

## Prevalence of Altered Hepatogram Values in Dengue Fever Patients

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### Abstract

The subject of this study is the altered hepatogram in patients with dengue. The objective of the study is to determine the prevalence of altered hepatogram in patients with dengue, who attended the Regional Hospital of Villa Hayes from January to March 2018. The methodology was of descriptive level, with a quantitative approach, non-experimental design and cross-sectional. The study population consisted of all patient records from 20 to 49 years old, with a diagnosis of dengue, who attended the Regional Hospital of Villa Hayes period January to March 2018, the sample consisted of 207 patient records from 20 to 49 years old, the data collection technique was documentary, as instrument clinical records were used, whose data were analyzed in statistical tables and graphs. The main findings were that, in the month of March 2018, there was the highest number of positive cases of dengue, which have been performed the study of hepatogram, being the female sex the most affected in adults aged 26 to 31 years, in which the liver functions AST, ALT and FA were the most altered. It can be concluded that patients suffering from dengue fever suffer from not so serious hepatic alterations.

**Keywords:**Dengue, Aedes aegypti, Hepatogram, Transaminase, Transaminases.

### Resumen

El presente trabajo tiene como tema “Hepatograma alterado en pacientes con dengue”. El objetivo del trabajo es “Determinar la prevalencia de hepatograma alterado en pacientes con dengue, que acudieron al Hospital Regional de Villa Hayes periodo enero a marzo del año 2018”. La metodología del trabajo fue; nivel descriptivo, con un enfoque cuantitativo, de diseño no experimental, de corte transversal. La población de estudio fueron todas las fichas de pacientes de 20 a 49 años, con diagnóstico de dengue, que acudieron al Hospital Regional de Villa Hayes periodo enero a marzo del 2018, la muestra consistió en 207 fichas de pacientes de 20 a 49 años, la técnica de recolección de datos fue la documental, como

instrumento se utilizaron fichas clínicas, cuyos datos fueron analizados en cuadros y gráficos estadísticos. Los principales hallazgos fueron que, en el mes de marzo del año 2018, se presentó la mayor cantidad de casos positivos de dengue, los cuales se han realizado el estudio de hepatograma, siendo el sexo femenino la más afectada en adultos de 26 a 31 años, en las cuales las funciones hepáticas AST, ALT y FA fueron las más alteradas. Se puede concluir que los pacientes que padecen dengue sufren de alteraciones hepáticas no tan graves.

**Palabras clave:**Dengue, *Aedes aegypti*, Hepatograma, Transaminasas.

## INTRODUCTION

Dengue is an endemic-epidemic viral disease caused by an arbovirus of the *Aedes* genus, mainly *Aedes aegypti*, which is currently the most important arbovirolosis worldwide in terms of morbidity, mortality and economic impact (1, 2).

This arthropod-borne human disease has four related serotypes (DENV-1, DENV-2, DENV-3 and DENV-4), which can vary in terms of symptoms. Almost half of the world's population is at risk of this infection because they live in tropical and subtropical areas, as well as more than 400 million travelers from Europe and North America who each year cross borders and return to their countries from Asia, Africa and Latin America (3, 4).

It is estimated that 3,000 million people live in areas where there is a risk of contracting dengue and that approximately 390 million infections (96 million of them symptomatic) and 20,000 deaths are caused by dengue per year, being a worldwide important health problem, in the region of the Americas. This disease represents one of the main reasons for medical consultation in health units, there is no specific treatment for the disease, it is treated according to the symptoms that one is presenting. One of the main problems of dengue fever is the use of prescription drugs to control the conditions associated with the disease, such as fever or body aches, namely Paracetamol, which, without an adequate dose or control of the patient's underlying pathologies, could lead to unwanted complications(5).

Diseases caused by arboviruses usually present in epidemic form, constituting febrile syndromes, headache and body aches. In dengue virus infection (DENV), the identification of warning signs, almost always during or after the fever subsides, helps in clinical diagnosis and patient care. Most of the time, arbovirolosis is self-limiting, but occasionally it can manifest severe forms such as shock, hemorrhage or severe organ involvement (PAHO). Dengue disease predominates in urban areas of temperate countries,

but these cannot be considered risk-free areas (6).

Among the clinical manifestations of dengue, organ involvement has been reported. Since the 1960s, liver involvement began to be discovered in Asia as an atypical manifestation of dengue, associated with mortality. Histopathological studies in fatal cases of dengue fever in Vietnamese children showed varying degrees of hepatitis (5, 6).

