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Epidemiological characterization of whooping cough in the province of Huancavelica, period 2017 – 2018

Caracterización epidemiológica de tos ferina en la provincia de Huancavelica, periodo 2017 - 2018

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Abstract

Objective: to determine the epidemiological characteristics of the whooping cough in the Province of Huancavelica, period 2017-2018. **Methodology**: a non-experimental cross-descriptive study was carried out; Sample: The data were collected from the total of epidemiological investigation files of probable cases of whooping cough in children less than 5 years of age from the Huancavelica Regional Health Directorate presented from January 2017 to December 2018. **Results**: the 87.5% of cases occurred in children under 01 years, the ratio of men and women was 5/4, the 55% were from the rural area; the 51% of children had full vaccination for their age, paroxysmal cough was the most frequent sign, although there were also noisy inspiration and vomiting after cough, the 89.8% of cases were treated in hospitalization and in the months of May and June the increase in cases was evident. **Conclusion**: the whooping cough continues to be a cause of childhood morbidity, being the most vulnerable children under 01 years old, coming from the rural area, without vaccination status or with partial immunization, paroxysmal cough was the characteristic sign and with the highest occurrence in frost period.

Keywords: Whooping cough, Bordetella pertussis, child, epidemiology.

Resumen

Objetivo: determinar las características epidemiológicas de la tos ferina en la Provincia de Huancavelica, periodo 2017-2018. **Metodología**: se realizó un estudio no experimental transversal - descriptivo; Muestra: Se recolectaron datos del total de fichas de investigación epidemiológica de casos probables de Tos ferina en niños menores de 5 años de la Dirección Regional de Salud de Huancavelica presentados de enero del 2017 a diciembre del 2018. **Resultados**: el 85.7% de casos se presentaron en niños menores de 01 año, con predominancia en varones a una razón 1.25 entre varones y mujeres, el 55.1% fueron del área rural; el 50% de niños tuvieron vacunación completa para su edad, la tos paroxística fue el signo más frecuente, aunque también se presentaron inspiración ruidosa y vómitos después de la tos, el 89.8% de casos recibieron tratamiento en hospitalización y en los meses de mayo y junio se evidenció el incremento de casos. **Conclusión**: la tos ferina continua siendo causa de morbilidad infantil, siendo los más vulnerables niños menores de 01 año, procedentes del área rural, sin estado vacunal o con inmunización parcial, la tos paroxística fue el signo característico y con mayor ocurrencia en periodo de heladas.

Palabras clave: tos ferina, Bordetella pertussis, niño, epidemiología.

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Introduction

The whooping cough is an acute infectious contagious respiratory disease, is characterized by a prolonged emetic paroxysmal cough that is often accompanied by a characteristic inspiratory stridor (rooster), in the children it adopts its most defined clinical features and a particular severity in young infants (1), the causal agent is the Bordetella Pertussis which is a gram-negative, anaerobic facultative coccobacillus, with affinity for the human respiratory mucosa (man is the only reservoir); it is an endemic disease that presents overlapping epidemic cycles every 3-4 years, after the accumulation of a cohort of considerable susceptible patients, the majority of cases occur between July and October. Neither suffering from natural disease nor vaccination provides complete or permanent immunity against reinfection or disease (2).

The whooping cough clinically manifested as coqueluchoid syndrome, is an important cause of the infant morbidity and mortality, for the 2014 it is estimated that they produced 24.1 million cases of whooping cough and 160,700 deaths of children under the age of 5 years old at the worldwide. According to the WHO, at the worldwide, the whooping cough is in the fifth place as a cause of death from an immune preventable disease in children under 5 years old of age (3).

In the Huancavelica Region, for the 2014 six cases were presented, one case for the period 2015 and 2016; however, for the 2017, were presented 13 confirmed cases, observing an increase of over 100% in the last years of reference (4), there was even one case of death due to this cause, despite this, there is no systematic information for the decision-making and the approach to prevention strategies, mainly in immunization (5).

The objective of the present research was to determine the epidemiological characteristics of the probable cases of the whooping cough in the Province of Huancavelica during the period 2017-2018.

Methodology

A descriptive, retrospective study was carried out between January 2017 and December 2018, collecting information from the epidemiological investigation sheets of probable cases of whooping cough in children under 5 years of age, registered in the Epidemiology Office of the Regional Health Directorate of Huancavelica (DIRESA). The sample was constituted by 49 children considered probable cases of whooping cough according to the operational definition of the MINSA: "In children under 3 months: Nons-pecific clinical picture of upper respiratory tract infection and cough that reaches apnea and cyanosis, triggered by stimuli (by example: food). In patients older than 3 months: Clinical picture with cough lasting at least two weeks and with one or more of the following symptoms: Cough paroxysms (repetitive attacks), inspiratory stridor and Postusive vomiting (vomiting immediately after cough) (6). The data were collected such as: age, origin, immunization history, clinical manifestations upon admission to hospital, sick days, and contacts with people with symptoms compatible with whooping cough. The Ethics Committee of the Nursing Faculty of the National University of Huancavelica reviewed and approved the research.

