Epidemiological surveillance for acute flaccid paralysis in Casanare, 2009-2022

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Abstract

Objective: To characterize epidemiologically the notification of acute flaccid paralysis cases in the department of Casanare, Colombia during the period 2009–2022.

Materials and methods: observational, descriptive, and retrospective study of the notification of the event in the SIVIGILA. Absolute and relative frequencies of sociodemographic variables, the number of vaccine doses received, clinical findings, and laboratory tests were included and analyzed in time, place, and person using the statistical program Epi-Info®.

Results: 26 cases (89.6%), one case in 2009 (3.8%), one case in 2010 (3.8%), three cases in 2014 (11.5%), one case in 2015 (3.8%), three cases in 2016 (11.5%), four cases in 2017 (15.4%), three cases in 2018 (11.5%), four cases in 2019 (15.4%), three cases in 2020 (1.5%), one case in 2021 (3.8%) and two cases in 2022 (7.7%) were included; 18 cases from urban area (69.2%); average notification rate of 22.00 per 100. 0000 children under 15 years of age; 20 male cases (76.9%), average age 9.4 (±3.6) years; 12 fever cases (46. 2%), 8 respiratory (30.8%), 6 digestive (23.1%), 19 muscle pain (73.1%), 3 meningeal signs (11.5%); average of VOP applied 2 doses, average of VIP 1 dose; 13 samples collected in a timely manner (50.0%), 12

referred within the time limits (46.1%), 8 of 12 samples processed (66.7%).

Conclusions: in the department of Casanare in the last 14 years, the annual goal of notification of at least one probable case has been met by 80%, a strategy of the country according to WHO goals in the eradication of acute flaccid paralysis.

Keywords: Disease Eradication, Poliovirus, Poliomyelitis, Epidemiologic Surveillance Services, Colombia

Resumen

Objetivo: caracterizar epidemiológicamente la notificación de casos de parálisis flácida aguda en el departamento de Casanare, Colombia, durante el período 2009–2022.

Materiales y métodos: estudio observacional, descriptivo, retrospectivo de la notificación del evento en el SIVIGILA. Se incluyeron frecuencias absolutas y relativas de variables sociodemográficas, número de dosis recibidas de vacunas, cuadro clínico, pruebas de laboratorio, analizadas en tiempo, lugar y persona utilizando el programa estadístico Epi-Info 7.0®.

Resultados: se incluyeron 26 casos (89,6%), un caso en 2009 (3,8%), un caso en 2010 (3,8%), tres casos en 2014 (11,5%), un caso en 2015 (3,8%), tres casos en 2016 (11,5%), cuatro casos en 2017 (15,4%), tres casos en 2018 (11,5%), cuatro casos en 2019 (15,4%), tres casos en 2020 (1,5%), un caso en 2021 (3,8%) y dos casos en 2022 (7,7%); 18 casos de área urbana (69,2%); tasa promedio de notificación de 22,00 por 100.0000 menores de 15 años; 20 casos hombres (76,9%), edad promedio de 9,4 (±3,6) años; se registraron 12 casos de fiebre (46.2%), 8 respiratorios (30,8%), 6 digestivos (23,1%), 19 dolores musculares (73,1%), 3 signos meníngeos (11,5%); promedio de VOP aplicadas 2 dosis, promedio de VIP 1 dosis; 13 muestras recolectadas oportunamente (50,0%), 12 remitidas dentro de los tiempos (46,1%), 8 de 12 muestras procesadas (66,7%).

Conclusiones: en Casanare, en los últimos 14 años se ha dado cumplimiento a la meta anual de notificación de al menos un caso probable en un 80%, estrategia del país según las metas de la OMS en la erradicación de la parálisis flácida aguda.

Palabras clave. Erradicación de la enfermedad, poliovirus, poliomielitis, servicios de vigilancia epidemiológica, Colombia

Introduction

Poliomyelitis is a highly contagious disease caused by an enterovirus of the Picornaviridae family that is transmitted from person to person, mainly by the fecal-oral route or through a common vehicle such as water or contaminated food that multiplies in the intestine and invades the nervous system and can cause paralysis, generally of the legs, in a matter of hours. It mainly affects children under 5 years of age, where between 5% and 10% of cases die from respiratory muscle paralysis (1, 2). This disease is preventable by vaccination.