Dengue infection can vary from mild forms of the disease, which only manifest an acute fever lasting 2 to 7 days, there are also cases of fever associated with intense general malaise, headache, headache. Some cases of dengue can evolve to severe forms in which there are hemorrhagic manifestations, loss of plasma, these cases of severe dengue are more frequent in patients who suffered a serotype of dengue and are infected again with a different serotype, there are also other clinical forms of dengue, less frequent, which are characterized by intensely affecting an organ or system: encephalitis, myocarditis, hepatopathies and renal damage (6).

## **MATERIALS AND METHODS**

This research studied the hepatic aspects suffered by patients who tested positive for dengue fever, during the suffering of the disease, taking into account the prevalence of altered hepatogram in patients with dengue fever who attended the Regional Hospital of Villa Hayes, period January to March 2018.

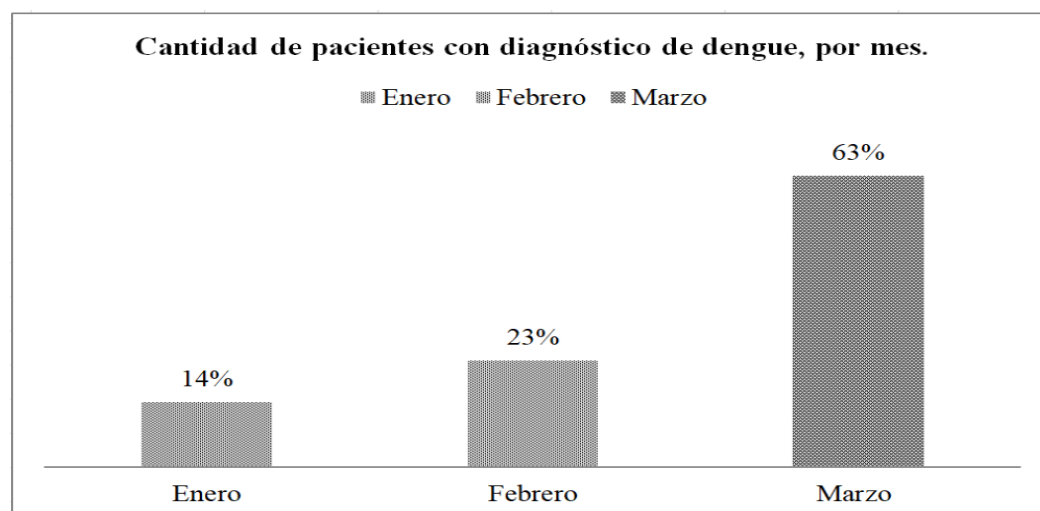
Descriptive, analytical, non-experimental cross-sectional study conducted at the Regional Hospital of Villa Hayes, Department of Presidente Hayes in the Western region of Paraguay, where existing situations were observed, not provoked in the research, with a quantitative approach since it correlates data, based on measurement and variables analyzed by statistical methods.

The research focused on patients with Dengue fever who had alterations in hepatogram studies during the disease who attended the Regional Hospital of Villa Hayes in the period from January to March 2018 with a non-probabilistic sampling, where 207 records of patients aged 20 to 49 years, who came to the health center from different localities of the Paraguayan Chaco were analyzed.