The data was organized in the IBM SPSS Statistics version 25 software, being a descriptive statistical analysis, expressed in absolute and relative frequencies, presented in statistical tables.

Results

There were 49 children under 5 years old of age with a probable case diagnosed of whooping cough, which were notified and registered in the epidemiological investigation file.

The epidemiological characteristics of the whooping cough cases in the Province of Huancavelica, in the period 2017-2018 were the next to, the 76.4% of the cases were children younger than 1 year, the 12.2% had to 1 year and the 2% from 2 to 4 years; according to the sex, the 57.1% were men and 42.9% women; the 55.1% were from rural areas and the 44.9% from urban areas (Table 1).

The 85.7% of probable cases of whooping cough occurred in children younger than 1 year of which 50% had full vaccination for the age and the other half without full vaccination, the 12.2% are 1-year-old children, the 3 children (50%) with and without complete vaccination and the 2% from 2 to 4 years with complete vaccination (Table 2).

Table 1. Epidemiological characteristics of the whooping cough in the Province of Huancavelica during the period 2017 - 2018

Characteristics	Fi	F%
Age group		
Under 1 year	42	85,7
1 year	6	12,2
From 2 to 4 years	1	2,0
Total	**49**	**100,0**
Sex		
Male	28	57,1
Female	21	42,9
Total	**49**	**100,0**
Origin area		
Urban	22	44,9
Rural	28	55,1
Total	**55**	**100,0**

In the clinical expression, the 81.6% of children presented paroxysmal cough, the 57.1% vomiting after cough and the 46.9% noisy inspiration. The 89.8% of children were hospitalized for treatment and the 10.2% with ambulatory treatment (Table 3).

In relation to the months of the year the probable cases were distributed in the months from January to April, showing 12 cases in this period, with predominance in just two months May and June, this period it showed 15 cases, in the third quarter (July-August-September), this period showed 10 cases and in the fourth quarter (October-November-December) with 12 cases.

The whooping cough appeared with the highest occurrence of cases between the months of May and June. This coincides with the phenomenon of the frost in the Sierra of the Perú, where the meteorological frosts generally start in April and it end in September, reaching their coldest period and being more frequent in June and July. The descent is more intense at the night and it is recorded in this time and in the early morning before sunrise with clear sky conditions or low cloudiness; this leads to an increase in the incidence rates of respiratory infections, such as the whooping cough.

Table 2. Vaccination status of the children under 5 years old with the whooping cough in the Province of Huancavelica during the period 2017 - 2018

Vaccination status	Complete vaccination		Incomplete vaccination		Total	
Age group	**fi**	**f%**	**Fi**	**f%**	**Fi**	**f%**
Under 1 year	21	50,0	21	50,0	42	85,7
1 year	3	50,0	3	50,0	6	12,2
From 2 to 4 years	1	100,0	0	0,0	1	2,0
Total	**25**		**24**		**49**	**100,0**

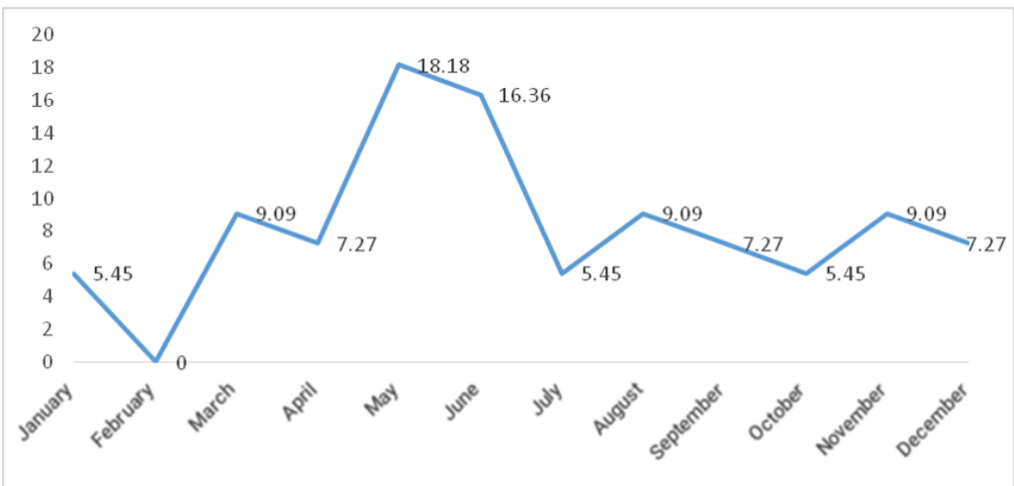
Table 3. Clinical picture of the whooping cough in children under 5 years old of age in the Province of Huancavelica during the period 2017-2018

Clinical picture	Yes		No		Total	
	fi	**f%**	**Fi**	**f%**	**Fi**	**f%**
Paroxysmal cough	40	81,6	9	18,4	49	100,0
Noisy inspiration	23	46,9	26	53,1	49	100,0
Vomiting after the cough	28	57,1	21	42,9	49	100,0

Table 4. Treatment of the whooping cough in children under 5 years old of age in the Province of Huancavelica during the period 2017-2018

Treatment	Yes		No		Total	
	fi	**f%**	**Fi**	**f%**	**Fi**	**f%**
Hospitalization	44	89,8	5	10,2	49	100,0
Ambulatory treatment	5	10,2	44	89,8	49	100,0

Graphic 1. Monthly distribution of the whooping cough cases in the Province of Huancavelica during the period 2017-2018



Discussion

In the Peru as in the world, there has been a resurgence of the whooping cough cases, despite being an immunopreventable disease and maintaining the adequate vaccination coverage, it continues to be a health problem for the children, according to the evidenced in the present research.

