

# Factors associated with severe dengue in patients from Cauca, Colombia, 2015–2021

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## ABSTRACT

**Introduction:** The department of Cauca, Colombia, is endemic for dengue fever. The prevalence of severe dengue has consistently exceeded national indicators, highlighting the critical importance of appropriate and timely classification and treatment of patients according to dengue types.

**Objectives:** To determine the sociodemographic and clinical factors associated with severe dengue in the department of Cauca from 2015 to 2021.

**Methods:** An observational, analytical, retrospective cross-sectional study was conducted with a population of 4,048 dengue cases. Statistically significant variables were entered into a logistic regression model.

**Results:** Of all cases, 98.5% (n=3,987) were classified as dengue fever. Factors associated with severe dengue included: days elapsed until medical consultation (OR 5.2; 95% CI: 2.1–12.5), hypotension (OR 3.8; 95% CI: 1.3–10.9), hepatomegaly (OR 3.2; 95% CI: 1.4–7.3), mucosal hemorrhage (OR 2.3; 95% CI: 1.2–4.6), platelet count below 100,000 (OR 3.4; 95% CI: 1.7–6.8), and fluid accumulation (OR 6.5; 95% CI: 2.6–16.2).

**Conclusions:** This study emphasizes the importance of comprehensive evaluation of dengue patients as a measure for early detection of warning signs and prevention of complications.

# Factores asociados a dengue grave en pacientes del departamento del Cauca - Colombia 2015-2021

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## INFORMACIÓN ARTÍCULO

### Palabras clave

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## RESUMEN

**Introducción:** el departamento del Cauca es endémico para dengue. La prevalencia de dengue grave se ha mantenido por encima del indicador del país, por lo que es de vital importancia clasificar y tratar adecuada y oportunamente a los pacientes según los tipos de dengue.

**Objetivos:** determinar los factores sociodemográficos y clínicos asociados con dengue grave en el departamento del Cauca 2015-2021.

**Métodos:** se realizó un estudio observacional, analítico y retrospectivo de corte transversal, con una población de 4048 casos de dengue. Las variables estadísticamente significativas se ingresaron a un modelo de regresión logística.

**Resultados:** se encontró que el 98,5 % (n = 3987) de los casos corresponden a clasificación de dengue. Dentro de los factores asociados a dengue grave se encontraron: días transcurridos hasta la consulta (OR 5,2; IC 95 %: 2,1 - 12,5), hipotensión (OR 3,8; IC 95 %: 1,3 - 10,9), hepatomegalia (OR 3,2; IC 95 %: 1,4 - 7,3), hemorragia en mucosas (OR 2,3; IC 95 %: 1,2 - 4,6), descenso de plaquetas a menos de 100.000 (OR 3,4; IC 95 %: 1,7 - 6,8) y acumulación de fluidos (OR 6,5; IC 95 %: 2,6 - 16,2).

**Conclusiones:** este estudio resalta la importancia de una evaluación exhaustiva del paciente con dengue como medida para una detección temprana de signos y de prevención de complicaciones.

## INTRODUCTION

Dengue fever is currently the most important vector-borne disease in the world in terms of morbidity and mortality (1), which has historically meant problems and disruptions in health services and public health, with countries in Africa, Asia, the Eastern Mediterranean, and the Americas bearing the heaviest burden (2). Several factors converge in this problematic (e.g. ecological, climatic and vector-related conditions, as well as virus propagation), with an impact on several regions (3). It is estimated that about four billion people are at risk of dengue infection. Annually, 390 million people have this diagnosis; for every 100 million, about 5% are diagnosed with severe dengue and in these cases the mortality is between 2% and 5%, which could be significantly lower with timely treatment (4). For the year 2021, according to the epidemiological bulletin of the National Institute of Health (INS), 39,409 cases of dengue were reported in Colombia, of which there were 18,803 (47.7%) without warning signs, 19,898 (50.5%) with warning signs and 708 (1.8%) of severe dengue, and a total of 147 probable deaths (5). The department of Cauca, as well as Valle del Cauca and Chocó, according to this bulletin, were the three departments that were above the expected upper limit in at least 80% of the epidemiological weeks in 2020 (5).

