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Review Article

Importance of proper nutrition in dengue infections

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ABSTRACT

Dengue fever has become one of the most significant public health issues in tropical and subtropical countries, including India. Most of the states in India report dengue fever cases during and after the monsoon each year. The affected patients have been at their homes for 4-5 days, either from fever or acute signs of dehydration, low platelets, vomiting, abdominal pain, and fever. Some of these seriously ill patients are admitted to the hospital for IV fluids, hydration, and monitoring of their vital signs. Overall, this brief review is based on data from the World Health Organization, the National Center for Vector Borne Disease Control (NCVBDC, govt. of India), and other relevant portals searched by relevant keywords. This paper's primary goal is to present and review home-based, low-cost nutrition integrated care for dengue. After reviewing the data, the study showed the recent three years of dengue status in all the states of India. Using a mosquito net, paracetamol as a fever-reducing drug, and the best food through a maximum liquid diet are already proven preventive measures against infections. In addition to extra water cum electrolyte drinks, all macro and micronutrients are essential proportionally for managing platelet count and boosting immunity against the virus. Sufficient and complete data is needed to do more research in community health and therapeutic nutrition.

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1. Introduction

The virus that causes dengue infects humans when infected mosquitoes bite them *Aedes aegypti* mosquitoes and, to a lesser extent, *Ae. albopictus* mosquitoes are the primary vectors that spread the disease. The virus that causes dengue is referred to as the dengue virus (DENV). Four DENV serotypes exist, and a person can be affected by the virus four times. Most of the world's population is now in danger from dengue, even though infections with DENV only cause mild sickness. Over 80% of all infections between 100 and 400 million annually—are typically mild and asymptomatic.

Dengue or severe dengue does not have a specific treatment. Severe dengue has a decreased mortality rate when the disease is detected early and treated appropriately.¹

2. Materials and Methods

This short review study is based on available data from the National Center for Vector Borne Diseases Control (NCVBDC, govt. of India,) and other relevant portal searching the significant keywords are to present and review home-based inexpensive nutrition integrated care dengue. food through a maximum liquid diet are the already proven preventive approaches to infections. However, case of dengue hemorrhagic fever, hospitalization and proper medical supervision as per the physician's advice.

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3. Discussions

3.1. Virus characteristics and transmission

Four different but closely related serotypes of the Flaviviridae family virus, which causes dengue, are known to exist (DENV-1, DENV-2, DENV-3, and DENV-4). It is thought that protection against that serotype is conferred after recovery from infection. Cross-immunity, however, is only transient and only partially present following recovery from the illness.¹ The risk of severe dengue is increased by subsequent (secondary) infections with different serotypes. Female virus-carrying mosquitoes (*Aedes aegypti* or *Aedes aegypti* as a secondary) bite humans and spread the virus to them. After feeding on a host, the virus regenerates in the midgut of infected mosquitoes with DENV infection and spreads to the salivary glands as secondary tissues.^{2,3} The extrinsic incubation period (EIP) observed is between consuming and transmitting the virus to a new host. EIP usually takes 8 to 12 days due to 25-28 °C as favorable temperatures. The period is generally influenced by temperature variations, initial viral concentration, and virus genotype.²⁻⁶

3.2. Global perspective

Almost the past 20 years, the number of dengue cases reported to WHO has increased by over 8-times, from more than five lakhs cases in 2000 to over 2.4 million in 2010 and 5.2 million in 2019. Numerous nations have not yet updated their statistics, and the COVID-19 pandemic may have made it more difficult for case reports in some countries. The Americas, South-East Asia, and Western Pacific are the most severely impacted, with Asia accounting for over 70% of the global disease load.¹

3.3. Indian scenario

According to the National Center for Vector Borne Diseases Control (NCVBDC), Telangana, Karnataka, and Maharashtra show maximum dengue cases, whereas Kerala shows 20 deaths till 30th September 2022.⁷ Most importantly, the states like West Bengal and Delhi are the worst hit. As of September 21, Delhi reported more than 500 cases, while Bengal had more than 800 new infections on September 27 according to Economic Times Online.⁸ Both West Bengal and Delhi's dengue outbreaks were hampered by nonstop rain. This article emphasized proper nutrition prevalence, causes, and effects. However, accurate and complete data are needed to detail 2 show the cases and deaths from 2020 to 2 September 30, sources.^{7,8}

3.4. The double burden for India and a few countries

India, Brazil, Vietnam, Philippines, Fiji, Colombia, Kenya, Peru, Paraguay, and Peru and other countries were severely affected in 2021 and still in 2022. Global healthcare and

