pre & Post- Interventional

Sl. No.	Knowledge regarding Dengue	Pre interventional Survey (%) (N= 100)	Post interventional survey (%) (N= 100)	Significance P value
1.	Mode of Transmission	82	99	<0.01
2.	Climatic condition favoring transmission	99	100	>0.05
3.	Time of bite	81	96	<0.01
4.	Availability of Medicine/Vaccine	44	90	<0.01
5.	Fatality of Disease	92	100	<0.01

In the Pre-Interventional survey, majority of the people (99%) in selected area have heard about Dengue and the season for the transmission of Dengue. Most of the people (91%) know about the severity of Dengue but only few (44%) heard about the unavailability of Vaccine for Dengue. After the conduction of awareness programme and distribution of *Nilavembu Kudineer* and Pamphlets regarding Dengue, most of the people attended for the Medical Camp are now aware of the Medicine, method of transmission of Dengue, etc. The data's collected were subjected to statistical analysis.

Preventive attitude

The attitude of the population with regard to the prevention and control of Dengue was also assessed. The preventive attitude in selected area i.e, in *Edacode Ward* was evaluated by examining the Home and environmental hygiene, water collections in surrounding areas, coverage of water storage containers and the practice of mosquito fend off procedures, etc. The collected data's were analysed by using paired t-test. It was observed that the awareness programme and intervention were able to improve the attitude of the people in selected areas.

Preventive attitude– Pre-Interventional and Post-Interventional Survey

Sl. No.	Preventive measure	Pre interventional Survey (%) (N= 100)	Post interventional survey (%) (N= 100)	P value
1.	Removing of Stagnant water	16	88	<0.01
2.	Fumigation – Neem leaf / Camphor	0	48	Non-estimable
3.	Usage of Mosquito repellent	6	46	<0.01
4.	Home and Environmental hygiene	8	76	<0.01

Intervention

The Interventional Programme for the prevention and control of Dengue consisted of an initial distribution of Pamphlets regarding Dengue and control measures with the distribution of *Nilavembu Kudineer*. The Siddha Medical Camps in the above said wards for the distribution of *Nilavembu Kudineer* and Pamphlets regarding Dengue was scheduled in the month of September 2017 for subsequent four weeks and it was completed in 1st October 2017. The prognosis in the subjects was assessed by the documentation of clinical manifestation in subjects participated in the medical camps. Then a Post Interventional Survey was carried out in above said wards in the last two days of October 2017.

Pre- Interventional Criteria for Clinical assessment – Observational (N=100)

Sl. No.	Clinical Manifestation	Severe – 3	Moderate – 2	Mild – 1	Nil - 0
1.	Fever	0	14 Cases	32 Cases	54 Cases
2.	Malaise	0	16 Cases	57 Cases	27 Cases
3.	Body pain	0	25 Cases	42 Cases	33 Cases
4.	Head ache	0	7 Cases	45 Cases	48 Cases
5.	Cough	0	3 Cases	23 Cases	74 Cases
6.	Knee/other Joint Pain	0	30 Cases	40 Cases	30 Cases

Statistical analysis

The Intervention with *Nilavembu Kudineer* was followed by 100 subjects in whom 22 subjects were taken the medicine in preventive aspect i.e, they had no clinical manifestation and other 78 subjects with certain clinical features. The self-perception of six clinical manifestations were recorded in ordinal 4-point scale (Severe - 3, Moderate - 2, Mild - 1, Nil - 0). However, since the observations were taken from a sufficiently large sample (N=78 persons) who tested positive to physical examination for both the time of pre-intervention and post-intervention, t-test (paired) is found to be an appropriate tool of the statistical analysis (rather than the non-parametric test of Wilcoxon Signed Rank T test, as applicable to the case of related ordinal data sets).

The salient results of the t-test (paired) with n=78 observations are furnished below.

