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Role of Rapid Card Test in Diagnostic Evaluation of Dengue Patients Attending OPD in a Tertiary Care Hospital Kanpur, India

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ABSTRACT

Introduction: Dengue fever is a substantial arthropod delivered viral conditions. Sickness is produced by any of the four dengue contagion serotypes. (DENV 1, DEN- 2, DEN- 3, DENV- 4). Dengue is transmitted by the bite of female mosquitoes of the species Aedes Aegypti and also Aedes Albopictus. **Methods:** This study was conducted in the department of Microbiology, CSJM University, Kanpur. (School Of Health Sciences). The blood sample collected from the patients with clinical daigonosis. The samples were collected from the each patients, The first sample is collected between 1-5 days of clinical symptoms and samples between 15-21 days of clinical symptoms the results are obtained through the detection of dengue ELISA experiment NS1Ag MICROLISA (solid phase enzyme) Dengue IgM MICROLISA enzyme based ERBA LISA Dengue tests which are treated through Q-Line Rapid Card, during the study period of October 2022 to March 2023. **Result:** Total samples 965 were collected through patients Out of 965 ,500 (51.81%) cases were male and 465 (48.18%) were female, NS1Ag positive Dengue Rapid Card. The tests were treated throughout 376 cases treated through NSIAg,276(28.6%) positive and IgM positive is 29(3%). **Conclusion**: Dengue fever is becoming more serious medical issues in India in nationwide. In the future more studies are requested to monitor dengue fever surveillance across the whole country.

Key Words: Dengue, NS1Ag, IgM, IgG, ELISA

Introduction

Dengue fever and dengue hemorrhagic fever which is a substantial arthropod delivered viral conditions.[1] Each time, there is a large number of dengue infections and goods are rehabilitated with dengue haemorrhagic fever, generally in rural areas of India.[2] Sickness is produced by any of the four dengue contagion serotypes.[3] A across the board strategy aimed at accelerating the capacity for guidance and outbreak reaction, changing behaviors and demoting the complaint burden using assimilated vector assignment in conjunction with early and exact opinion has been endorsed.[4] Antiviral medications and vaccines that are present under Dengue

contagion has got four serotypes (DENV 1, DEN- 2, DEN- 3, DENV- 4).[5] Dengue is transmitted by the bite of infected feminine mosquitoes of the species Aedes Aegypti and also Aedes Albopictus, This sickness causes varying clinical symptoms from mild asymptomatic illness to fatal Dengue Hemorrhagic Fever (DHF) and Dengue Shock Design (DSS) 2 Fever, headache, myalgia/ arthralgia, nauseousness, puking and maculo-papular rashes are the clinical symptoms of definitive dengue fever presentation for Other infections like malaria, typhoid, and leptospirosis can imitate dengue and laboratory studies are must- have for an early definite clinical diagnosis.[6] The conclusions can be done with different biomarkers, they include solitude of contagion in culture or mosquitoes or finding of viral genomic RNA, prisoner and discovery of viral labors (NS1 protein) or the host vulnerable response to viral infection (dimension of contagion specific immunoglobulin M and G (IgM and IgG).[7] An expressive rising IgM situation 3- 5 days after the onset of symptoms shows a primary infection.[8] This can persist for 1- 3 months, in secondary infection there will be elevated situations of IgG at 6-15 days of symptoms and IgM can also be detected in secondary infection.[9] As per the World Health Organization (WHO) dengue case portrayal in acute febrile illness blood samples to be collected, First sample in 1- 5 days of onset of symptoms and required sample 6- 14 days after the strike of symptoms during the convalescent phase.[10] This study was done for the assessment of quick card tests and prisoner ELISA tests development could also make an meaningful beneficence to dengue control in the future.[11]

Materials and Methods

This study were conducted in department of microbiology, Government Medical College Kannauj, from October 2022 to March 2023. 965 blood samples were collected from the patients of febrile illness with clinical diagnosis of the dengue Sample. The Patients were diagnosed based on the Guidelines, Treatment, Prevention and Control of Dengue Fever (World Health Organization, 2009). Data on clinical symptoms and laboratory tests were collected for the analysis.