One of the ways to mitigate the damage caused by the disease is the classification provided by the World Health Organization (WHO) in 2009, which sought to standardize the typification in order to help clinicians classify timely patients at risk of complication by defining three main classes of dengue infection: with or without warning signs and severe dengue (6); this has led different governmental entities to adopt this classification (7) along with various studies that evidence the associated clinical, paraclinical, pathophysiological and sociodemographic factors that facilitate the approach and timely diagnosis of the patient (8–11). However, studies focused on severe dengue in the department of Cauca are scarce and the distribution of factors associated with severe dengue in the local context is unknown. Consequently, the present study intended to make use of the information reported to SIVIGILA, in order to identify these associations in the department of Cauca and to show which variables predominate in this population.

## METHODS

An observational, analytical, retrospective cross-sectional study was conducted, and the inclusion criterion established was all cases diagnosed with dengue reported to the Epidemiological Surveillance System of the department of Cauca between 2015 and 2021. The initial database had a total of 6,083 records. Firstly, patients from the department of Cauca were selected, and a total of 5,699 records were obtained. Then, only those with a final classification of case were selected; this was determined after excluding records according to variable 4.1 “follow up and classification” of the mandatory notification forms 210 and 220 for dengue and severe dengue, respectively, of the National System of Public Health Surveillance. These options correspond to cases excluded because of epidemiological criterion, laboratory results, not fulfilling case conditions or typing mistakes. Finally, a total of 4,455 records were obtained.

Three previously established exclusion criteria were then applied: first, duplicated records by identification number, first and last names, date reported and date of symptom onset were identified, resulting in 325 excluded records; next, 67 records with incomplete variables were discarded; and, lastly, 15 records were excluded because the time from symptom onset to consultation was more than 30 days. The final database had 4,048 records.

The dependent variable was severe dengue event, and the independent variables were classified in two groups: (a) *sociodemographics*: age, sex, municipality, area where the case occurred,

ethnic group, healthcare regime, history of travel within the previous 15 days, time elapsed from symptom onset to consultation, hospital referral at first consultation, and history of relatives with dengue; and (b) *clinical signs and symptoms*: dengue classification, fever, headache, rash, abdominal pain, vomiting, diarrhea, hypotension, drowsiness, myalgia, arthralgia, hepatomegaly, considerable mucosal bleeding, hypothermia, elevated hematocrit, thrombocytopenia with platelet count less than 100,000, and fluid accumulation.

After this process was finished, the database was processed in the statistical software package IBM SPSS Statistics (version 25, available at Universidad del Área Andina) to perform all calculations. First, a univariate descriptive analysis was performed in order to describe the nature and distribution of variables, with descriptive statistics being used for qualitative data. The prevalence of both dengue and severe dengue was also determined. A bivariate analysis was then performed to explore associations between the dependent variable and the independent variables using the Chi-square test, with the aim of identifying factors associated with severe dengue morbidity with the OR. Subsequently, a multivariate analysis was performed with the variables that showed association with the outcome, and they were entered into a logistic regression model. For all statistical analyses, a 95% confidence interval (CI) and a significance level of  $p < 0.05$  were used.