In the mid-1980s, the Pan American Health Organization (PAHO) proposed the eradication of wild poliovirus as a goal for the American continent, with the approval of all governments by resolution; the initiative involved mass vaccination campaigns that achieved a significant reduction in the circulation of the virus; thus, in 1994, three years after the presentation of the last confirmed case in the continent and after reviewing the investigation of about 3,800 probable cases of poliovirus in the Americas, the Pan American Health Organization (PAHO) proposed the eradication of wild poliovirus, with the approval of all governments by resolution. 800 probable cases of poliomyelitis reported by the countries, the International Commission for the Certification of Poliomyelitis Eradication (CIPEP) concluded that there was no autochthonous circulation of wild poliovirus, a situation that is maintained in such a way that by 2013, the region had completed twenty-three years free of polio (1, 3).

Given the risk of international spread of poliovirus, a public health emergency of international concern, the World Health Organization (WHO), in 2005, through the Declaration of the 19th Meeting of the International Health Regulations Emergency Committee, recommended the extension of the temporary recommendations, regardless of the number of cases; in 2015, Member States committed to contain all type 2 polioviruses, including Sabin and other vaccine strains, in essential facilities designated to handle these viruses (4) (5); and, in 2021, the roadmap is set to eradicate sustainably by 2026, all polioviruses globally (2, 5).

In February 2023, the Emergency Committee of the International Health Regulations (IHR) reported the status of 33 countries globally infected with different types of poliovirus, two of them, Afghanistan and Pakistan, with endemic transmission of wild poliovirus type 1 (WPV1); in April, Afghanistan, Malawi, Mozambique and Pakistan are considered as infected with WPV1, Madagascar, Mozambique, Malawi, Democratic Republic of Congo

with circulating type 1 vaccine-derived poliovirus (cVDPV1), Israel with circulating type 3 vaccine-derived poliovirus (cVDPV3) and 29 countries with circulating type 2 vaccine-derived poliovirus (cVDPV2) (6).

According to the Ministry of Health and Social Protection, in Colombia, in 1991 the last case of wild poliovirus type 1 poliovirus was confirmed in the municipality of Arjona, Bolivar; in 1989 the last case of wild poliovirus type 3 was confirmed in Maicao, La Guajira-Colombia; and, in 2009, the only case of polio by vaccine-derived poliovirus was reported, in a 14-month-old minor, vaccinated with three doses of OPV resident in the municipality of Marulanda, Caldas, with isolation of vaccine-derived poliovirus 2, confirmed as vaccine-derived poliovirus type 2; not to mention that, by wild poliovirus type 2, which circulated until 1982, did not evidence confirmed cases (7). In 2018, a second case of vaccine-derived poliovirus was reported in an 11-month-old immunodeficient patient from the municipality of Tuluá, Valle (8); it is worth mentioning that in 2015, the Global Commission for the Certification of Poliomyelitis Eradication officially certified the eradication of wild poliovirus type 2 (9.

The National Institute of Health in accordance with the functions conferred in decree 780 of 2016, operates public health surveillance of acute flaccid paralysis whose objective is oriented to monitoring the circulation of poliovirus (wild or vaccine-derived) in the national territory, the study of cases reported to the system for classification and compliance with the standard indicators established for monitoring the eradication of poliomyelitis at national and international level. In fulfillment of its role, the institution issued the technical documents of surveillance guidelines in force 2022 and circular 021 of November 16, 2018, for the strengthening of acute flaccid paralysis surveillance (8, 10).

In Casanare, epidemiological surveillance of Poliomyelitis began in 2006 with the issuance of the protocol for public health surveillance of acute flaccid paralysis, updated in 2005 and issued by the Ministry of Social Protection and the National Institute of Health. According to data from the Public Surveillance System (SIVIGILA by its acronym in Spanish), the first probable case reported was in 2009 by a UPGD of the department, in a child under 8 years of age from the municipality of Orocué (11).

In consideration of the above, the objective of this study is to characterize epidemiologically the notification of cases of acute flaccid paralysis in the department of Casanare during the period 2009 to 2022.