Collection and transport of samples

Blood samples were collected in Red- limited vacutainers with all sterile medications. Samples were centrifuged and tube separated. Those samples not reprocessed within 6 hours were cooled at 2- 8 degree centigrade and were reused within 3 days. From each case 2 blood samples (Sample 1 between 1-5 days of clinical symptoms and sample 2 between 15-21 days of clinical Symptoms) were composed. Dengue day 1 rapid test Dengue Day 1 Test stuff contains two devices; one device for Dengue NS1 Antigen detection and other devices are for the differential discovery of Dengue IgM/IgG Antibodies in natural serum/ tube. Dengue IgM/IgG test instants (Positive results will appear as early as 2- 10 minutes. Negative results were verified after 20 minutes only). All the serum samples were tested for Dengue using Q –Line rapid Card. (Q-Line Biotech Private Limited. New Delhi, India) Rapid test kits as per manufacturer's instructions.

ELISA Tests

Dengue ELISA experiments will give the best interpretation if experiments are served with fresh samples that have not been indurate and frozen. Kit & its components were stored at 2- 8 °C. (Expiry date on the kit indicates the date beyond which stuff should not be used).

Experiment principle

A) NS1Ag MICROLISA is a solid phase Enzyme Linked Immunoassay (ELISA) based on the "Immediate Sandwich" principle.
B) DENGUE IgM MICROLISA is an Enzyme Immunoassay based on " Erba Lisa ".
C) DENGUE IgG MICROLISA is an Enzyme Immunoassay based on Erba LISA
D) DENGUE NS1Ag MICROLISA is an Enzyme Immunoassay based on Erba LISA .

Tests were done as per the manufacturer's instruction.

Results:

During the study period of October 2022 to March 2023. Total sample 965 patient were exposed to different types in the clinical history suggestive of dengue fever and a positive dengue test. Out of 965 cases 500 (51.81%) were males and 465 (48.18%) were females, followed by 112(11.60%) and 853 (88.49%) were treated through IgM and NS1Ag Positive Dengue Rapid Card the tests were treated throughout of 376 Cases were treated through, followed the NS1, 276 (28.6%) positive and IgM positive is 29 (3%). Serum samples were to do with ELISA tests. From the remaining cases only (305) cases were positive and attending for a follow up and improvised sample were collected only from these cases only. First sample was contained between 1-5 days of the onset of symptoms and the alternate sample 15-21 days thereafter. Relevant clinical history were collected from the case or patient affair and there after serum samples were collected. For all these cases both and Rapid and ELISA tests were done. Test lines are coated with anti-human IgM monoclonal antibodies and antihuman IgG monoclonal antibodies discretely. Test was done as per the manufacturer's results.

Table No1.1: Age Distribution by Rapid Card

Age	NS1 Rapid Card	IgM Rapid Card
0 - 10	120	07
11 - 20	142	22
21 - 30	195	37
31 - 40	133	14
41 - 50	106	11
51 - 60	112	13
61 – 70	45	08