## **RESULTS**

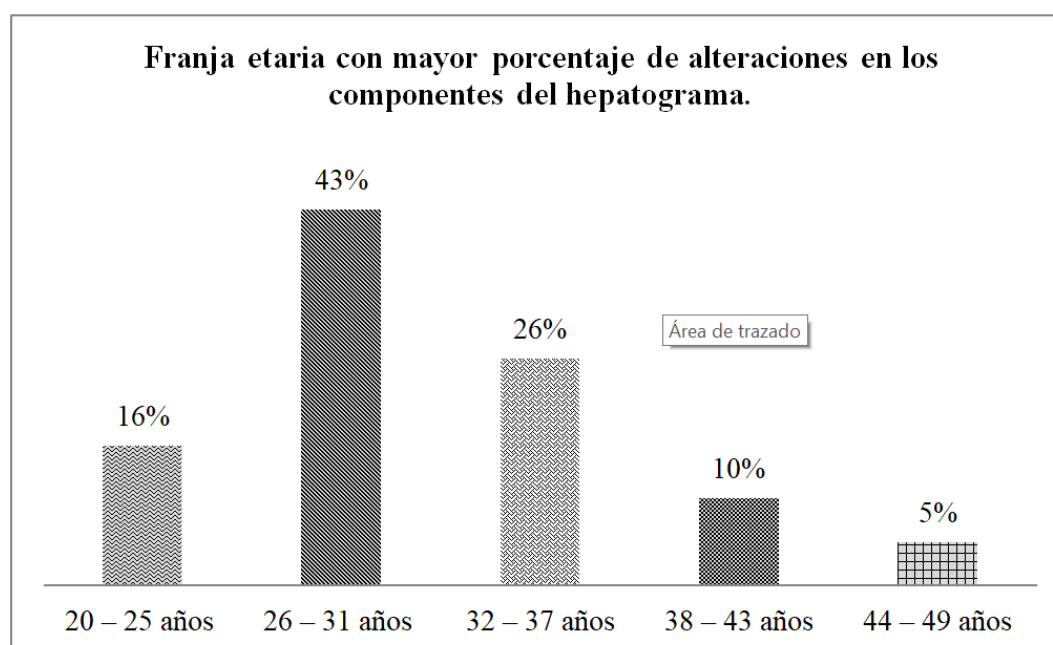
A total of 207 records processed at the Regional Hospital of Villa Hayes in the

period from January to March 2018 were analyzed. Figure 1 shows the corresponding percentage by month of patients who attended the Hospital.



*Figure1. percentage of patients attending the Regional Hospital of Villa Hayes per month.*

Of the total analyzed, 63% of the positive cases of dengue fever occurred in March, 23% in February and 14% in January. Data was collected through the statistical registry of the fever department of the Regional Hospital of Villa Hayes. Of the total number of confirmed cases, 60% of the alterations in liver biomarkers occurred in women and 40% in men, regardless of the fact that no studies have been recorded that relate positive cases of dengue, nor the increase in liver biomarkers with the sex of the patients.



*Figure2. Age range and prevalence of alterations of hepatogram components in each group.*

Figure 2 shows the age range and the percentage of prevalence among each one. The prevalence of these alterations was in the age group 26 to 31 years, where the frequency was 43%, followed by the range of 32 to 37 years with 26%, the range of 20 to 25 years with 16%, 38 to 43 years with 10% and the range of 44 to 49 years with 5%, thus the age range. Taking these data into account, it can be observed that the age range with the highest percentage of positive cases of dengue with greater alterations in hepatogram studies was 26 to 31 years of age.

Of the total number of positive cases analyzed, 85% of the patients did not present alarm signs, while 15% did present alarm signs, without serious cases, taking into account the classification of DENV (dengue virus), which are without alarm signs, cases with alarm signs and serious cases (7).

On the other hand, the patients were classified between those who presented alterations in parameters and those who presented normal values, with 64% of patients presenting alterations in hepatogram parameters, compared to 36% who presented normal values, taking into account the reference values.

The parameters observed were liver enzymes such as aspartate transaminase (ATS), alanine aminotransferase (ALT) and alkaline phosphatase (ALP), and total bilirubin (BT) values were also observed. Based on the 207 patient records, an individual analysis of each parameter was performed and it was observed that 132 patients had elevated ATS values, 105 patients had elevated ALT values, 98 patients had elevated FAIc values and 28 patients had elevated BT values.

*Table 1 Groups according to hepatic compromise.*

<b>Grade</b>	<b>Frequency</b>	<b>Percentage</b>
<b>A</b>	75	36%
<b>B</b>	101	49%
<b>C</b>	31	15%
<b>Total</b>	207	100%

Table 1 shows how it was grouped according to the degree of liver involvement, taking into account the classification proposed by Souza (2004), the prevalence of grade A was 36%, representing 75 patients, grade B, was 49%, representing 101 patients and grade C,

15% representing 31 patients, it can be seen that grade B was the one with the highest percentage of hepatic involvement (6).

## DISCUSSION

The results obtained in the present study showed that the highest percentage of Dengue infection registered in the Regional Hospital of Villa Hayes occurred in the month of March, which may have been due to climatic conditions that could have favored larval development; in that month, the number of cases registered was 131, out of 207 registered in the months under study. The study also showed that 60% of the total number of cases registered were in women, compared to 40% at the regional level. In documents on updates from the Pan American Health Organization, a similar behavior can be observed, taking into account that it affects a higher percentage of women, as in Guatemala, where children under 15 years of age represent 52% of the total number of cases and women 54% (7).