## RESULTS

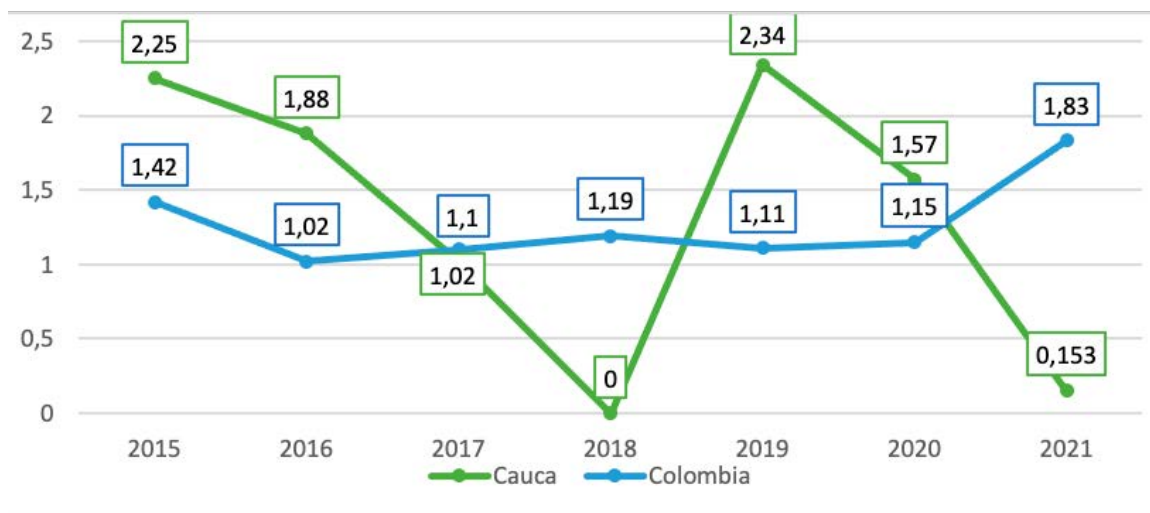
From the total number of patients identified, it was found that 98% ( $n = 3,987$ ) of the cases corresponded to a classification of dengue with and without warning signs, while 1.5% ( $n = 61$ ) corresponded to severe dengue. As regards sociodemographic characteristics, it was found that 53.7% of patients were male, 46.8% were between 0 and 19 years of age, 62% lived in main towns of municipalities, 57% belonged to the subsidized regime, and their ethnic group corresponded to "other" in 65.7% of cases. Regarding the number of days from the onset of symptoms until medical attention was received, 56.4% of patients sought attention in the first three days; 44.7% required hospitalization; 88.2% had no history of travel during the previous 15 days; in 82% of cases, patients had no relatives or cohabitants with dengue symptoms in the previous 15 days; and 99.1% of patients were from a dengue-endemic municipality (Table 1).

**Table 1. Percentage and frequency of distribution according to sociodemographic characteristics**

Variable	Absolute Frequency	Relative Frequency
<b>Final Classification</b>		
Dengue	3987	98.5
Severe dengue	61	1.5
<b>Sex</b>		
M	2172	53.7
F	1876	46.3
<b>Age</b>		
0–19 years	1876	46.8
20–39 years	1172	29
40–49 years	645	15.9
60+ years	335	8.3
<b>Area of residence</b>		
Main town of municipality	2509	62
Settlement	639	15.8
Rural area	900	22.2
<b>Ethnic group</b>		
Indigenous	187	4.6
Rom	7	0.2
Raizal	2	0.04
Afro-Colombian	1192	29.4
Other	2660	65.7
<b>Days from symptom onset to consultation</b>		
1–3 days	2284	56.4
4–6 days	1249	30.9
7–9 days	335	8.3
10 or more days	180	4.4
<b>Hospital referral at first consultation</b>		
Yes	1811	44.7
No	2237	55.3
<b>History of recent travel (previous 15 days)</b>		
Yes	476	11.8
No	3572	88.2
<b>History of relatives with dengue</b>		
Yes	479	11.8
No	3319	82
Unknown	250	6.2
<b>Endemic municipality</b>		
Yes	4010	99.1
No	38	0.9

Source: SIMIGILA Cauca database 2015–2021

A comparison was made between the prevalence of severe dengue in the department of Cauca and the prevalence in Colombia, and it was found that the department presented, throughout the study period, higher prevalences than the country; only in 2018 and 2021 was the department below the country's figures (Figure 1).



**Figure 1. Comparative chart of severe dengue prevalence in the department of Cauca, Colombia, between 2015–2021**

Source: SIMGILA Cauca database and epidemiological bulletins of the Colombian National Institute of Health (INS) 2015–2021

As regards sociodemographic variables, an association was found between severe dengue and age, ethnic group, days from symptom onset to consultation and hospital referral at first consultation. The other variables did not have a statistically significant association (Tables 2 and 3).