Graph No1.1: Age Distribution By Rapid Card

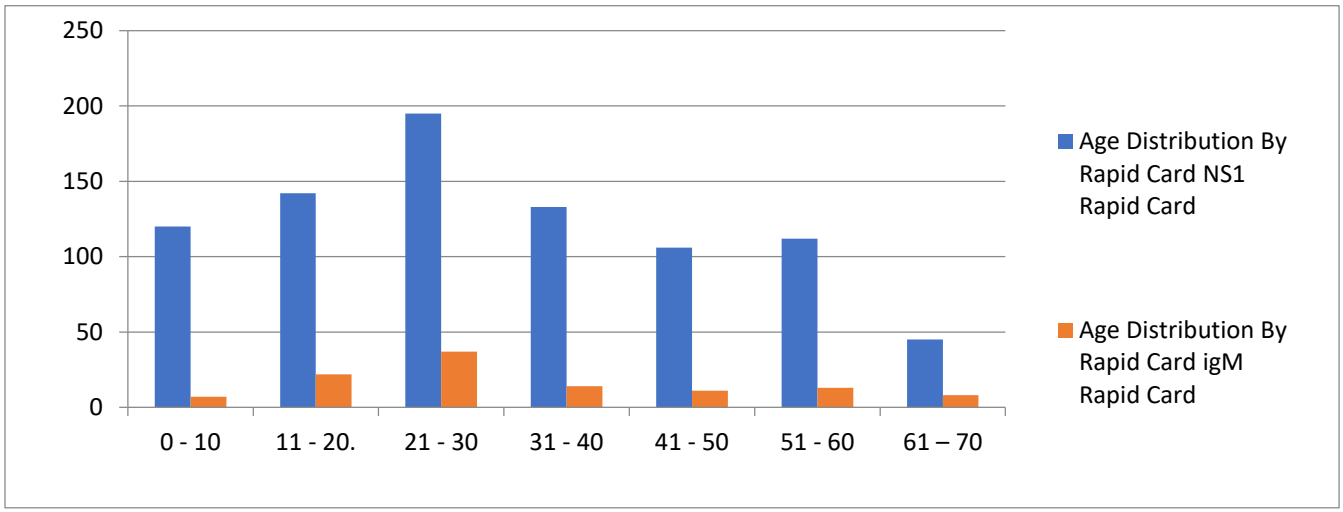


Table No 1.2: Distribution of Gender and Positive Rapid Card

Total Case	Male	Female	Positive by Rapid card NS1	Positive by Rapid card IgM
965	500	465	853	112

Graph No 1.2: Distribution of Gender & Positive Rapid Cards

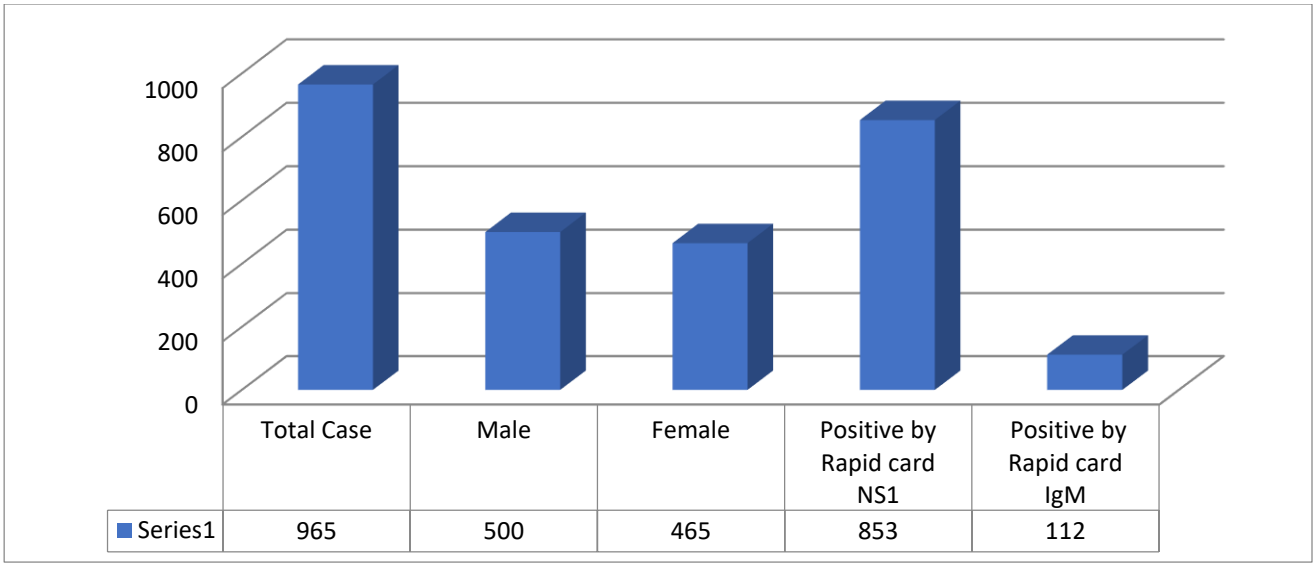


Table No 1.3: Age Distribution by ELISA

Age	NS1Ag (ELISA)	IgM (ELISA)
0-10	03	01
11-20	19	03
21-30	87	08
31-40	61	06
41-50	54	04
51-60	17	02
61-70	26	03
71-80	09	02