Materials and methods

Descriptive, retrospective study based on the notification of probable cases to the Public Health Surveillance System (SIVIGILA) by the Municipal Notifying Units (UNM) of the department during the period 2009-2022. The study variables were those included in the event notification form: sociodemographic characteristics (municipality, area of origin, sex, age, type of social security, population group, ethnicity; and, of notification: type of case, hospitalization, final condition; and; specific, number of doses received of Oral Poliovirus Vaccine (OPV) and Injectable Poliovirus Vaccine (IPV), clinical picture, progression and onset of paralysis, other commitments in the organism, laboratory studies performed.

The variables under study were analyzed in time, place and person using descriptive statistics with the statistical program Epi-Info 7.0®.

The notification rate for acute flaccid paralysis in children under 15 years of age was calculated from the cases reported to SIVIGILA as numerator, whose denominator was the population data according to population projections of the National Administrative Department of Statistics (DANE by its acronym in Spanish). Population projections. National Population and Housing Census CNPV-2018 2020 (12) and constant of 100,000 inhabitants; additionally, compliance with the surveillance indicators of the event, percentage of cases with timely stool sample collected within the first 14 days of the onset of paralysis and percentage of cases investigated within 48 hours of notification were calculated.

Ethical Considerations

The study is classified as research without risk, according to Resolution 8430 of 1993 of the Ministry of Health, in compliance with the activities and obligations contemplated for epidemiological surveillance in Decree 3518 of 2006 and the single regulatory decree of the health sector 780 of 2016 (13-15 (14- 16).

Results

During the period 2009-2022 29 probable cases of acute flaccid paralysis were notified, by individual notification 3 (10.3%) from other departments and 26 (89.6%) from Casanare, of which, by year under study, 2009 (1; 3.8%), 2010 (1; 3.8%), 2014 (3; 11.5%), 2015 (1; 3.8%), 2016 (3; 11.5%), 2017 (4; 15.4%), 2018 (3; 11.5%), 2019 (4; 15.4%), 2020 (3; 11.5%), 2021 (1; 3.8%) and 2022 (2; 7.7%), reported by 47.4% (9/19) of the municipalities of the department, according to area of origin, 18 (69.2%)

urban and 8 (30.8%) rural, with an average of 2.4 cases during the period under study, and an average notification rate of 22.00 per 100. 0000 under 15 years of age in the general population, as can be seen in Table 1, which shows the data for each of the municipalities of the department of Casanare:

Table 1. Case notification rate by municipality and area of origin by year of study, acute flaccid paralysis, Casanare, 2009-2022.

Municipality	DANE Population 09-22	2009		2010		2014		2015		2016		2017		2018		2019		2020		2021		2022		Total	AF	AR
		F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R			
URBAN																										
Monterrey	3.248	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	1	31,85	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	1	1,0	30,79
Orocué	1.630	1	64,81	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	1	1,0	61,36
Paz de Ariporo	7.310	0	0,00	0	0,00	0	0,00	0	0,00	1	13,92	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	1	1,0	13,68
Tauramena	4.297	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	1	23,65	0	0,00	0	0,00	0	0,00	0	0,00	1	1,0	23,27
Villanueva	7.122	0	0,00	0	0,00	0	0,00	0	0,00	1	14,58	0	0,00	0	0,00	1	14,11	0	0,00	0	0,00	1	13,57	3	1,0	14,04
Yopal	37.269	0	0,00	1	2,77	0	0,00	0	0,00	1	2,71	3	8,07	1	2,71	3	7,98	1	2,61	1	2,58	0	0,00	11	1,6	4,22
Total	80.172	1	1,28	1	1,28	0	0,00	0	0,00	3	3,81	4	5,05	2	2,50	4	4,94	1	1,21	1	1,20	1	1,20	18	2,0	2,49
RURAL																										
Aguazul	2.806	0	0,00	0	0,00	1	35,37	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	1	1,0	35,64
Hato Corozal	2.510	0	0,00	0	0,00	0	0,00	1	38,77	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	1	1,0	39,84
Pore	1.585	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	1	65,79	0	0,00	0	0,00	1	1,0	63,08
Tauramena	2.367	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	1	40,73	0	0,00	0	0,00	0	0,00	0	0,00	1	1,0	42,24
Yopal	6.483	0	0,00	0	0,00	2	31,25	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	1	15,69	0	0,00	1	16,00	4	1,3	61,70
Total	34.981	0	0,00	0	0,00	3	8,30	1	2,77	0	0,00	0	0,00	1	2,73	0	0,00	2	5,59	0	0,00	1	3,93	8	1,6	22,87
GENERAL																										
Aguazul	9.807	0	0,00	0	0,00	1	10,39	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	1	1,0	10,20
Hato Corozal	4.162	0	0,00	0	0,00	0	0,00	1	24,09	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	1	1,0	24,03
Monterrey	4.636	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	1	21,99	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	1	1,0	21,57
Orocué	4.006	1	28,88	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	1	1,0	24,96
Paz de Ariporo	10.946	0	0,00	0	0,00	0	0,00	0	0,00	1	9,28	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	1	1,0	9,14
Pore	3.655	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	1	27,32	0	0,00	0	0,00	1	1,0	27,36
Tauramena	6.643	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	2	29,93	0	0,00	0	0,00	0	0,00	0	0,00	2	2,0	30,11
Villanueva	9.553	0	0,00	0	0,00	0	0,00	0	0,00	1	10,76	0	0,00	0	0,00	1	10,30	0	0,00	0	0,00	1	10,10	3	1,0	31,40
Yopal	43.670	0	0,00	1	2,33	2	4,64	0	0,00	1	2,30	3	6,94	1	2,31	3	6,80	2	4,47	1	2,22	1	2,24	15	1,7	34,35
Casanare	116.354	1	0,87	1	0,87	3	2,62	1	0,87	3	2,61	4	3,46	3	2,57	4	3,40	3	3,37	1	0,84	2	1,68	26	2,4	22,0
Colombia	11.201.817	159	1,29	149	1,15	207	1,27	139	1,08	185	1,44	160	1,24	178	1,35	156	1,19	110	0,85	134	1,13	158	1,33	1735	157,7	15,49
Femenino	56.743	0	0,00	1	1,79	0	0,00	0	0,00	0	0,00	1	1,78	1	1,76	1	1,74	2	3,45	0	0,00	0	0,00	6	0,5	10,57
Masculino	59.603	1	1,71	0	0,00	3	5,09	1	1,69	3	5,05	3	5,05	2	3,35	3	4,98	1	1,65	1	1,64	2	3,29	20	1,8	33,56