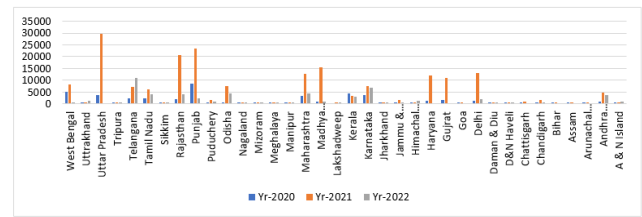


Fig. 1: Dengue cases -2020 -2022, till September 30 (Source: <http://nvbdc.gov.in>)

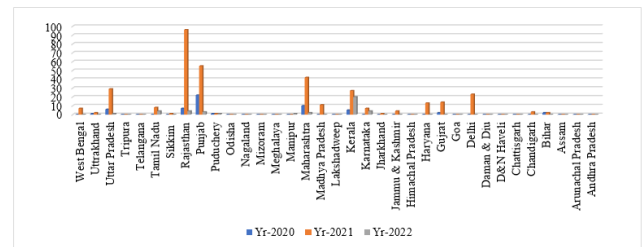


Fig. 2: Death from Dengue -2020 -2022, till 30th September (Source: <https://nvbdc.gov.in>)

management systems remain under tremendous strain due to the COVID-19 epidemic. The WHO has focused on diagnosing and treating the prevention of vector-borne illnesses like dengue and other similar infections during covid-19 pandemic phases.^{1,8}

3.5. Best possible nutrition and daily diet

Plenty of fluids should be consumed, including oral rehydration solution, soups, fresh citrus fruit juices, coconut water, and drinking water. The additional fluids manage hydration and prevent dehydration due to high fever and vomiting. Lemon water is one of the cheapest and best sources of vitamin C that enhances water and detoxifies the body. Pomegranates, apples, oranges, and mixed juices are also helpful. Homemade soups added with spinach, beetroot, and tomato soup are good enough for hydration cum personal taste during infection and recovery. Coconut water supplies a good amount of potassium, whereas beetroot contains a very high amount of vitamin A, vitamin B9, Vitamin C, manganese, and iron. These altogether boost up erythrocytes and prevent anemia and convalescence.⁹ Mosambi juice is helpful in dengue as one of the RNA- viruses. The bioactive compounds (BAC) in Mosambi are solely employed for various clinical applications considering several therapeutic benefits, not only in Asian countries but also in the west. Ascorbic acid, B vitamins, amino acids, and other secondary metabolites are best found in fruit pulp and juice. The fruit contains polyphenols, including flavanones, hesperetin, naringenin, and chlorogenic acid.¹⁰

According to the study, weight management should be a significant factor or comorbidity for dengue, mainly severe. As per the study, children and adolescents with severe plasma leakage (DHF grades III and IV) were more likely to be overweight than patients with mild plasma leakage (DHF grades I and II) (45.5% vs. 18.8%). However, there is still insufficient data on proper nutrition for dengue shock syndrome and dengue hemorrhagic fever other than a general liquid diet followed by a soft diet.¹¹

Dengue patients need a balanced diet rich in protein, good fat found in omega 3,6,9 (all three), and calculative carbohydrates available in cereals as a daily staple food. Tentatively 50%-55% of carbohydrates, more than 1 gram per kg body weight protein, and around 20%-25 % visible fat would be the proper segregation of total calories to make a diet plan in a day. In addition to more than enough electrolytes, all macro and micro minerals cum vitamins are essential in meals. To get enough fiber, vitamins, and minerals, more fruits, vegetables, and dairy products are needed to maintain platelets. India is one of the best countries that produce a variety of vegetables and fruits seasonally and are available cheaply. They are the natural and reliable sources of multivitamins and minerals to protect and boost the immune system, which is a crucial concern for this viral infection.¹²

3.6. More research on nutrients functions

More trials are needed on the specific micronutrients discussed in this article, such as vitamins D and E. Some randomized trials (RCT) were told to be there to confirm the positive results of all micronutrients for dengue patients. Many scientific tests are also needed on various subjects of all ages about the severities of DENV infection, which are DF, DHF, and DSS.¹³

4. Conclusions

Dengue infections can be prevented and recovered without extraordinary efforts. The best food through a liquid diet, mosquito net protection, and paracetamol as a fever-reducer are known preventive measures against infections. analyzing the data, the study revealed the dengue situation over the previous three years in India's states. As per nutrition is concerned, a for controlling platelet count and enhancing immunity against the virus, in addition to extra water and electrolyte drinks. To conduct additional research in community health and therapeutic nutrition, sufficient and complete data are required.

5. Source of Funding

None.

6. Conflict of Interest

None.

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