Graph No 1.3: Age Distribution by ELISA

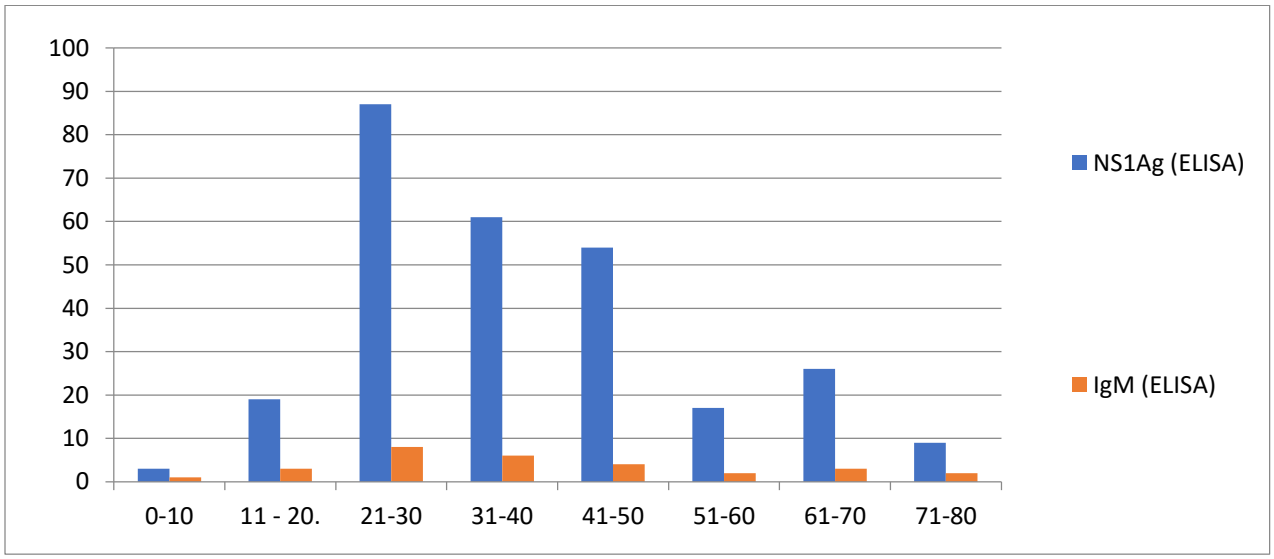
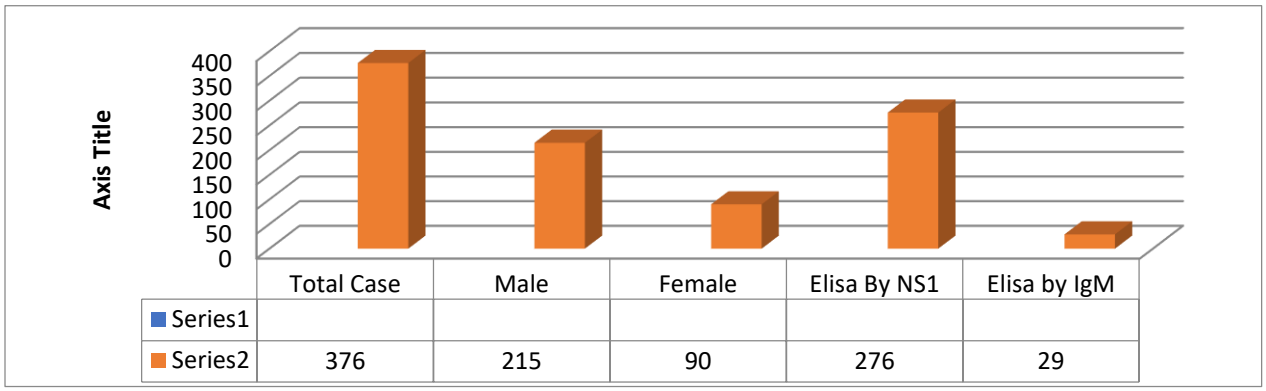


Table No 1.4: Distribution of Gender & ELISA Positive cases

Total Case	Male	Female	Elisa By NS1	Elisa by IgM
376	215	90	276	29

Graph No 1.4: Distribution of gender & Elisa Positive cases



Clinical findings in Dengue Fever:

Dengue hemorrhagic fever : The cardinal feature of Dengue Hemorrhagic Fever is plasma leakage due to increased vascular permeability as evidenced by hemoconcentration (≥20 percent rise in hematocrit above baseline), pleural effusion, or ascites [1]. Dengue Hemorrhagic Fever is also characterized by fever, thrombocytopenia, and hemorrhagic manifestations (all of which may also occur in the setting of Dengue Fever 12. In the setting of Dengue Hemorrhagic Fever, the presence of intense abdominal pain, persistent vomiting, and marked restlessness or lethargy, especially coinciding with defervescence, should alert the clinician to possible impending 'Dengue shock syndrome' .

