International Journal of Community Medicine and Public Health
Yashaswini GR et al. Int J Community Med Public Health. 2022 May;9(5):2112-2116
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20221226

Original Research Article

Clinico-epidemiological profile and cost incurred in the management of dengue among the patients admitted in tertiary care hospital of Mysuru, Karnataka

Yashaswini G. R., Praveen Kulkarni*, M. R. Narayana Murthy

Department of Community Medicine, JSS Medical College, Mysuru, Karnataka, India

Received: 16 December 2021
Revised: 12 April 2022
Accepted: 15 April 2022

***Correspondence:**
Dr. Praveen Kulkarni,
E-mail: praveenkulkarni@jssuni.edu.in

ABSTRACT

Background: Dengue is the most extensively spread mosquito-borne disease; endemic in more than 100 countries. The overall seroprevalence of dengue infection in India was 48.7% (95% CI 43.5-54.0). One of the major factors that determine the outcome dengue syndrome is the cost incurred in its management. As there are paucity of studies related to cost involved in the management of dengue in southern India, this study was undertaken in a tertiary care hospital.
Methods: A cross-sectional study was conducted among 100 patients in JSS hospital, Mysuru Karnataka. Convenience sampling was used to select the patients during the visit and a pre-tested semi-structured questionnaire was used to collect socio-demographic details along with symptoms and cost incurred in dengue treatment. Data analysis is done by arithmetic mean, median, standard deviation, inter quartile range and percentages in SPSS and excel.
Results: In this study 98 (98%) of the respondents had fever, 61 (61%) of respondents had muscle pain, 52 (52%) of the respondents had joint pain, 45 (45%) had head ache, 28 (28%) had bleeding, 51 (51%) had abdominal pain, 43 (43%) had chills, 29 (29%) had vomiting, 19 (19%) had pain behind eyes, 15 (15%) swollen glands, 19 (19%) had rashes. Overall direct cost for the management of dengue was Rs. 62505.5/- (46785.50-76958.75) and overall indirect cost was Rs. 17500/- (2250-25500).
Conclusions: This study provides that the overall direct cost for the management of dengue treatment was Rs. 62505.5/- (46785.50-76958.75) and overall indirect cost was Rs. 17500/- (2250-25500) respectively.

Keywords: Dengue, Direct cost, Indirect cost, Clinic-epidemiological profile

INTRODUCTION

Dengue is the most extensively spread mosquito-borne disease; endemic in more than 100 countries. Information about dengue disease burden, its prevalence, incidence and geographic distribution is critical in planning appropriate control measures against dengue fever.[1] Recent global estimates suggest that more than 390 million dengue infections are reported annually.[2]

Dengue is a viral infection caused by four types of viruses (DENV-1, DENV-2, DENV-3, DENV-4) belonging to the *Flaviviridae* family. The viruses are transmitted through the bite of infected *Aedes aegypti* and *Aedes albopictus* female mosquitoes that feed both indoors and outdoors during the daytime (from dawn to dusk). These mosquitoes thrive in areas with standing water, including puddles, water tanks, containers and old tires. Lack of reliable sanitation and regular garbage collection also contribute to the spread of the mosquitoes.[3]

The dynamics of virus transmission depends on the interactions between the atmosphere, agent, and the host population vector, and its ability to coexist in a specific habitat is determined by environmental factors and the socioeconomic, political, and biological characteristics of the virus, vector, and the person affected.[4]

According to national vector borne disease control programme in India, three-pronged approach is adapted for the prevention and control of dengue. These prongs are early diagnosis and treatment of dengue cases, integrated vector control and environmental protection measures including behaviour change communication.[5]

India contributed to 34% of the 96 million apparent dengue virus infections estimated to have occurred globally in 2010. The Karnataka state had recorded 4,427 cases in 2018. Most of these cases were reported from large city limits like Bengaluru, Mysuru, Devanagari and Raichur etc.[6]

The overall seroprevalence of dengue infection in India was 48·7% (95% CI 43.5-54), increasing from 28.3% (21.5-36.2) among children aged 5-8 years to 41% (32.4-50.1) among children aged 9-17 years and 56.2% (49.-63.1) among individuals aged between 18-45 years.[6]

Dengue fever has a signs and symptoms like abrupt onset of high fever, sever frontal headache, pain behind the eyes which worsens with eye movement, muscle and joint pains, loss of sense of taste and appetite, measles like rash over chest and upper limbs, nausea and vomiting.[7]

One of the major factors that determine the outcome dengue syndrome is the cost incurred in its management. The cost incurred in the management of dengue is basically classified into direct and indirect costs. Direct cost includes the cost related OPD charges, investigations, hospitalization, drugs, platelet transfusion etc. Indirect cost includes the expenses related to food, transportation, wages lost of the patient as well as care giver etc.[8]

Direct costs (or financial costs) represent the actual expenditure on health care services and goods, providing direct information about monetary amounts needed to be paid for the resources; therefore it is recommended from a practical standpoint.[9]

The In this background the present study was undertaken with the objectives to assess the clinico-epidemiological profile and cost incurred in the management of dengue among the patients attending tertiary care hospital in Mysuru.