F: Frequency, R: Rate, AF: Average Frequency, AR: Average Rate

According to gender, 6 (23.1%) were female and 20 (76.9%) were male, with an average age of 9.4 (±3.6) years, median and mode 9.5 years, minimum value 1 and maximum 14 years. The data according to the distribution by each of the municipalities of the department of Casanare are shown in Table 2:

Table 2. Univariate analysis of age and number of doses of oral and injectable polio vaccine by municipality and gender, Acute flaccid paralysis, Casanare, 2009-2022

Municipality	Cases	Media	DE	Median	Mode	Min	Max
Gender							
Female							
Monterrey	1	14	-	14	14	14	14
Pore	1	12	-	12	12	12	12
Yopal	4	9,3	1,7	9,5	7	7	11
Total	**6**	**10,5**	**2,4**	**10,5**	**7**	**7**	**14**
Male							
Aguazul	1	1	-	1	1	1	1
Hato corozal	1	11	-	11	11	11	11
Orocué	1	8	-	8	8	8	8
Paz de Ariporo	1	10	-	10	10	10	10
Tauramena	2	12	0,0	12	12	12	12
Villanueva	3	8	3,6	7	5	5	12
Yopal	11	9	4,1	10	10	2	14
Total	**20**	**8,9**	**3,9**	**10**	**10**	**1**	**14**
General							
Aguazul	1	1	-	1	1	1	1
Hato corozal	1	11	-	11	11	11	11
Monterrey	1	14	-	14	14	14	14
Orocué	1	8	-	8	8	8	8
Paz de Ariporo	1	10	-	10	10	10	10
Pore	1	12	-	12	12	12	12
Tauramena	2	12	0,0	12	12	12	12
Villanueva	3	8	3,6	7	5	5	12
Yopal	15	9	3,6	10	10	2	14
Total	**26**	**9,2**	**3,6**	**10**	**10**	**1**	**14**
Oral Vaccine Dose (OPV)							
Female							
Pore	1	3	-	3	3	3	3
Yopal	6	3,2	1,8	3,5	1	1	5
F	**4**	**3,3**	**1,7**	**3,5**	**1**	**1**	**5**