According to the WHO 2011 case definition, dengue infection is suspected in a patient with high fever and two of the following signs or symptoms:[13]

- Headache
- Retro-orbital pain
- Mylagia
- Arthralgia/ bone pain
- Rash
- Bleeding manifestations: petechiae, epistaxis, gum bleeding, hematemesis, melena, or positive tourniquet test.
- Leukopenia (WBC ≤ 5,000 cells/mm^3)
- Platelet count ≤ 150,000 cell/mm^3
- Hematocrit (Hct) rising 5–10%.

DISCUSSION:

Rapid Card Tests that can be accomplished near the case's point- of- care are being adopted worldwide for their utility in original opinion. Unembellished analyses able of providing an answer within 15 –30 slice are largely desirable, particularly in resource- restricted settings.[14] The interpretation of the Rapid Card Tests will need to be weighed in environment with other attributes that may be important to the end stoner comprehending original demand charge, sample matrix that can be used, volume of sample necessary, storehouse temperature and shelf life. We set up that ELISA accoutrements had superior perceptivity when compared to RDTs. Because of their superior performance, ELISAs would be the committed individual choice when laboratories with trained labor force and outfit are accessible.[15] Depending on the frequencies of dengue and other febrile conditions, the positive and negative prophetic valuations of the bias tested will vary. still, given the high particularity observed for both Rapid Card Tests and ELISAs, the positive of these bias is expected to be lesser than in many utmost endemic countries, where dengue accounts for over 30 of febrile disease (Elisa ranging from 86 for the Pan bio–Rapid Card Tests to 100 for the Bio-Rads, Standard Diagnostics, Rapid card tests, and In Bios ELISA).[16] There fore individualities testing positive are doubtful to bear farther confirmational testing. In the study Dengue Rapid Tests NS1 Dengue Kit (Q Line Rapid Card) 853 cases were Positive and IgM 112 Were Positive.

Follow up Elisa NS1 (Erba Lisa) 276 Positive and 29 Were Positive. These are Negative Cases NS1 63 & 08. We set up many Rapid Card Tests or ELISAs replying to the Opportunity For Improvement (OFI) samples, but a specific cross-reactivity panel was not performed; false outcome as a result of a cross Dengue Rapid Tests had lower perceptivity than ELISAs, accordingly the -reactive antigen can negatively affect the Positive Pressure Ventilation. negative predictive value of an NS1 ELISA is likely to be superior to that of Dengue Rapid Tests. substances testing negative on and Dengue Rapid Tests but still presenting with high clinical dubitation of dengue could bare-tested using laboratory analyses, which may include a combination of NS1 ELISA, and MAC- ELISA.[17] Indeed so, Dengue Rapid tests can have considerable mileage by significantly reducing the quantum of substantiating testing needed. The purpose of this study was to investigate the clinical characteristics and risk factors for severe dengue fever in India during the dengue outbreak in 2018. As a more serious consequence of dengue, Standard Diagnostics patients often have more serious clinical symptoms. However, in this outbreak, the only significant difference between Standard Diagnostics and dengue patients is the platelet counts.[18]The number of low platelet counts in Standard Diagnostics was greater than that in dengue patients ($p < 0.02$). But there were no significant differences between Dengue Fever and Dengue Hemorrhagic Fever in other clinical symptoms. Standard Diagnostics is considered to occur in children and infants (Simmons et al., 2012; St. John et al., 2013). However, in this study, there were only two Standard Diagnostics inpatients (13 and 18 years old) younger than 18 years old. The mean ages of Standard Diagnostics and Dengue Fever were 46.14 and 48.67, respectively, which were not significantly different.[19] Compared with Dengue Fever inpatients, Standard Diagnostics inpatients were more likely to be male ($p < 0.06$). The formation of Standard Diagnostics is not related to age but is related to gender. The reason may be that the spread of dengue is related to the population mobility. Compared with females, males have a larger proportion of migrant workers and are more vulnerable to mosquito bites, which are more likely to lead to Standard Diagnostics. In 2018 the main epidemic type in Xishuangbanna. Prefecture was DENV-1, with an incidence rate of up to 67%. DENV-2

accounted for 32%, and only one patient had DENV-3, which was consistent with our assumption that the epidemic trend was dengue virus.[20]

Conclusion:

Dengue fever becoming more serious medical issue in Vietnam. The disease affects all age groups and provinces nationwide. Without the dengue vaccination, it is suggested to continuously communicate and educate people about disease prevention as well as vector control. In the future, more studies are requested to monitor dengue fever surveillance across the whole country and determine the biomarkers associated with prognosis, intervention and treatment in order to reduce the mortality and morbidity.