The disease does not distinguish between sexes, but in the country, there is a higher infection rate among women, which may be mainly due to the lifestyle in which women spend more time at home. This is the hypothesis expressed by Dr. Iván Allende, epidemiologist and general director of the General Directorate of Health Surveillance (DGVS - Dirección General de Vigilancia Sanitaria).

One of the organs most compromised by dengue virus infection is the liver. Liver injury, although not fully characterized in the early stages of dengue, is one of the lesions that persist after infection. The cause of liver impairment was first thought to be a multifunctional etiology, later it was hypothesized that such impairment or damage may be secondary to hypoxic injury, to the direct effect of the virus, and also to immune-mediated damage (8). Liver damage in dengue can range from asymptomatic increase in serum transaminases to severe liver damage including the incidence of acute liver failure, the pathway of action of dengue virus is from hepatocytes and also to Kupffer cells in the liver (9). The virus binds to cell receptors to initiate its infective process, and through the process of endocytosis binds to what is taken into the cell (10).

The alterations in the values of parameters of hepatogram studies are frequent findings that make evident the hepatic damage that can occur due to dengue disease, and can also rarely cause acute lesion of hepatic cells, although some patients may present hepatomegaly, jaundice and pain in the right hypochondrium (11).

Asymptomatic alteration of liver function test values are frequent findings. It was also known that dengue fever may rarely cause acute liver cell injury, although some patients may

present with.

With respect to the values presented for some parameters such as Aspartate transaminase (ATS), alanine aminotransferase (ALT), alkaline phosphatase (ALP) and total bilirubin (BT), it could be seen that 132 patients presented elevated values of ATS. In the work developed by Goyal& Ahmed (2017), they obtained a higher percentage of patients with elevated ATS values, it was 91%. In another study developed by Amit Soni et al., (2017), they classified values and percentages of patients presenting within each range, finding results similar to this study, where they observed that 45.6% of patients had an elevation of at least 3 times in AST levels, another 36.7% of patients had an elevation of 3 to 10 times in AST levels and finally 16.4% of patients had elevation greater than 10 times in serum AST levels. In the present study, this discrimination was not developed. On the other hand the ALT values in this study was 51%, a value below that obtained by Goyal& Ahmed (2017), whose percentage of patients with elevated ALT values was 80%, compared to 20% who presented normal values, while in the study of Amit Soni et al, (2017), they also observed that 27.8% of patients had 1-3 fold elevation in ALT levels, 59.4% of patients had 3-10 fold elevation in ALT levels and only 8.9% of patients had greater than 10 fold elevation in serum ALT levels (10, 12)

With respect to the FAlc parameter, 47% of the total obtained elevated values of this parameter, which compared to the work developed by Goyal and Ahmed (2017), is above, since these authors reported a percentage well below, being the same of 29%, in the study could not differentiate between dengue hemorrhagic and classic dengue, In a study conducted by China et al. (2008), serum ICPF levels were elevated in 30.3% of patients with classic dengue and in 40% of patients with dengue hemorrhagic fever, comparing the results obtained, they were almost similar to the present study, in which ICPF levels were elevated in 47% of patients (10, 13).

Finally, another of the parameters analyzed in this study was BT, where 28 patients had elevated values, the same corresponds to 14% of the total analyzed, a value very similar to that obtained in the work of Goyal& Ahmed (2017), who reported 10% of the total analyzed likewise, another study by Parkash et al. (2010) found that 3.1% of patients had hyperbilirubin, while in another study, Larrea et al. (2005) observed that the indecency was 2 out of every 63 patients (12, 13, 14).

## CONCLUSIONS

With the present study developed in the Regional Hospital of Villa Hayes, during the study period, firstly, it was observed that the highest number of infected patients was obtained in the month of March, a fact that can be attributed to climatic factors that favor larval development. Likewise, it could be observed that the prevalence occurs in the female sex, the prevalence of the research is not influenced by the sex of the patients, although there are reports in other countries of the region, in the country there are no records that relate, showing the lack of reports and official records of the percentage of men and women who are affected by the virus at the country level, the age range most affected is 26 to 31 years, which was the one with the highest number of positive cases, and there are no previous records at the country level that show that the age of the patients is an indication of the severity of the disease or the hepatic compromise that must be present when suffering from this pathology.

With respect to the parameters observed, there is no relationship between the development of alarm signs, since the majority did not present alarm signs, but there was a majority with elevated liver parameters, showing that liver function can vary from a biochemical condition to severe acute liver cell injury.

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