Male							
Aguazul	1	4	-	4	4	4	4
Hato Corozal	1	1	-	1	1	1	1
Tauramena	1	3	-	3	3	3	3
Villanueva	3	4	1,7	5	5	2	5
Yopal	6	3,1667	1,8	3,5	1	1	5
Total	**12**	**3,3**	**1,7**	**3,5**	**5**	**1**	**5**
General							
Aguazul	1	4	-	4	4	4	4
Hato corozal	1	1	-	1	1	1	1
Pore	1	3	-	3	3	3	3
Tauramena	1	3	-	3	3	3	3
Villanueva	3	4	1,7	5	5	2	5
Yopal	9	3,2222	1,8	4	1	1	5
Total	**16**	**3,3**	**1,6**	**3,5**	**5**	**1**	**5**
Injectable vaccine dose (IPV)							
Female							
Pore	1	2	-	2	2	2	2
Yopal	1	1	-	1	1	1	1
Total	**2**	**1,5**	**0,7**	**1,5**	**1**	**1**	**2**
Male							
Tauramena	2	2	0	2	2	2	2
Villanueva	1	9	-	9	9	9	9
Yopal	4	2,3	1,9	1,5	1	1	5
Total	**7**	**3,1**	**2,9**	**2**	**2**	**1**	**9**
General							
Pore	1	2	-	2	2	2	2
Tauramena	2	2	0	2	2	2	2
Villanueva	1	9	-	9	9	9	9
Yopal	5	2	1,7	1	1	1	5
Total	**9**	**2,8**	**2,6**	**2**	**2**	**1**	**9**

According to age group, 3 (11.5%) from 0 to 4 years, 7 (26.9%) from 5 to 9 years and 16 (61.5%) from 10 to 14 years, with a notification rate of 7.75 from 0 to 4 years, 18.01 from 5 to 9 years and 41.16 from 10 to 14 years (Figure 1), whose socio-demographic characteristics are shown in Table 3:

Figure 1. Case notification rate by age group according to year of study Acute flaccid paralysis, Casanare, 2009-2022