Column1: Comparison of Visit -1 data with initial (Visit-0) datas

Column2: Comparison of Visit -2 data with initial (Visit-0) datas

Column3: Comparison of Visit -3 data with initial (Visit-0) datas

Column4: Significance – t vauue in Paired t-test (df=77)

Prospective Interventional Assessment of Observational Criteria

Sl. No.	Clinical Manifestation	V1-0	V2-1	V3-0	t Value (df=99)
1.	Fever	0.679	0.256	0.000	7.851
2.	Malaise	1.141	0.564	0.000	20.051
3.	Body pain	1.179	0.564	0.000	15.796
4.	Head ache	0.756	0.385	0.000	11.005
5.	Cough	0.346	0.141	0.000	5.516
6.	Knee/other Joint Pain	1.282	0.692	0.000	17.621

The test-statistic (t) is found to be significant ($p < 0.05$) for all the 6 variables, with lower values for the post-intervention visit. Thus the prognosis data shows that the medical intervention through the administration of *Nilavembu Kudineer* to the patients is effective in reducing the clinical manifestations like fever, malaise, body pain, head ache, cough and joint-pain.

The prognosis data (N=22) for those were given the medicine *Nilavembu Kudineer* as a preventive measure than as a curative one, showed that none of these persons had displayed any symptoms of fever or cough or any other diseases during the visits by the medical team.

The survey clearly shows that the interventional measures did make an effective change in the attitude of the residents in that most of them had found to have adopted all the preventive measures, except the one relating to the use of repellents' as suggested during the intervention campaign. In comparison, their attitudinal score showing the adoption behaviour before the intervention was low. Use of mosquito repellent was still not a preferred preventive measure for mosquito control by the residents of that area, possibly because of the awareness on the health-risks of the chemical fumigants, and also may be because of the high recurring cost of purchase of chemical repellents'.

The Post - Interventional Survey in the Dengue prevalent area showed the improvement in Preventive attitudes like removing of stagnant water, using of mosquito repellants and fumigation processes with Neem leaves, Camphor, etc in certain houses. Moreover, no case of Dengue was reported in that area in the month of October and November 2017.

IV. Discussion

There were many in-vitro studies that proved the inhibitory effect of *Nilavembu (Andrographis paniculata)* and other ingredients of *Nilavembu Kudineer* against Dengue and other viral agents causing fevers. Siddha literature strongly indicates that the decoction made out of these herbs can cure many types of fever and related illness.^[5] The Pharmacological studies exhibit antipyretic action with hepato protective effect of *Nilavembu Kudineer* which can serve as a good preventive as well as a curative one. A pilot double blind trial has revealed the protective effect of *Andrographis paniculata* against common colds.^[6]

The significant reduction of fever by ethanolic extract of *Nilavembu Kudineer* Choornam (EENKC) on the brewer's yeast induced pyrexia in rat shows its antipyretic potential. This property may be due to inhibiting the enzyme cyclooxygenase and reducing the level of PGE2 within the hypothalamus. Moreover the EENKC treated animals showed good anti-inflammatory activity at 1, 3 and 5 h in carrageenan induced inflammation compared of control animals. It may be due to inhibition of the release of first and second phase inflammatory mediators.^[7]

The antipyretic, anti-inflammatory and analgesic action of NKC may be due to the presence of phytoconstituents in the medicinal plants present in NKC.^[8] The study finding supports the efficacy of *Nilavembu kudineer*, concludes that it might be a safer, better alternative medicine in short and long-term treatment of fever due to its multiple therapeutic activity. *Nilavembu kudineer* has body cleansing activity that detoxifies the blood and remove the pathogenic endotoxins from liver and spleen.^[9]

The anti-viral property of *Nilavembu* and the anti-inflammatory, anti-pyretic, antioxidant, immunomodulatory and analgesic activities of the ingredients of the formulation *Nilavembu Kudineer* can make it as a prophylactic drug and it can be used in the public health measure to combat the viral infections causing fever including Dengue.

The programmes for creating awareness to the public and the implementation of preventive measures has now become the need of the hour to reduce the public health impacts caused by Dengue in prevalent areas. The present study in *Pallichal Panchayat* of Thiruvananthapuram district was able to bring about an increase in the awareness and the development of preventive attitude in the local population.

V. Conclusion

The Cohort Study concludes that the intervention with *Nilavembu Kudineer* and creating of awareness regarding Dengue to the public is more beneficial for the development of prevention attitude and to convalesce from the complications of Dengue or other fever like illness. The public health initiative interventions like the distribution of *Nilavembu Kudineer* can impede the outbreak of Dengue like illness in the world. Hence, similar strategies need to be advocated as a part of our routine Dengue prevention & control activities.

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