METHODS

This cross-sectional study was conducted in a tertiary care hospital attached to JSS medical college hospital situated at Mysuru for a period of one year from January to June 2021 after obtaining institutional ethics committee approval (JSS/MC/EC/PG/MPH/18/2020-21 dated 16.06.2020). Consecutive 100 serologically confirmed cases of dengue admitted in various departments of JSS hospital Mysuru during the study period and consenting to participate in the study were included. Subjects with no authentic bills/vouchers for the expenses incurred and not consenting to participate in the study were excluded. After obtaining written informed consent, pre tested structured proforma was used to collect the data on socio demographic characteristics like age, gender, education, occupation, income, marital status, socio economic status. The clinical profile including symptoms, pre hospital care, preferred method of treatment, preferred type of health care system, treatment seeking behavior were collected through interview technique. Data related to cost of care of dengue was collected using a check list by referring to the bills and receipts as per actuals at the time of the discharge.

The following details of cost were collected:

Table 1: Cost collected.

Direct cost	Indirect cost
Hospitalization cost	Travel and conveyance food and refreshment
Investigations	Loss of wages of the patient
Drugs	Loss of wages of the care giver
OPD charges	Any other cost as informed by the patient indirectly related to the management of illness
Blood/ platelet transfusion cost	

Statistical analysis

Data collected was entered into MS excel-2010 followed and analyzed using SPSS version 24 (licensed to JSSAHER). Descriptive statistical measures like percentage, mean, standard deviation, mode interquartile range applied. Results were presented as tables and graphs as relevant.

RESULTS

Sociodemographic characteristics

Among 100 subjects included in the study, majority 47 (47.0%) were in the age group of 21 to 40 years and least 07 (7.0%) were above the age of 60 years, 57(57%) were males and 43(43%) were females. The 27 (27.0%) had studied still high school and 22 (22.0%) were illiterates, 38 (38.0%) were machine and assemblers by occupation, 47(47%) subjects were belonging to lower socioeconomic status according to modified BG Prasad classification, 66 (66.0%) were married, 71(71.0%) were hailing from rural areas (Table 2).

Table 2: Socio-demographic characteristics of study subjects.

Variables	N	Percent (%)
Age groups (in years)		
<20	18	18.0
21-40	47	47.0
41-60	28	28.0
>60	7	7.0
Gender		
Male	57	57.0
Female	43	43.0
Education		
Graduate and above	12	12.0
Intermediate or diploma	25	25.0
High school	27	27.0
Primary school	14	14.0
Illiterate	22	22.0
Occupation		
Professionals, technical and associates	5	5.0
Clerks	18	18.0
Skilled works and shop and market sales workers	7	7.0
Skilled agricultural and fishery workers	6	6.0
Craft and related trade worker	7	7.0
Plant and machine operators and assemblers	6	6.0
Elementary occupation	13	13.0
Unemployed	26	26.0
Not applicable	12	12.0
Socio-economic status		
Upper middle	8	8.0
Upper lower	45	45.0
Lower	47	47.0
Marital status		
Married	66	66.0
Unmarried	31	31.0
Widow/widower	3	3.0
Locality		
Rural	71	71.0
Urban	29	29.0

Clinical profile of dengue patients

In this study 98 (98%) of respondents had fever, 61 (61%) of had muscle pain, 52 (52%) of respondents had joint pain, 45 (45%) had head ache, 28 (28%) had bleeding, 51 (51%) had abdominal pain, 43 (43%) had chills, 29 (29%) had vomiting, 19 (19%) had pain behind eyes, 15 (15%) swollen glands, 19 (19%) had rashes (Table 3).

Table 3: Clinical profile of dengue patients.