**Table 2. Association of sociodemographic variables with dengue and severe dengue**

Variable	Severe dengue		Dengue		p	OR	(95% CI)
	n	%	N	%			
Sex							
M	37	1.70	2135	98.30	0.26	1.33	(0.79–2.24)
F	24	1.30	1852	98.70			
Age							
0–19 years	43	2.30	1853	97.70	0.00		
20–39 years	10	0.90	1162	99.10			
40–49 years	4	0.60	641	99.40			
60+ years	4	1.20	331	98.80			

**Table 2. Association of sociodemographic variables with dengue and severe dengue (Continuation)**

Variable	Severe dengue		Dengue		p	OR	(95% CI)
	n	%	N	%			
Area of residence							
Main town of municipality	46	1.80	2463	98.20	0.60		
Settlement	4	0.60	635	99.40			
Rural area	11	1.20	889	98.80			
Healthcare regime							
Contributory	23	1.70	1337	98.30	0.59*		
Subsidized	32	1.40	2275	98.60			
Exception	1	1.10	93	98.90			
Special	3	3	97	97			
Not covered	2	1.80	107	98.20			
Undetermined	0	0	78	100			
Ethnic group							
Indigenous	1	0.50	186	99.50	0.04*		
Rom	1	14.30	6	85.70			
Raizal	0	0	2	100			
Afro-Colombian	12	1	1180	99			
Other	47	1.80	2613	98.20			
Days from symptom onset to consultation							
1–3 days	15	0.70	2269	99.30	<0.00*		
4–6 days	32	2.60	1217	97.40			
7–9 days	11	3.30	324	96.70			
10 or more days	3	1.70	177	98.30			
Hospital referral at first consultation							
Yes	54	3	1757	97	<0.00*	9.79	(4.44–21.57)
No	7	0.30	2230	99.70			
History of relatives with dengue							
Yes	4	0.80	475	99.20	0.38*		
No	52	1.60	3267	98.40			
Unknown	5	2	245	98			

\*Because the number of observed counts was less than five, the bilateral exact significance of Fisher's exact test is reported  
Source: SIMGILA Cauca database 2015–2021

**Table 3. Association of variables of clinical signs and symptoms with severe dengue and dengue**

Variable	Severe dengue		Dengue		<i>p</i>	OR	(95% CI)
	n	%	N	%			
Headache							
Yes	44	1.30	3410	98.70	0.00	0.43	(0.24–0.77)
No	17	2.90	577	97.10			
Retro-orbital pain							
Yes	19	1.30	1486	98.70	0.32	0.76	(0.44–1.31)
No	42	1.70	2501	98.30			
Myalgia							
Yes	50	1.50	3266	98.50	0.99	1.00	(0.52–1.93)
No	11	1.50	721	98.50			
Arthralgia							
Yes	45	1.70	2617	98.30	0.18	1.47	(0.82–2.61)
No	16	1.20	1370	98.80			
Skin rash							
Yes	21	2	1040	98	0.142	1.48	(0.87–2.53)
No	40	1.30	2947	98.70			
Abdominal pain							
Yes	40	3.60	1078	96.40	<0.00	5.14	(3.01–8.75)
No	21	0.70	2909	99.30			
Vomiting							
Yes	32	3.60	854	96.40	<0.00	4.04	(2.43–6.72)
No	29	0.90	3133	99.10			
Diarrhea							
Yes	19	3.80	487	96.20	<0.00	3.251	(1.87–5.63)
No	42	1.20	3500	98.80			
Drowsiness							
Yes	11	7	147	93	<0.001*	5.747	(2.93–11.26)
No	50	1.30	3840	98.70			
Hypotension							
Yes	8	11	65	89	<0.00*	9.10	(4.16–19.92)
No	53	1.30	3922	98.70			
Hepatomegaly							
Yes	12	12.4	85	87.60	<0.00*	11.24	(5.77–21.90)
No	49	1.20	3902	98.80			
Mucosal bleeding							
Yes	18	8	207	92	<0.00*	7.64	(4.33–13.48)
No	43	1.10	3870	98.90			
Hypothermia							
Yes	2	10	18	90	0.03*	7.47	(1.69–32.94)
No	59	1.50	3969	98.50			