References:

[1] Costa RL, Voloch CM, Schrago CG. Comparative evolutionary epidemiology of dengue virus serotypes infection genetics and evolution. Infectious Genetics Evolution. 2012 Mar; 12(2): 309-14.

[2] Gupta N, Srivastava S, Jain A, Chaturvedi UC. Dengue in India. Indian Journals Medical Research. 2012 Sep; 136(3): 373-90.

[3] Maria G Guzman Gustavo Kauri. Dengue diagnosis advances and challenges. International journal of infectious diseases, 8(2004) 69-80.

[4] Sangita Kamath , Neeraj Jain, Satish Gupta, A C Jha and B S Rao. Dengue Epidemic in Jamshedpur-Tata Main Hospital (TMH) Experience. Journal Tropical Diseases 2015, 3:2.

[5] Vikram Khan, Daolatsinh Zala, Sandeep Sanghvi H.C. Srivastavaand V K. Das. Occurrence of Dengue Cases in Silvassa, Dadra Nagar Haveli (Union Territory), India. Jounal Tropical Diseases 2016.

[6] Damodar T, Dias M, Mani R, Shilpa KA, Anand AM, Ravi V, Tiewsoh J Clinical and laboratory profile of dengue viral infections in and around Mangalore India. Indian Journal Medical Microbiology 2017; 35:256-61.

[7] Irani Ratnam, Karin Leder, Jim Black, Mand Joseph Torresi, Dengue Fever and International Travel. Journal of Travel Medicine 2013; 20 (6): 384–393.

[8] Louis Jose Dzouza, Lais Bastos, Pessanha,Laura, Curvalho Mansur. Comparison of clinical and laboratory characteristics between children and adults with dengue. Brazil Journal infectious diseases. 2013; 17(1): 27–31.

[9] K Jayashree G, C Manasa P, Pallavi G, V Manjunath. Evaluation of Platelets as Predictive Parameters in Dengue Fever. Indian Journal of Hematology and Blood Transfusion. July-Sept 2011; 27(3): 127- 30.

[10] Muller DA, Depelsenaire AC. Young PR. Clinical and Laboratory Diagnosis of Dengue Virus Infection. Journal Infectious Diseases. 2017; 215(2): 89-95

[11] Bhatt, P., Sasidharan, S. P., Varma, M., and Arunkumar, G. Journal Infectious Diseases (2020).

[12] Current understanding of the pathogenesis of dengue virus infection, Current Microbiology. 78, 17–32.: 10.1007/s00284-020-02284-

[13] Chaturvedi, U.C, Agarwal, R, Elbishbishi, E.A, and Mustafa, A.S. (2000).

[14] Cytokine cascade in dengue hemorrhagic fever: implications for pathogenesis. Federation of Europian Microbiological Syndrome, Immunology, Medical Microbiology. 28, 183–188 : 10.1111/j.1574-695X.2000,tb01474.x

[15] Cui, X, G, Li, L, H, Zhou, H.N, Shan, X.Y, and Bai, C.H. (2016). Clinical characteristics of 109 dengue virus type 2 infected cases in Xishuangbanna.

[16] China Journals,Infectious Diseases 34, 231–232.

[17] Fried, J.R, Gibbons, R.V, Kalayanarooj, S, Thomas, S.J, Srikiatkhachorn, A, Yoon, I.-K., et al. (2010).

[18] Serotype-specific differences in the risk of dengue hemorrhagic fever: an analysis of data collected in Bangkok, Thailand from 1994 to 2006.

[19] Is diabetes a risk factor for a severe clinical presentation of dengue? – review and metaanalysis. PLoS Neglected Tropical Diseases. 9:e0003741.: 10.1371/journal.pntd.0003741

[20] Dengue viruses concept. Scitable by Nature Education, 2013. Available from: http://www.nature.com/scitable/topicpage/dengueviruses-22400925 [Last accessed on 2013 Sep 11].