Clinical characteristics	Number	Percentage (%)
Symptoms		
Fever	98	98.0
Muscle pain	61	61.0
Joint pain	52	52.0
Head ache	45	45.0
Bleeding	28	28.0
Abdominal pain	51	51.0
Chills	43	43.0
Vomiting	29	29.0
Pain behind eyes	19	19.0
Swollen glands	15	15.0
Rashes	19	19.0
Duration of symptoms		
<5 days	44	44.0
>5 days	56	56.0
Visited doctor for symptoms before coming to tertiary care hospital		
Yes	89	89.0
No	11	11.0
Type of hospital visited before coming to tertiary care hospital		
Government	34	38.2
Private	55	61.8

Cost involved in the management of dengue

In this study it can be observed that, overall direct cost for the management of Dengue among the study subjects was Rs. 62505.5/- (46785.50-76958.75) and overall indirect cost was Rs. 17500/- (2250-25500) respectively. Major component of the direct cost was related to the hospital expenses Rs. 28621 (23874.75-36476.25) followed by investigational cost Rs. 17444.5 (12855.50-21246.25) and cost related to drugs/ medicines Rs. 14308 (10005.25-16541.25). Major component of indirect cost was related to the travel Rs. 2000 (1000-2500) followed by food Rs. 2000 (1000-2000), cost related to wages loss patient Rs. 10000 (0-15000) and wages loss care giver 2500 (250-5000) and regarding other cost 1000 (0-1000) (Table 4).

Table 4: Cost incurred in management of dengue among study subjects.

Section	Median	Inter quartile range	Minimum	Maximum
Direct cost (Rs.)				
Hospital cost	28621	23874.75-36476.25	12,317	55714
Investigation cost	17444.5	12855.50-21246.25	5825	32164
Drug's cost	14308	10005.25-16541.25	3645	29461
OPD charges	50	50-50	50	50
Blood transfusion	2082	0.00-2645.00	0	3846
Overall direct cost	62505.5	46785.50-76958.75	21837	121235

Continued.

Section	Median	Inter quartile range	Minimum	Maximum
Indirect cost (Rs.)				
Travel	2000	1000-2500	1000	3500
Food	2000	1000-2000	500	3000
Wage's loss of the patient	10000	0-15000	0	40000
Wage's loss of the care giver	2500	250-5000	0	20000
Other	1000	0-1000	0	2000
Overall indirect cost	17500	2250-25500	1500	68500

DISCUSSION

Dengue virus infection is increasingly recognized as one of the world's emerging infectious diseases. Dengue in India is also considered to be a major public health problem.[10] Rapid urbanization, poor sanitary conditions, burgeoning urban slums, changing lifestyles of people, environmental changes are contributing to the increasing burden of dengue in the country. One of the major factors that determine the outcome dengue syndrome is the cost incurred in its management.

Socio-demographic characteristics

In the present study out of 100 study subject's majority, 24% were in the age group 31-40 years, 57% were males, 27% had studied till high school, 26% were unemployed, 47% were belonging to lower socio-economic status, 66% were married and 71% were from rural localities. The results are comparable to the observations made by Bharadwaj et al in their study at Assam where highest number of cases of dengue were in the age group of 20 to 60 years with clear male preponderance.[11] Rawat et al in a study at Ajmer region, observed that majority of patients with dengue were above the age of five years, with male preponderance.[12] One contrasting observation of present study compared to both the above-mentioned studies is that of rural preponderance of cases. The probable reason for it could be, the study site being one of the major tertiary care centre catering to rural areas across two to three nearby district, large number of patients hailing from those localities visit the hospital.

Clinical profile

In the present study, fever was a predominant clinical feature among 98% of the study subjects followed by muscle pain in 61% joint pain 52%, headache 45%, abdominal pain 51% and chills in 43% of subjects. These results are comparable with the study conducted by Laul et al where all patients had come with fever along with varied clinical manifestations 65 patients (57%) had abdominal pain, out of which 26 had right upper quadrant pain with fever headache 100 (87%), body ache 99 (86%), backache 67 (58%), bleeding 24 (21%), rashes 25 (21%), vomiting 78 (68%). In another study conducted by Rawat D et al. at Ajmer,[12] Most common presenting complaint and bleeding manifestation were fever and petechiae. Similar results were also obtained in a study conduced by Bharadwaj et al.[11] Where, fever was the most common symptom present in almost 100% cases, followed by headache 85.36%, myalgia 81.30%, nausea and vomiting 61.78% and joint pain 52.03%. Hence we can observe that, dengue presents as acute illness like any viral infections with fever, myalgia, arthralgia, headache etc. Few cases will show bleeding manifestations and haemorrhagic shock is seen rarely.