**Table 3. Association of variables of clinical signs and symptoms with severe dengue and dengue**

Variable	Severe dengue		Dengue		<i>p</i>	OR	(95% CI)
	n	%	N	%			
Elevated hematocrit							
Yes	15	7.80	178	92.20	<0.00*	6.97	(3.82–12.73)
No	46	1.20	3809	98.80			
Decreased platelet count							
Yes	48	4.40	1036	95.60	<0.00	10.51	(5.67–19.49)
No	13	0.40	2951	99.60			
Fluid accumulation							
Yes	12	24.50	37	75.50	<0.00*	26.145	(12.86–53.14)
No	49	1.20	3950	98.80			

\*Because the number of observed counts was less than five, the bilateral exact significance of Fisher's exact test is reported  
Source: SIVIGILA Cauca database 2015–2021

After applying the logistic regression model, it was found that age between 20–39 years is a protective factor for severe dengue, as compared with other age ranges; it was also observed that the variables associated with severe dengue were consultation between 4 to 6 days after symptom onset, followed by consultation between 7 to 9 days, hospital referral at first consultation, presence of hypotension, hepatomegaly, mucosal bleeding, platelet count less than 100,000 per mL, fluid accumulation and hypothermia (Table 4).

**Table 4. Factors associated with severe dengue in patients with confirmed dengue in the department of Cauca during the years 2015–2021**

Variable	Severe dengue		Dengue		<i>p</i>	OR	(95% CI)
	n	%	N	%			
Aged 20–39 years	10	0.90	1162	99.10	0.01	0.40	(0.19–0.86)
4–6 days until consultation	32	2.60	1217	97.40	0.01	2.36	(1.18–4.71)
7–9 days until consultation	11	3.30	324	96.70	<0.00	5.20	(2.16–12.55)
Hospital referral at first consultation	54	3	1757	97	0.00	3.77	(1.56–9.11)
Hypotension	8	11	65	89	<0.01	3.81	(1.32–10.99)
Hepatomegaly	12	12.40	85	87.60	<0.00	3.29	(1.46–7.38)
Mucosal bleeding	18	8	207	92	<0.01	2.35	(1.20–4.62)
Hypothermia	2	10	18	90	0.012	0.04	(0.00–0.51)
Platelet count less than 100,000	48	4.40	1036	95.60	<0.00	3.47	(1.75–6.89)
Fluid accumulation	12	24.50	37	75.50	<0.00	6.57	(2.66–16.27)

Source: SIVIGILA Cauca database 2015–2021

## DISCUSSION

The aim of this study was to determine the sociodemographic and clinical factors associated with severe dengue in dengue patients in the department of Cauca, Colombia, from 2015 to 2021. First, we found that most dengue patients were male, that they were in the age range of 0–19 years; these findings are in agreement with those reported by Palacios and Rico (12) in another study carried out in Colombia, and by Lugo *et al.* (13) in a study entitled “Dengue con signos de alarma ¿Podemos predecir evolución a grave desde la emergencia?” [“Dengue with warning signs: Can we predict evolution to severe dengue from the emergency?”]. However, in a study conducted in Paraguay, Rojas and Ríos (14) found that the majority of dengue patients were female. We found that the majority of cases occurred in urban settings, which is similar to what Lugo *et al.* found in Paraguay (13). The above is related to the description given by Padilla *et al.* (7) in their article “Dengue en Colombia: epidemiología de la reemergencia a la hiperendemia” [“Dengue in Colombia: epidemiology from re-emergence to hyperendemicity”], according to which dengue has been historically characterized by its occurrence in urban and peri-urban settings, because population density facilitates transmission of the disease by the mosquito to people and vice versa.

As regards the time between symptom onset and consultation, it was found that most patients consulted within the first three days, with something similar being described by Burattini *et al.* (15) in a study carried out in 2006 in Brazil, where most patients also consulted before three days. On the other hand, in our study, dengue patients did not have a history of travel to endemic areas during the previous 15 days, this being directly related to the origin of the participants, with 99.1% of cases being from municipalities endemic for dengue; furthermore, in the department of Cauca 70% of the municipalities are located below 1,800 m above sea level, thus falling under the classification of endemic. According to Padilla *et al.* (7), *Aedes aegypti* has colonized all the Pacific region of Colombia situated under 1,800 meters above sea level.