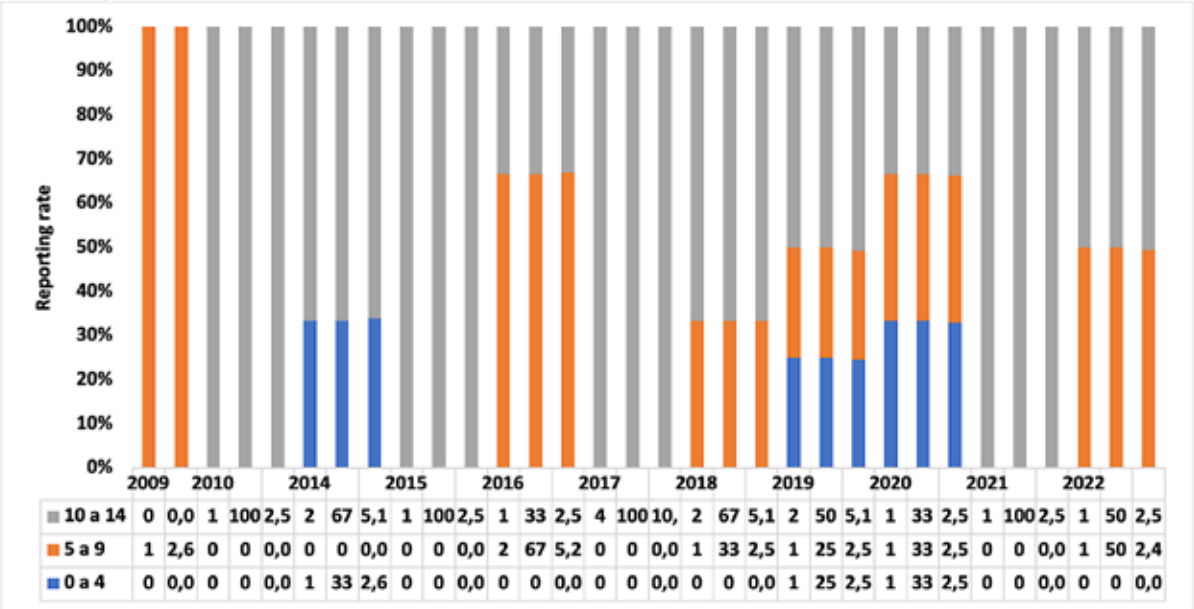
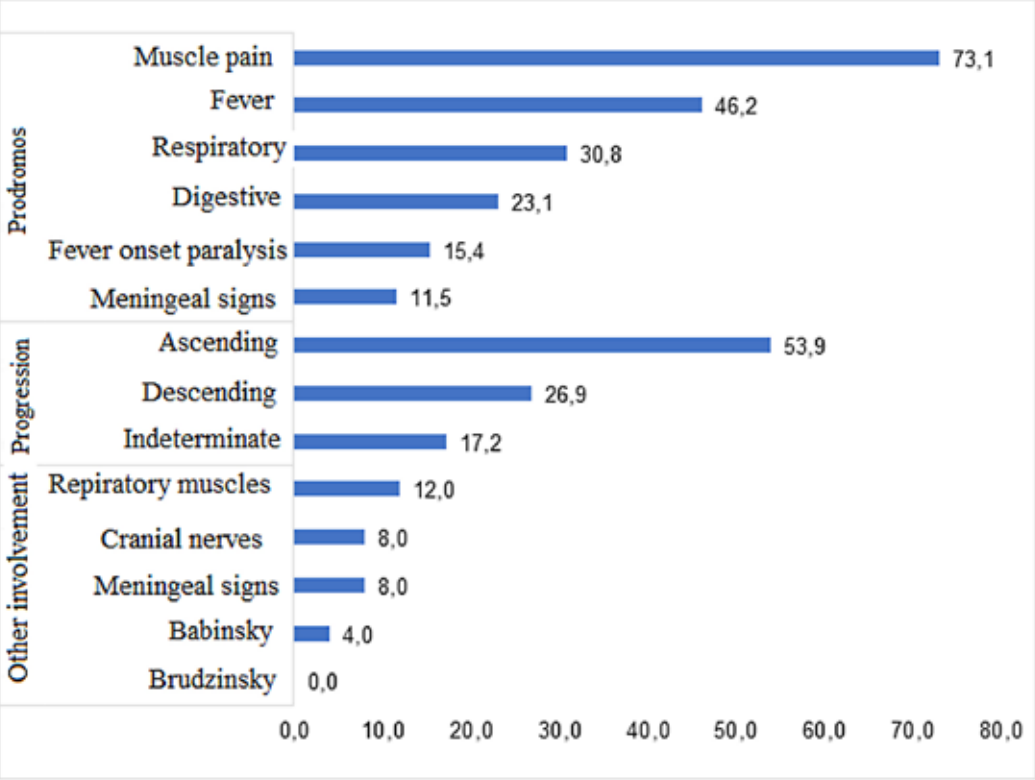


Table 3. Socio-demographic and notification characteristics, Acute flaccid paralysis, Casanare, 2009-2022.

Variable		Cases	%
Gender	Female	6	23,1
	Male	20	76,9
Type of social security	Subsidized	15	57,7
	Contributory	8	30,8
	Special	3	11,5
Population group	Other	25	100
	Pregnant	1	3,8
Ethnicity	Other	26	100
Admitted patient	Yes	25	96,1
	No	1	3,9
Initial case classification	Probable	25	96,1
	Clinically confirmed	1	3,9
Case adjustment	Ruled out	24	92,3
	No adjustment	2	7,7
Nationality	Colombia	10	38,5
	No data	16	61,5
Final condition	Alive	26	83,3
Age group	0 4 years old	3	11,5
	5 9 years old	7	26,9
	10 14 years old	16	61,5

Regarding the clinical picture, in the initial phase of the disease (prodrome), the signs and symptoms manifested, 12 (46. 2%) fever, 8 (30.8%) respiratory, 6 (23.1%) digestive, 19 (73.1%) muscle pain, 3 (11.5%) meningeal signs, 4 (15.4%) fever at the onset of paralysis; progression of paralysis: 14 (53.9%) ascending, 7 (26.9%) descending and 5 (17.2%) indeterminate; other involvement, 3 (12.0%) respiratory muscles, 2 (8.0%) meningeal signs, 1 (4.0%) Babinsky's sign and 2 (8.0%) cranial nerve involvement (Figure 2). 61.5% (16/26) of the cases had a record of the number of doses of oral polio vaccine (OPV) with a median of 3.5, minimum value 1 and maximum 5; and 34.6% (9/26) had a record of the number of doses of injectable polio vaccine (IPV) with a median of 2.0, minimum value 1 and maximum 9 doses (Table 2).

