



3rd March 2025

Subject: Advisory for the Prevention and Control of Dengue Fever

Background:

Dengue is a vector-borne viral infection caused by a virus of the Flaviviridae family, Flavivirus genus. The transmission of virus is facilitated by mosquitoes of the genus *Aedes* (*Aedes aegypti* & *Aedes albopictus*) which are widely distributed in subtropical and tropical areas of the world especially in urban and semi-urban settings. There are approximately 100-400 million people affected every year around the world.

Dengue Fever is endemic in more than 100 countries including Pakistan. There is substantial evidence that its multiple serotypes are circulating in the different regions of the country. Surge of cases are mostly reported when the temperature threshold remains 26-29°C (for 3-5 weeks) and humidity at 60%. In 2023, a total of 21,016 confirmed cases were reported, mostly after the monsoon season, while in 2024, the number rose to 28,427 confirmed cases nationwide.

Generally, dengue cases start to be reported from April to June, and a significant rise is usually observed in the post-monsoon season (September-November). Additionally, the increasing rate of urbanization, coupled with poor living conditions and climate change, poses a heightened risk of dengue outbreaks in various regions of the country.

Purpose:

Keeping in view the seasonal trends of Dengue Fever, it is imperative to work on prevention while staying vigilant for detection of cases and ensuring preparedness to launch response activities for curtailing the transmission of dengue fever. This advisory is therefore, intended to alert all provincial and federal health departments and hospitals to make all necessary arrangements and measures for effectively managing the situation during ongoing Dengue season.

Risk Factors:

There are various factors contributing to the transmission of dengue fever like unplanned urbanization associated with social and environmental factors including population density, poor water storage practices, access to reliable water resources, high mobility and community's knowledge regarding dengue fever. Moreover, climate change also contributes a high risk of dengue fever transmission, especially a post monsoon surge in cases.

Clinical presentation:

Dengue is caused by any one of four subtypes of dengue viruses (DENV-1, DENV-2, DENV-3, or DENV-4). Infection with one serotype confers lifelong homotypic immunity against that serotype and a very brief period of partial heterotypic immunity to other serotypes, however, a person can also be infected by multiple serotypes. The incubation period ranges from 3 to 14 days (commonly 4-7 days). Dengue has a wide clinical spectrum - ranging from flu like illness to severe dengue - which could be fatal. Initial dengue infection may be asymptomatic (50-90%), may result in a non-specific febrile illness, or may produce the symptom complex of classic dengue fever (DF). Classic dengue fever is marked by rapid onset of high fever, headache, retro-orbital pain, diffuse body pain (both muscle and bone), weakness, vomiting, sore throat and altered taste sensation. The severity of the pain leads to the term break-bone fever. However, early identification and good clinical management can greatly reduce the case fatality rate to <1%. Sequential infections with different serotypes increase the risk for dengue hemorrhagic fever and dengue shock syndrome. Warning signs include severe abdominal pain, persistent vomiting, marked change in temperature (from fever to hypothermia), hemorrhagic manifestations, change in mental status (irritability, confusion or obtundation) and thrombocytopenia (platelet count of <100,000/mm³).

Early signs of shock include restlessness, cold clammy skin, rapid weak pulse and narrowing of the pulse pressure (systolic and diastolic blood pressure). Patients with dengue fever must be referred to hospital if they develop any of these signs.

Specimen Collection, Transportation and Laboratory confirmation:

Collect 3-5 ml venous blood / serum. Label and pack it properly in triple packing and transport maintaining cold chain, to the lab along-with complete history form. Transport the sample to the provincial labs for dengue ELISA and PCR testing (if available) or send representative sample to the Virology Department of Public Health Laboratories Division at the National Institute of Health, Islamabad for serotype detection. Time period for test is critical and mentioned below:

- a. Dengue NS1 antigen can be detected in the serum as early as 1 Day Post Onset (DPO) of symptoms and up to 7 DPO.
- b. Serological detection by IgM ELISA after 5 days of the onset of illness.
- c. Molecular detection using Real-time PCR test within one week after onset of illness.
- d. IgG is detectable at low titer at the end of the first week of illness and slowly increases. In contrast, antibody titers rise extremely rapidly during a secondary infection.
- e. High levels of IgG are detectable even in the acute phase and they rise dramatically over the preceding two weeks.

All health and laboratory personnel should ensure strict adherence to the Standard Precautions for handling any suspected DF/DHF cases and samples.

Treatment/ Clinical Management:

- Case management at the primary and secondary care levels (where patients are first seen and evaluated) are critical in determining the clinical outcome of dengue. A well-managed front-line response reduces hospital admissions and also saves lives.
- The most important measure to assist the patients with dengue fever is to carefully evaluate them for impending complications, such as early evidence of DHF.
- There is no specific antiviral treatment for dengue infection and treatment mainly relies on development of symptoms. Supportive treatment must be undertaken as required for the specific disease manifestations. Fever and myalgia should be managed with acetaminophen. Aspirin or non-steroidal anti-inflammatory agents should generally be avoided because of the risk of bleeding complications and the potential risk of Reye's syndrome in children.
- Patients with dengue fever should be cautioned to maintain their intake of oral fluid to avoid dehydration.
- Administration of corticosteroids has no demonstrated benefit and is potentially harmful to patients.
- Platelet transfusions may be warranted in severe thrombocytopenia (<10,000/mm³) and active bleeding. However, whole blood transfusion may be needed in case of significant bleeding.
- Hematocrit (HCT) should always be interpreted together with vital signs and hemodynamic state. Hematocrit measurements must be interpreted with caution critically assessing the adequacy of fluid repletion. IV fluid therapy with crystalloids or colloids will decrease HCT levels; the decrease in HCT will be more pronounced and sustained with colloid therapy.