With respect to signs and symptoms, it is worth noting that all patients presented fever, a result that is similar to that obtained in a study carried out in Taiwan during the dengue outbreak of 2014 (16). The above is related to the fact that 56.4% of patients consulted within the first three days of the onset of symptoms. According to the Dengue Guidelines for patient care published by the Pan American Health Organization (17), this corresponds to the acute fever phase, which is normally accompanied by myalgia, arthralgia and headache, symptoms that in the present study occurred in more than 60% of patients.

The rest of the signs and symptoms, like rash, diarrhea, abdominal pain and vomiting, were present in less than 30% of patients. This is similar to the results of a retrospective study of adults with dengue between 2008 and 2014 in Taiwan, which included 669 participants (18). The same was found in a study entitled “Factores asociados a la evolución a dengue grave en un hospital de tercer nivel de atención del Paraguay, 2019 a 2020” [“Factors associated with the evolution to severe dengue in a third-level care hospital in Paraguay, 2019 to 2020”] (14).

As regards the calculation of severe dengue prevalence in the department of Cauca, the results show a cumulative prevalence of 1.5% between 2015 and 2021. Unfortunately, no studies have been carried out in the department of Cauca that allow for a comparative analysis; comparison is possible, however, with studies of the department of Valle del Cauca, with shared climatic, social and environmental characteristics, and that, together with Chocó, Nariño and Cauca, makes up the Colombian Pacific region. In the department of Valle, a retrospective study was conducted during 2013 that found a prevalence for severe dengue of 33.4%, higher than that found for Cauca (19) and much higher than that found in the present study; this could be due to the fact that said department has greater urban and economic development, which leads it to have the highest burden in the region (7).

When compared with the rest of the country, the trend of prevalence in the department of Cauca has remained above the national level; only in 2018 there were no cases of severe dengue, which could be related to something indicated in the dengue event report of the INS for that year, in which they mentioned that “most territorial entities do not fulfill the requirement of confirming 100% of cases of dengue with warning signs and severe dengue, as established in the public health surveillance protocol and the guidelines for care” (20). According to this, there could be underreporting because severe dengue events were not confirmed that year. In 2019, an increase in the prevalence of severe dengue was observed in the department of Cauca, possibly associated with the start of an endemic period in Colombia, according to INS. This was a foreseeable scenario, given the cyclical behavior of dengue, which usually repeats every three to four years (21). For 2020 and 2021, a decrease in the prevalence of severe dengue was observed, which is inferred to be related to the onset of the COVID-19 pandemic, according to a National Institute of Health dengue event report for 2020; dengue reports up to epidemiological week 12 were in outbreak conditions, and after this week there was a marked decrease in the notification of cases. This would be related to the measures implemented, such as preventive isolation and restriction of air and land mobility, which prevented people from moving and reduced the speed of transmission of the virus (22). However, it could also be related to the fact that people stopped consulting health services for diseases other than COVID-19, leading to case underreporting (22).

With respect to age, our study identified it as a protective factor ( $p = 0.01$ ; OR = 0.40; 95% CI: 0.19–0.86) in the age group of 20 to 39 years, which indicates that people in this age range have a lower risk of developing severe dengue. It is worth mentioning that, according to the results of other studies, age has also been associated with a higher risk of severe dengue at the early and final stages of life, i.e. children under five years old and adults older than 60 years (15,23,24).

Hospital referral at first consultation and the time of evolution until the patient presents symptoms are congruent with the pathophysiology of dengue, taking into account that after the presentation of the febrile phase with the characteristic symptoms of myalgia, arthralgia and headache, a defervescence stage usually follows, where the patient begins to manifest systemic symptoms that indicate progression to severe forms of the disease, which is congruent with our results for the aforementioned variables (15,25–27).