Figure 2. Clinical manifestations according to year under study, Acute flaccid paralysis, Casanare, 2009-2022



According to the estimation of the surveillance indicators of the event, 13 (50.0%) of the cases with stool samples collected in a timely manner (first 14 days of onset of paralysis), 21 (80.8%) of cases investigated within the first 48 hours after notification, 12 (46.1%) stool samples were submitted to the virology laboratory before 6 days after sample collection, of which 66.7% (8/12) processed within the first 14 days, after receiving the sample.

Discussion

The department of Casanare, in seven of the eleven years of study, reported more than one probable case of flaccid paralysis coming mostly from the urban area; where, almost half of the municipalities of the department reported probable cases of the event, of which Yopal, capital of the department, concentrates more than half of the reported cases.

The average notification rate of the department per 100,000 inhabitants is higher than that of the country during the same study period; by municipality, this value is exceeded, in order, by Yopal, Villanueva, Tauramena and Pore. By area of origin, the highest rate corresponds to the rural area, in which the four municipalities that reported cases to the department, being the highest for Pore; and, in the urban area, the highest rate has Orocué; not to mention that in the municipalities of Chámeza, Sácama, Maní, Nunchía, Recetor, Sabanalarga, San Luis de Palenque, Támara, Trinidad and La Salina during the entire period no probable cases of the event were reported.

Surveillance of acute flaccid paralysis and the strategic plan for the eradication of poliomyelitis, among the indicators for monitoring the event, includes the notification rate, with which countries are expected to notify at least one case per 100,000 children under 15 years of age (8) (9). Compliance with the notification rate according to the target of one case per year per 100,000 children under 15 years of age, for the department of Casanare from 2009 to 2015 and in 2021 was not met. In the other years of this study, if the goal was met; the highest rate was achieved in 2017, thus, in the last year of analysis, the notification rate calculated for the Nation was an average of 1.33 cases per 100,000 children under 15 years of age and for the department of Casanare of 1.70 for the same number of inhabitants, which showed compliance with the goal for this period, even surpassing that of Colombia (8, 16-26). Most of the reported cases were reported by the Empresa Social del Estado, a second level of complexity institution that provides health services in the capital of the department, and in a small proportion by institutions in other departments; this could be attributed to the severity and complications presented by a patient suspected of having the disease.

According to gender, the highest proportion was evidenced in the male gender, only one third of the notified cases were in the female gender, that is, for every 3 males, a female is notified to the surveillance system, reason that, when compared with the notification at the national level in the same

years of study, the masculinity ratio maintained the proportion; for every 100 females, 138.8 were of the male gender on average. Likewise, the median age was similar to that of the country at 9.5 years.

A little more than half of the cases were concentrated in the 10 to 14 years age group, followed by the 5 to 9 years age group and, to a lesser extent, in the 0 to 4 years age group, a behavior similar to that reported in Colombia, where the average proportion was higher for the 10 to 14 years age group (38.3%); it is worth mentioning that according to PAHO, those at greatest risk of acquiring poliomyelitis are persons under 15 years of age who have not been vaccinated against polio (27) (28); Among them, children under five years of age are more susceptible, and this risk increases when, in the places where this person lives or visits, there are others not vaccinated against polio and poor hygienic conditions; however, in the surveillance of acute flaccid paralysis, the age group under five is where there is a lower proportion of probable cases reported (8, 16-26).

According to the sociodemographic characteristics, more than half of the reported cases, according to the type of insurance to the General Social Security Health System (SGSSS) are in the subsidized regime, i.e., poor, vulnerable population that is not able to pay their contribution to the contributory regime (15). There were no cases belonging to any ethnic group.

Until 2018, the nationality variable was not filled out, therefore, only one third of the cases were reported as Colombian; this variable was included in the surveillance system in February 2019 (28).

Between 2015 and 2020, even though the specific infant fertility rate in the department of Casanare went from 3.7 to 2.7 (per 1. 000 girls of reproductive age there were 3.7-2.7 live births), it was higher than that of the country, which went from 3.1 to 2.2 (29,30), a situation to which the girls reported as probable cases of acute flaccid paralysis in 2017 were no stranger, a year in which according to the population group variable, a girl under 14 years of age was registered as pregnant, which, additionally, according to the Colombian criminal code is considered as a presumed sexual crime (30).

