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Characteristic Presentation of Dengue and Salmonella Typhi Infections in Suburban Remote and Endemic Zones Surrounding Higher Medical Centre - An Outline of Prognostication

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ABSTRACT

Background: In our study, we observed a high prevalence of infectious fevers, specifically dengue and typhoid fevers. The study was conducted in rural patients, as the specialty institute is located near the catchment area. Dengue virus is primarily transmitted by the Aedes mosquito, resulting in thrombocytopenia and hemorrhagic shock. Salmonella, on the other hand, causes enteric infections along with high-grade fever and various complications. It is important to note that morbidity and mortality rates are significantly elevated in these aforementioned conditions.

Aims & Objectives: Obtaining conclusive clinical laboratory diagnoses for Salmonella and Dengue infections is crucial in high-prevalence areas to improve treatment outcomes and reduce overall incidence.

- Creating strategies to identify and prevent Salmonella and Dengue, highly contagious bacterial pathogens and mosquito-borne viral disease.
- We aim to effectively address chronicity and morbidity by using a comprehensive diagnostic, treatment, and management approach.

Materials & Methods:

- Study Area: Madha Medical College Hospital & Research Institute, Kancheepuram.
- Type of Study: Retrospective data observational analysis
- Study Period: March 2018 to March 2019

Result: Our study provides valuable insights on fevers. Males represent 64.3% of the population, while females make up 35.7%. In terms of age groups, 0–14-year-olds make up 61.9%, 15–29-year-olds are 16.7%, 30–44-year-olds are 9.5%-, and 45–59-year-olds are 11.9%. Dengue fever is observed in 76.2% of cases, while Typhoid is observed in 23.8%. All cases involve fever and various accompanying symptoms, each with different percentages. Dengue investigations are done in 76.2% of patients, while S typhi is present in 23.8%. Patient management includes 20% receiving day care and 80% requiring admissions.

Discussion: Clinical and lab investigations are used to evaluate the disease's clinical status. Dengue treatment includes symptom management, supportive care, and intensive care as needed. Precautions are taken to prevent multi-organ failure. Enteric fever is treated with targeted antibiotics to control transmission.

Conclusion: Early diagnosis and treatment, along with prompt implementation of measures to limit spread, offer multiple advantages, as stated in this study.

Keywords: *Dengue, Salmonella Typhi Infections. Suburban Remote, Endemic Zones*

INTRODUCTION

Dengue fever is considered endemic in numerous countries in Asia, while typhoid fever continues to be a prevalent global issue. The stages of this illness include prodromal, febrile, complication, and convalescent phases. A specific group of patients, exhibiting clinically suspicious symptoms of salmonella or enteric fever, are identified by the presence of a persistent high-grade fever, lasting muscle aches, loose stools, rose spots on the chest and abdomen, hepatosplenomegaly, as well as symptoms commonly associated with Dengue, such as eye pain, pain behind the ears, and joint and bone pain. Dengue fever poses a significant global threat to human health, caused by the acute viral flaviviridae and transmitted by Aedes mosquitoes. This illness can result in hemorrhagic fever and shock. Since 1960, the number of Dengue cases has increased more than 30 times, affecting approximately 400 million people each year. The World Health Organization has classified Dengue as uncomplicated and severe, with the severe cases further divided into 4 grades, ranging from mild to severe shock (1). The impact of increasing temperature on LANCET dengue virus (DENV) is observed in subtropical and tropical regions, resulting in a significant number of deaths ranging from 10,000 to 40,000. The prevalence of mosquito-borne diseases is exacerbated by climate change. A total of 206 original studies have established a quantitative relationship between heat waves and the occurrence of dengue fever. Through meta-analysis, it has been confirmed that a 1-degree increase in temperature leads to a 13% rise in dengue cases (2). The diagnosis of Salmonella enteric fever caused by S. typhi, a gram-negative bacterium, typically stems from poor hygiene practices, as well as food and water contamination. Each year, approximately 21.6 million cases are reported. Prognosis can be improved through prompt diagnosis and treatment. Travelers are advised to prioritize food and water hygiene and also consider vaccination (1). Effective treatments for chronic carriage of enteric fever include the use of antimicrobial agents like fluoroquinolones, which have shown eradication rates of 92%. Another treatment option, amoxicillin, offers better eradication rates (2). Given their endemic nature, dengue and enteric diseases hold significant importance in our region.

Aims & Objectives:

To obtain a conclusive clinical laboratory diagnosis for the detection of Salmonella and Dengue infections in order to achieve optimal treatment outcomes, especially in areas with high prevalence rates, with the aim of reducing the overall incidence.