Public Health Actions:

a. Strengthening of disease surveillance:

Timely detection of new cases, clusters, and identification of hotspots to carry out case response activities is imperative. The cases may be detected as per following case definitions:

- Clinically compatible case of Dengue like illness: Any person with acute febrile illness of > 2 days and <10 days with two or more manifestations from severe headache, myalgia/ arthralgia, retro-bulbar pain, severe muscular pain, severe backache or joint pain, platelets <150,000 and hemorrhagic signs.
- Suspected Case: An acute febrile illness of 2 - 7 days duration with 2 or more of the following: Headache, retro-orbital pain, myalgia (muscle pain), arthralgia (joint pain) or hemorrhagic rash.
- Probable Case: A clinically compatible case of dengue-like illness, dengue, or severe dengue with other laboratory results indicative of probable infection.
- Confirmed case: Suspected/Probable case confirmed by lab tests.

- **Dengue Hemorrhagic Fever:** Defined as dengue with any one or more of warning signs i.e. severe abdominal pain or persistent vomiting, red spots or patches on the skin, bleeding from the nose or gums, vomiting blood, black tarry stools (feces or excrement), drowsiness or irritability, pale, cold or clammy skin, difficulty breathing and blood picture showing a total white blood cell count of $<50,000/\text{mm}^3$ and platelets of $<100,000$.

b. Vector Surveillance and Integrated Vector Management:

- Strengthen routine indoor and outdoor dengue vector surveillance systems across union councils, towns and districts.
- Regularly inspect standing water sources inside and outside homes for mosquito larvae, and eliminate breeding sites through mechanical means or apply the recommended dose of larvicides if necessary.
- Examine all possible containers or points of stagnant water collection i.e. rooftop water tank, fountains, coolers, flowerpots, bird's drinking pots, underground water tank, ponds, tires, cans and bottles, bucket, discarded appliances, clogged drains etc.
- Covering, emptying and cleaning of domestic water storage containers on a weekly basis.
- Ensure the proper vector surveillance of hotspots i.e. hospitals, junkyards, graveyards, nurseries, schools, higher education institutes, tire shops, basements, parks, hotels, under construction buildings, mosques, swimming pools, factories and offices etc.
- Ensure proper waste disposal, eliminate stagnant water, and cover water storage containers to prevent mosquito breeding.
- Deploy mosquito traps in high-risk areas to monitor and control adult mosquito populations.
- Ensure the mechanical elimination of all potential breeding sites. Chemical treatment can be done only at those sites where mechanical elimination is not possible.
- Fogging is recommended during emergency to kill the adult mosquitoes and allowed after the vector density assessment has been done by the entomologist.
- Apply WHO approved insecticides as per manufacture's recommendations labeled on the supplied containers for indoor residual spray and fogging.
- Ensure vector surveillance to eliminate larval breeding sites, apply peri-focal indoor residual spraying (IRS), and conduct fogging to control the adult mosquito population in the home of a confirmed dengue patient as well as in surrounding homes.
- Educate the public on mosquito control measures and encourage participation.

c. Multi-stakeholder engagement

Involving all the relevant stakeholders is very crucial and important in preventing and responding to dengue fever. The prevention and control of dengue requires close collaboration and partnership between the health and non-health sectors. The line departments include local government, public health institutes, the Directorate of malaria control, environment protection agency, solid waste management, WASA, education, agriculture, parks and horticulture, forest wildlife & fisheries, agriculture, communication and works and tourism etc. and international partners/organizations.

d. Personal protection:

- Adopting personal protection measures like wearing long-sleeved clothes, use of mosquito repellent lotions/sprays, and use of mosquito repellent coils.
- Use of bed nets while sleeping outside in open environment.
- Use of mesh screens on windows.
- Home isolation of patients with mild illness
- Visit to hospital in case of development of danger signs

e. Risk Communication & Community Engagement:

- Arrangement of health awareness sessions to sensitize community for prevention against Dengue fever.
- Dissemination of brochures and pamphlets.
- Raising awareness in community through use of print, electronic and social media.
- Improving community participation and mobilization for mosquito control activities at community level.

f. Hospital preparedness:

- All the designated hospitals need to prepare/spare special isolation ward/beds for dengue patients especially during the peak season to timely cater the patients and minimize the potential damage due to dengue.
- All designated hospitals need to ensure adequate supplies for dengue patient management.
- Use insecticide treated bed nets to prevent mosquito bite and transmission of dengue fever from patient to other persons.
- Vector surveillance and indoor residual spray or fogging in the premises of the hospitals
- Refresher training of all concerned healthcare can help in efficiently managing the dengue patients thereby reducing the workload and mortality.

g. Monitoring & evaluation:

Active monitoring of surveillance activities need to be carried out to determine effectiveness of control interventions.

Reporting:

Prepare a line-list for all the suspected cases with information (demographic, clinical & risk factor), enter data in DHIS-2 and share with DDSRU at provincial DGHS Office and NIH. FELTP fellows and alumni may be engaged for outbreak investigation and response measures. Findings of outbreak investigation may be shared with provincial DGHS and NIH.

The Center for Disease Control (CDC), NIH may be contacted for technical assistance on Tel: 051-9255237 and Fax No. 051-9255575.



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