The initial classification of the cases was incorrect for only one of them, which was clinically confirmed and was reported in epidemiological week 50 of 2022. The case adjustment variable according to laboratory results was found without adjustment in a small proportion of the cases (2), also reported in the last weeks of the year; this could be attributed to the completion of the state contracting, which prevents continuity of the actions

contemplated for the investigation, follow-up, final classification and closure of cases. In terms of mortality, there were no mortalities associated with the notification of cases of acute flaccid paralysis.

As for the clinical forms of poliovirus infection, according to a study by the University Hospital and Ruber International Hospital in Spain, 90-95% of cases may be asymptomatic and the rest may behave as a mild or severe disease, with manifestations such as fever, meningeal signs, head and back pain, neck stiffness, and 50% of severe cases may develop paralytic disease (31). Among the signs and symptoms in the probable cases reported in the department, almost 50% presented fever, one third of the patients presented respiratory and digestive symptoms, most of them muscular pain and, in small proportion, meningeal signs, involvement of cranial nerves and Babinsky reflex. Likewise, regarding the progression of the paralysis, in more than 50% of the cases it was ascending.

The strategy implemented to achieve the eradication of poliomyelitis in the American continent urged to reach and maintain vaccination coverage higher than 95%, with at least three doses of Polio in children under one year of age. Likewise, and given the risk of importation of wild poliovirus, it has been necessary to apply booster vaccines in children under six years of age to achieve the interruption of the wild virus in the world (32); at two, four and six months of age, plus two boosters at 18 months and five years of age (33). According to the doses applied of OPV and IPV vaccines, an average of 2.5 doses were applied; a maximum value of five doses of OPV and nine of IPV, the latter is noteworthy because it exceeds the recommended doses and boosters, which could be attributed to a typing error; nine of the cases were recorded without any dose of vaccine applied. In Casanare, according to information provided by the Expanded Plan of Immunization (EPI), vaccination coverage has averaged 95% in the last six years, highlighting that in 2021, 100% was obtained in the first, second and third doses in children under one year of age.

Among the surveillance indicators of the event, of the total number of probable cases of acute flaccid paralysis reported, the sample collected was timely for half of them, in one case, the sample was taken 26 days after the paralysis and twelve cases have no record. While all cases should be investigated within 48 hours after notification, one case was investigated 38 days after notification in 2014, another 22 days in 2021 and three cases have no investigation date information in 2015, 2016 and 2019. On the other hand,

more than half of the records lacked information regarding the shipment of the stool sample to the virology laboratory before 6 days after sampling; and, of the total stool samples, one from 2016 and one from 2021 were processed at 26 and 18 days respectively, and two with no record of the information. The main limitation of this study was the quality of the data, understood as the complete recording of all study variables, a situation that did not allow, among others, to verify compliance with surveillance indicators.

Conclusions

The department of Casanare in the last 14 years has strengthened the surveillance of the event to comply with the annual goal of notifying at least one probable case of acute flaccid paralysis, almost 80% of the years reviewed cases were reported, clarifying that during the years 2011 to 2013 no notification was obtained, This strategy is part of the country's actions to meet the WHO goals in the eradication of acute flaccid paralysis and in the search for cases to be able to demonstrate as a department that there is no circulation of any poliovirus or cases related to the vaccination process.

It was evidenced that during the extreme months of the year there were failures in the adherence to the protocol and adjustment of the information, which can be attributed to the high rotation of the personnel that performs the public health surveillance actions both at departmental and municipal level, this is often reflected by the modality of contracting and/or linking which interferes in the investigation of the cases, follow-up, closure and final classification of the cases.

Therefore, it is recommended, in the first place, the continuous improvement in the recording of the information reflected in the quality of the data, reinforcing in those responsible for the notification the importance of filling in all the variables to be studied as appropriate in the notification form, in particular, for the event under study of flaccid paralysis; Likewise, strengthening the strategy of Institutional Active Search (BAI) for the identification of probable cases, for which the national guidelines 2023 expand the surveillance of acute flaccid paralysis in young people and adults under 50 years of age in seven UPGD Sentinels, this strategy could be adopted in the department to expand the search for cases; finally, it is recommended to continue and maintain vaccination coverage above 95%, with vaccination, a 99% reduction (34) in the presentation of the disease has been demonstrated worldwide.

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