It is observed that the most vulnerable group are children under the1 year old age, being the males that to present the highest incidence and those from rural areas, this is a result that coincides with the research made by Juan Santos García in which he found a higher incidence of cases in children younger than 1 year with a percentage of 93.8% (30) of confirmed cases (7) (8).

In our research, the half of cases have complete the vaccines; despite the fact that the

vaccination is the best prevention strategy for the whooping cough, the result concord with the research made by Mónica Sosa (9) who shows that the 69% of the confirmed cases (n = 58) presented the certificate from the current vaccination scheme according to the age.

The whooping cough vaccine is applied in combination with diphtheria toxoid, tetanus toxoid, hepatitis B and against haemophilus influenzae type b (Pentavalent vaccine) to children of 2, 4 and 6 months of age (10), on 3 doses ; after that, two reinforcements are administered at 18 months and 4 years of age (11), it contains dead bacilli of Bordetella pertussis (12).

The vaccine protects for a period of approximately three years; the anticoqueluchoso component causes the formation of antibodies in a smaller proportion and the residence time of these antibodies is shorter. In fact, clinical pictures of pertussis disease appear in well-vaccinated children. A clinical efficacy of 70% to 90% was recorded in the first 3 years after four doses, being greater than 91.4% for severe forms (13).

All the available vaccines do not reduce the nasopharyngeal bearing of the Bordetella pertussis, so the circulation of the microorganism can be maintained to some degree despite good coverage (14).

The vaccination strategies focused for decades fundamentally, on the protection of infants and young children who constitute the most vulnerable population due to the greater severity of the disease at that age. However, these strategies have not taken into account the need for protection of the teenagers and adults who although they do not suffer from a severe form of the disease, constitute a reservoir from which the disease is transmitted to the infants and newborns. (15)

Clinical picture

The Table 3 shows that the 81.6% of the children presented paroxysmal cough, and the 57.1% vomited after cough, and the 46.9% presented noisy inspiration. After an incubation period from 7 to 10 days (range 5-21), the symptoms corresponding to the catarrhal phase of the disease appear. In the catarrhal phase, there are: mild symptoms of runny nose, cough, low-grade fever and nasal congestion, the condition being indistinguishable from a common cold. It usually lasts for about 2 weeks and the disease is rarely suspected in this phase unless it is a contagion from a known source. In the paroxysmal phase, the cough occurs in the form of predominantly nocturnal fits accompanied in occasions by the facial congestion or cyanosis, vomiting, choking sensation, and inspirational “rooster” after coughing. It is characteristic that 5 or more cough strokes occur in the same expiration followed by the typical inspiratory “rooster” (15). The cough is the guiding symptom that will allow the diagnostic and, in the absence of a typical cough, diagnostic is difficult and is usually performed late, unless contagious disease is suspected from a known case (15).

Hospitalization

It was found that the approximately to 90% of children needed hospitalization to receive treatment, mainly those under the age of 01 year who arrive after being cared for in the first level health establishments of the Province of Huancavelica. The diagnostic delay was to mainly due to the unspecific clinical characteristics, in many occasions we observed that it can take more than 16 days in the 50% of cases, and up to more than 40 days in the 25%, this is a problem that increases the rates contagion, due to the large number of cases that spend most of the period of transmissibility without receiving treatment or establishing isolation measures (16).

The most serious forms of the disease occur in infants, especially in children under the 6 months of life who are not vaccinated. The intensity of the symptoms and the frequency of complications force to the hospitalization of more than the 70% of this age, and more than 80% are under two months of age (1).

Finally, the graphic N ° 1 show the presentation of the whooping cough cases by month, the greatest occurrence was between the months of May and June. This coincides with the phenomenon of the frost in the Sierra from Perú, where the meteorological frosts generally start in April and end in September, reaching their coldest period and being more frequent in June and July. The more intense descent is recorded at the night and in the early morning before sunrise with clear sky conditions or low cloudiness; this leads to an increase in the incidence rates of the respiratory infections, such as the whooping cough.

Conclusions

- The epidemiological characteristics of the whooping cough in the Huancavelica Region from the period 2015 to 2018, showed a higher incidence in children younger than 01 year, with a higher occurrence in male children who come from the rural area.
- Despite the introduction of the pentavalent vaccine, the cases of whooping cough continue occurring despite the fact that the 50% of the cases had a pentavalent vaccine, between the first and third doses.
- The paroxysmal cough is the most common sign among the children considered probable cases, the loud inspiration and the vomiting after cough occurred less frequently.
- The highest occurrence of cases occurs in the months of May and June.

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