Specific Objectives:

- Determining and implementing strategies for the identification and prevention of the highly contagious bacterial pathogen Salmonella and the mosquito-borne viral disease Dengue.
- By employing the complete diagnostic, treatment and management approach, we aim to address chronicity and morbidity more effectively.

Need for the Study:

The health coverage in rural areas is lower compared to urban areas, demonstrating the need for improved provision of community awareness and early utilization of available management methods to prevent the spread of diseases.

MATERIALS AND METHODS

Study Area: Madha Medical College Hospital & Research Institute, Kancheepuram.

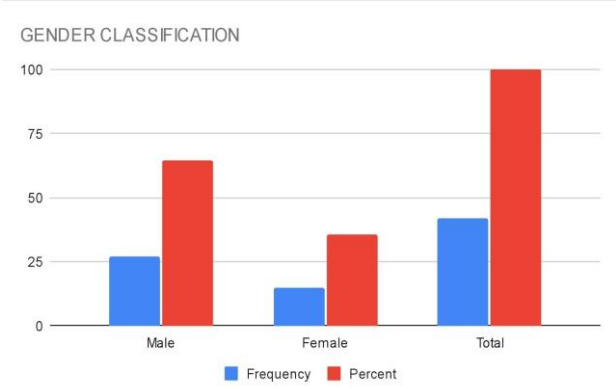
Type of Study: Retrospective data observational analysis

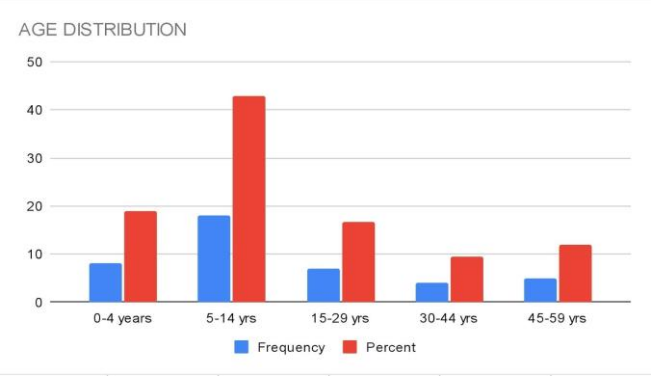
Study Period: March 2018 to March 2019

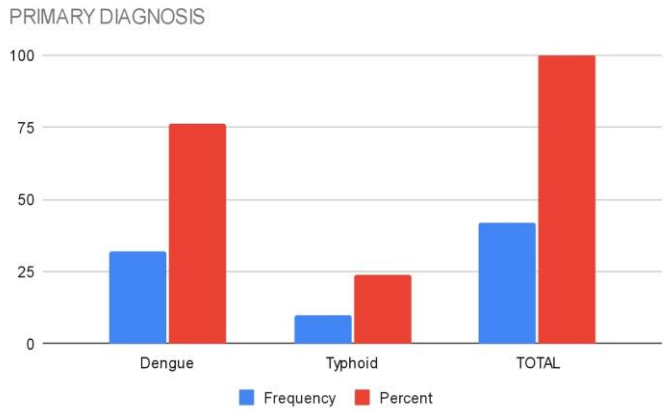
During a one-year period, a significant number of patients with Pyrexia were observed, and some required admission and treatment. A strong clinical suspicion of dengue and salmonella was critically diagnosed and reported for further confirmation and treatment. The patients who were clinically screened and fell within the range of either typhoid or dengue, out of the total forty-two, were determined to have either dengue or typhoid through laboratory imaging techniques such as x-ray, computed tomography, ultrasound, and magnetic resonance imaging. All vital signs and parameters were examined according to the established protocol and recorded.

RESULTS

Our study, although small in scale, yields valuable insights regarding fevers. The gender distribution reveals that males represent 64.3% of the study population, while females account for 35.7%. In terms of age groups, individuals aged 0-14 constitute 61.9%, 15-29 comprise 16.7%, 30-44 comprise 9.5%, and 45-59 comprise 11.9%. Dengue fever is observed in 76.2% of the cases, while Typhoid is observed in 23.8%. It is noteworthy that 100% of the cases involve the presence of fever, alongside symptoms such as chills, myalgia, weakness, vomiting, and other classical signs, each exhibiting different percentage values. Furthermore, our study reveals that investigations for dengue are undertaken in 76.2% of the patients, while S typhi is observed in 23.8%. Regarding patient management, 20% receive day care management, whereas 80% require admissions.