Regarding clinical variables, this study showed association between severe dengue and other conditions such as hypotension, hepatomegaly, mucosal bleeding, decreased platelet count, and fluid accumulation. These results have been identified in several meta-analyses that aimed to show the predictors of severe dengue. First, in this study hepatomegaly showed association in agreement with what was found in the papers by Tshenten *et al.* (OR 5.39; 95% CI: 3.29–10.65) (9), Htun *et al.* (OR 3.34; 95% CI: 2.38–4.68) (10), Yuan *et al.* (OR: 4.4; 95% CI: 3–6.4 (28), and Zhang *et al.* (OR: 4.7; 95% CI: 1.7–2.5) (29); likewise, mucosal bleeding showed a significant association, as had been reported by the previously named authors with OR 14.56, 95% CI: 5.38–39.39; OR 6.8, 95% CI: 4.1–11.3 and OR 13.6, 95% CI: 3.2–56.5, respectively. Likewise, the results of this study showed an association of severe dengue with fluid accumulation, with OR 6.578 (2.66–16.27), which is similar to the findings of a study carried out by Tshenten *et al.* (9). Hypotension was another predictor that showed association with severe dengue in the studies of Palacios Polania (12), with OR 29.4, 95% CI: 17.06–50.65, in the same way that other works showed an association with thrombocytopenia, such as that of Lugo *et al.* (13). In their case-control study, the authors found that the association of this variable with hemoconcentration was a predictor of severe dengue (OR: 3.3; 95% CI: 2.0–11.3), unlike what was found in this investigation.

On the other hand, according to the results of this study, hypothermia was found to be a protective factor in the multivariate analysis, even though none of the meta-analyses reviewed

mentioned hypothermia as a protective factor in their results, and studies that include this variable are scarce. It is worth mentioning that only two patients presented this factor from the totality of patients diagnosed with severe dengue, representing 0.5% of cases; however, this could be associated with the natural history of dengue in the critical phase, and with the fact that hypothermia is infrequent during the initial presentation of the disease (32). This stage comes after the febrile phase, which lasts from 7 to 10 days on average (32,33). Similarly, in this study more than 95% of patients consulted during the first 10 days, corresponding to the clinical manifestations of the febrile phase, which could explain the result obtained.

The variables retro-orbital pain, myalgia, arthralgia and skin rash did not show a statistical association with the outcome. Vomiting, diarrhea, drowsiness and elevated hematocrit were significant in the bivariate analysis but not in the multivariate analysis; furthermore, these variables were not statistically significant in the aforementioned meta-analyses. Although abdominal pain showed an association in the bivariate analysis, it was not statistically significant in the multivariate analysis; however, in the previously mentioned meta-analyses it did show an association (9,10,28,29,33). This could be related to the fact that, in this study, 56% of patients consulted within the first three days after the onset of symptoms, and 100% presented fever, so it is inferred that they could have been administered some type of antipyretic or pain medication to reduce the abdominal pain; in addition, it is worth noting the high percentage of self-medication in the Colombian population for any type of symptom (34).

The study had some limitations, like the absence of certain variables that, in global epidemiology, have influenced the risk factors of severe dengue, such as comorbidities and laboratory test results, which were not included in the mandatory notification forms. One of the strengths of the study was the large number of data records, which made it possible to perform the different statistical analyses with a high level of significance.

## CONCLUSIONS

The prevalence of severe dengue in the department of Cauca during the study period was of 1.5%, placing it above the national prevalence. The symptoms most frequently reported by the participant population were fever, which behaved like a constant, followed by headache and myalgia. According to the results, it can be concluded that consulting after three days of the onset of dengue symptoms is a risk factor for developing the severe form; moreover, as more days pass before consultation, the risk of severe illness increases even more.

As regards the clinical variables, this study showed a relation with hypotension, hepatomegaly, mucosal bleeding, decreased platelet count, and fluid accumulation, which highlights the importance of a comprehensive physical examination of patients and the availability of a detailed medical history. In spite of the limitations of this study, it is important to highlight population data for analysis and interpretation, which helps to obtain more information from regions of the country where there is not enough literature for situating in context the information available about this disease.

## ETHICAL ASPECTS

Taking into account the provisions of Resolution Number 8430 of 1993 of the Ministry of Health, the present study is considered risk-free; moreover, it complies with the guidelines of the Nuremberg Code, the Declaration of Helsinki and the Belmont Report. The use of the information was authorized by the Public Health Surveillance Process of the Departmental Health Secretariat of Cauca.

## CONFLICT OF INTEREST

There are no conflicts of interest to be reported.

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