In the present study the overall direct cost incurred in the management of dengue was Rs. 62505.5/- (46785.50-76958.75) and overall indirect cost was Rs. 17500/- (2250-25500) respectively. Under direct cost the major component was related to the hospital expenses Rs. 28621 (23874.75- 36476.25) followed by investigational cost Rs. 17444.5 (12855.50-21246.25) and cost related to drugs/ medicines Rs. 14308 (10005.25-16541.25). 66 Under indirect cost the major component was related to the travel Rs. 2000 (1000-2500) followed by food Rs. 2000 (1000-2000), cost related to wages loss the patient Rs. 10000 (0-15000) and wages loss the care giver 2500 (250-5000) and regarding the other cost 1000 (0-1000). It is compared with the study by Panme et al the median and interquartile range (IQR) direct costs for pediatric dengue without warning signs, dengue with warning signs, and severe dengue were 179.80 (IQR 85.51-428.51) USD, 145.06 (IQR 90.89-321.86) USD, and 933.51 (IQR 400.50-1117.43) USD, respectively.[13] The median and IQR direct costs for adult dengue without warning signs, dengue with warning signs, and severe dengue were 312.75 (IQR 174.55-531.03) USD, 287.22 (IQR 210.96-389.34) USD, and 720.39 (IQR 389.23-1035.51) USD, respectively. Cost of care is largely dependent on the place of treatment, pricing pattern of the health centre, public health policies, medicinal costs, severity of illness and spending capability of the patient.[13] As the present study was conducted in a private medical college hospital which provides care at a subsidised cost to the patients, the cost patterns are comparatively lesser.

Limitations

The present study was conducted in a tertiary care private medical college hospital which provides clinical care at a concessional price which may affect overall cost involved in care.

CONCLUSION

The present study concludes that dengue was commonly found in the age group of 31 to 40 years, males, residing in rural areas and belonging to lower socioeconomic status. Fever was the commonest manifestation and other symptoms were myalgia, arthralgia, headache, headache etc. In this study it can be observed that, overall direct cost for the management of Dengue among the study subjects was Rs. 62505.5/- (46785.50-76958.75) and overall indirect cost was Rs. 17500/- (2250-25500) respectively.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Ganeshkumar P, Murhekar M V, Poornima V, Saravanakumar V, Sukumaran K, Anandaselvasankar A et al. Dengue infection in India: A systematic review and meta-analysis. PLoS Negl Trop Dis. 2018;12(7):e0006618.
2. Pe D, Sebrango C, Shkedy Z, Stuyft P Van Der. The Relationship between Economic Status, Knowledge on Dengue. Risk Perceptions and Practices. 2013;8(12):6-11.
3. Hasan SR, Riaz M, Jafri FA. Characteristics and outcome of dengue infection; clinical perspective from a secondary care hospital of Karachi. Pakistan J Med Sci. 2012;29(1):115-8.
4. Jaramillo Ramírez GI, Álvarez LSB. Knowledge, Attitudes and Practices Regarding Dengue, Chikungunya, and Zika and their Vector Aedes Aegypti in Villavicencio, Colombia. Open Public Health J. 2017;10(1):80-9.
5. DSS, DFDHF. Long term action plan for prevention and control of Early Case reporting and management: Fever alert surveillance. Virology. 2006;1-13.
6. Murhekar M V., Kamaraj P, Kumar MS, Khan SA, Allam RR, Barde P, et al. Burden of dengue infection in India, 2017: a cross-sectional population based serosurvey. Lancet Glob Heal. 2019;7(8):e1065-73.
7. Khetarpal N, Khanna I. Dengue Fever: Causes, Complications, and Vaccine Strategies. J Immunol Res. 2016;2016:6803098.
8. Shepard DS, Halasa YA, Tyagi BK, Adhish SV, Nandan D, Karthiga KS et al. Economic and disease burden of dengue Illness in India. Am J Trop Med Hyg. 2014;91(6):1235-42.
9. Zhang JH, Yuan J, Wang T. Direct cost of dengue hospitalization in Zhongshan, China: Associations with demographics, virus types and hospital accreditation. PLoS Negl Trop Dis. 2017;11(8):e0005784.
10. Kulkarni P, Kumar DS, Hugara S, Manjunath R, Murthy MR. Empowering Village Health Sanitation and Nutrition Committee members on dengue prevention and control: An educational interventional study in rural areas of Mysuru, Karnataka. Indian J Med Sci. 2021;73(2):179-83.
11. Bhardwaj LM, Borthakur S, Bhattacharyya PC. Clinico-epidemiological study of dengue cases in a tertiary care hospital, Guwahati, Assam. Int J Adv Med. 2017;4:1605-12.
12. Rawat D, Singh K, Garg P. Clinico-epidemiological study of dengue fever in Ajmer region. Int J Contemp Pediatr 2019;6:2046-52.
13. Panmei K, Joseph AK, Rose W, Abraham OC, Mathuram AJ, Kumar S et al. Direct cost of illness for dengue in hospitalized children and adults at a referral hospital in India. Int J Infect Dis. 2019;84:S64-7.

Cite this article as: Yashaswini GR, Kulkarni P, Murthy MRN. Clinico-epidemiological profile and cost incurred in the management of dengue among the patients admitted in tertiary care hospital of Mysuru, Karnataka. Int J Community Med Public Health 2022;9:2112-6.