CHIEF COMPLAINTS		
Complaints	**Frequency**	**Percent**
Fever with Myalgia and Generalised Weakness	15	35.7
Intermittent Fever with Chills, Rigors, Body Ache and Generalised Weakness	17	40.5
Fever with Burning Micturition, Lower Abdomen Pain and Constipation	2	4.7
Fever with Loose stools, Myalgia, Generalised Weakness, Abdominal Pain	8	19.1
Total	42	100.0

INVESTIGATIONS		
	FREQUENCY	**PERCENT**
Dengue NS1	18	42.9
Dengue IgG	5	11.9
Dengue IgM	9	21.4
Sal Typhi 'O'	5	11.9
Sal Typhi 'H'	3	7.1
Sal Typhi 'A'(H)	1	2.4
Sal Typhi 'B'(H)	1	2.4
TOTAL	42	100

CLINICAL EXAMINATION		
	FREQUENCY	**PERCENT**
Pyrexia	23	54.8
Dehydration	12	28.6
Tachycardia	4	9.5
Low Blood Pressure	3	7.1
TOTAL	42	100

Management		
	FREQUENCY	**PERCENT**
Treated as Outpatient with Medication and Diet advice	20	47.6
Fluid resuscitation and antibiotic administration	8	19.1
Admission needed with Fluid resuscitation, antibiotics and platelet transfusion	3	7.1
Observatory stay with regular monitoring	9	21.4
Specialist Opinion needed and shifted to Infectious disease Dept	2	4.8
Total	42	100

DISCUSSION

Essential laboratory investigations encompass biochemistry, hematology, microbiology, and imaging investigations for prompt diagnosis, identifying complications, reducing morbidity and mortality through precise treatment, ultimately leading to successful treatment and follow-up. Imaging techniques such as X-ray are used to eliminate pleuroparenchymal changes and effusion. Sonography is utilized to identify serologic fluid in dengue and hepato spleno-megaly in both dengue and typhoid cases, as well as bowel abnormalities. Additionally, computed tomography and magnetic resonance imaging are valuable tools. The definitive treatment involves addressing symptoms, rehydration, hemo product supplementation, specific medication administration, and, if necessary, the use of inotropic medicines. There is currently no specific treatment available for dengue fever. However, platelets can be used to correct hypovolemia and bleeding. The exact underlying mechanisms of the disease are still not well understood, but it is believed to involve a hyperactive reaction between the virus and the human immune system. Supportive care is essential and should be provided continuously (3). It is believed that the clinical characteristics and risk factors, particularly for severe dengue, are mainly associated with secondary heteromorphic dengue (4). The pathogenesis, prevention, and control of dengue hemorrhagic fever are also discussed, highlighting the correlations with antibody dependent enhancement, cytokine dysregulation, and variations in lipid profile (5). For the treatment of enteric fever and paratyphoid, supportive care is recommended, and the World Health Organization suggests the use of azithromycin, ciprofloxacin, or ceftriaxone (6). According to a BMJ clinical update, empirical doxycycline, hydration with steroids, and fluoroquinolones are considered important (7). Recent advances in African regions include the use of fluoroquinolones, macrolides, and cephalosporins (8). Supportive and specific management as well as in-patient care are essential in this scenario.

CONCLUSION

The study conducted in a suburban area with a catchment in a medical college hospital has demonstrated the significant importance of early diagnosis in both dengue and typhoid. This was accomplished through the identification of clinical symptoms, signs, and laboratory imaging, which greatly facilitated early diagnosis and proper treatment. For the treatment of salmonella typhi, antibiotics such as ciprofloxacin, azithromycin, and ceftriaxone are commonly utilized. In cases of dengue, an isotonic crystalloid solution is initiated at a rate of 20 mg/kg/hr and may be replaced with colloid plasma or dextran in emergency situations. Once improvement is observed, the treatment for dengue can be initiated by employing a crystalloid solution, leading to a reduction in morbidity and mortality rates. The absence of mortality cases due to referral to a well-equipped center further highlights the significance of this approach. Inclusion of this data in a national analysis would contribute to its revision and facilitate a comprehensive examination.

Suggestions: A more comprehensive and longer-term study, involving a larger sample size, is currently underway and is expected to provide more conclusive findings.

Limitation: Factors such as distant location, delayed referral, complicated presentation, and a population with limited education should be taken into consideration.

Declaration by Authors

Ethical Approval: Approved

Acknowledgement: The team involved in this research includes the staff of the fever center, the department of general medicine, the research group, as well as the nursing and paramedical team.

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Conflict of Interest: The authors declare no conflict of interest.

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