

Epidemiological Profile of Pertussis from 2008 to 2014 of 6th Regional Management of Health, State of Paraíba, Brazil

ORIGINAL

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Abstract

Introduction: Pertussis is an acute disease of the respiratory tract, has global distribution and occurs endemically with epidemic cycles every 2-5 years. It can occur at any time of year and at any stage of life, but mainly affects children under six months. It is observed the resurgence of the disease in Brazil even in places with high proportion of vaccine coverage.

Objective: The research aimed to identify the epidemiological profile of pertussis in period from 2008 to 2014 in the municipalities linked to 6th Regional Management of Health from Paraíba.

Method: The study is characterized as descriptive epidemiological from secondary data by a quantitative approach, it was used for data collection the database of 6th GRS and SINAN.

Results: The results show suspected cases reported in seven municipalities, higher incidence of female, white color and less than a year old, all cases in children under six months, with severe symptoms of the disease with a significant incidence of hospitalization in this age group.

Conclusion: Pertussis is still present in the region, it is necessary to maintain high vaccination coverage, the survey suggests that the laboratory test be respected because more than half of the suspected

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cases did not perform and improve the quality of information from the appropriate filling of the plug notification.

Keywords

Primary Attention to Health;
Health Profile; Pertussis.

Introduction

Pertussis, also known as whooping cough, is an acute disease of the respiratory tract. It can occur at any time of year and at any stage of life, but mainly affects children. Pertussis has global distribution and occurs endemically with epidemic cycles every 2-5 years. The incidence of pertussis presents widely variations in countries of the same continent and in different regions of the same country. In Brazil, despite low coefficients of incidence of pertussis, the number of cases and deaths from whooping cough increased significantly in 2011 and 2012 [1].

In Brazil, in the early 80's, it was reported more than 40,000 cases annually with a coefficient greater than 30/100 thousand inhabitants. The incidence and mortality of pertussis showed a downward trend. A sharp reduction in the occurrence of pertussis in the world occurred after improving the vaccination coverage against this disease. It was believed that the systematic use in large-scale of anti-pertussis immunization could make the incidence in the population at low levels or even eradicated, however, what is observed is the resurgence of the disease even in places with high proportion of vaccine coverage [2].

It was noted a resurgence of pertussis in all age groups in some countries. This fact has been attributed to the decrease of acquired immunity and sensitivity of epidemiological surveillance and the low effectiveness of the pertussis component of the vaccine [3].

It is estimated that 90% of deaths from pertussis still occur in developing countries, where vaccination rates are low, both in the basic scheme, as in rein-

forcements doses. It happens because of primary (no induction of appropriated immune response) or secondary (reduction in protective antibody titers) failures of vaccines, conducting to greater circulation of *Bordetella pertussis* and the occurrence of epidemics [1].

In regions where there is low immunization rate, children are the main reservoir for *Bordetella pertussis*, against match, where there is effective vaccination coverage in children, adolescents and adults are the main sources of transmission of the bacteria. Currently, the Ministry of Health recommends vaccination coverage with pertussis component above 90%, and attributed efficacy of 75% to 80% against pertussis with complete basic scheme [4].

All pertussis suspected case should be reported through the Notifiable Diseases Information System - SINAN, with the objective of data collecting and processing on notification of diseases throughout the national country; the entry of data in SINAN is made by using some standardized forms, as individual records of notifiable according to the ordinance 1943 of October 18th, 2001 [5].

Given the potentiality of whooping cough, a cough should not be ignored by health professionals, requiring a more thorough approach on symptoms and in laboratory for the etiologic diagnosis.

Accurate incidence data are difficult to ascertain due to underreporting and subdiagnoses, especially in older children and adults whose disease presentation may be atypical [2, 6].

The most efficient way for finding the disease still remains the culture, by means of a nasopharyngeal collection. Other diagnostic methods, such as real-time PCR allows us to identify many cases of whooping cough with negative culture.

Experts attest that, the more delayed is done the exam, the harder it is the accuracy of the diagnosis. Therefore, by having difficulties with diagnosis, health professionals end up having serious problems in accurately identify the presence of disease and administer palliative medicine for the symptoms without much effectiveness in combating pertussis [7].

The treatment of whooping cough is done with antibiotics, however it is necessary to seek care for the medicine to be prescribed in adequate dosage by trained professionals [8].

Given the history of whooping cough, arose in me the interest in conducting documentary research of pertussis epidemiology profile from 2008 to 2014 in the 6th Regional Health Management of Paraiba, the choice of 6th RHM was done by the difficulty of access the information in other regional, because there is no disclosure of information about the disease and by the regional receive data of twenty four municipalities. The present study is of great importance for health professionals in order to guide and answer questions about the theme, seeking to decrease the epidemiological index, describing the proportion of occurrence of the disease in this population, informing it is in endemic or epidemic level, in parallel in relation to the vaccination status of the affected population.

In this sense, the research aimed to study the epidemiology of pertussis in the period from 2008 to 2014 in the municipalities linked to 6th Regional Health Management of Paraiba analyzing completeness of the data of reported cases.

Method

This was an epidemiological study of analytical character, where it sought to understand the incidence of pertussis from secondary data analysis, by a quantitative approach.

The state of Paraiba has 12 Regional Health Managements - RHM, among them there is the 6th RHM, to be the third largest management, and is made up of 24 municipalities.

The survey was conducted in the Department of Epidemiological Surveillance, of the 6th RHM in the city of Patos, State of Paraíba (PB). The 6th Regional Health Management is responsible for coordinating health activities in 24 municipalities, forming one of the largest metropolitan areas in the State of Paraíba, Brazil.

The population of the study, were all reported cases of pertussis in the 6th RHM, corresponding to 38 cases reported through the Notifiable Diseases Information System - SINAN. It was adopted as inclusion criteria all cases notified, residents in the 6th RHM; 29 cases, from 2008 to 2014, the only period available for the 6th RHM, and as an exclusion criteria, resident cases in the 6th RHM seen in other regional.

It was used for data collection, database of the 6th RHM and the Notifiable Diseases Information System (SINAN) file. We collected socio-demographic data (age, gender, race/color and municipality) and epidemiological of the study (number of doses of pertussi component vaccine, coughing, cough with winch, cyanosis, vomiting, apnea, temperature > 38°C, hospitalization and collection of nasopharyngeal material). Data collection occurred in the period from September to October 2014.

For the data collection process, we took into account the requirements contained in Resolution 466/12, which regulates research on human beings, ensuring the safety of the anonymity and privacy [9].

For this, it was used a Confidentiality and Protection of Risk Term (CPRT), in which to be given access to information, exams, observations of personal data of individuals from documents and ensuring confidentiality. The study was approved by the Ethics Committee in Research of the Patos Integrated College (FIP), via Brazil platform, under protocol number - CAAE: 310071145.5.0000.5181.

Data analysis was based on study of analytical epidemiology. For qualitative variables were made the absolute frequencies (n) and relative (%), shown in tables and/or graphics. It was calculated the average incidence of the period from

2008 to 2014, number of cases divided by 7 and as the denominator the population of center for the period 2011 multiplied by 100,000. This same calculation was used for incidence table by age group having as a data source the IBGE. Association analyzes were performed by Fisher's Exact test using OpenEpi software (www.oponepi.com) to assess the association between age range and various categorical variables of the study. The level of significance was set at 0.05 or 5%.

Results and Discussion

Data from the municipalities linked to 6th RHM, were cataloged uniformly, using the 6th RHM database and records of compulsory notification for each case, totaling 29 suspected cases, 8 confirmed and 21 disposed in seven municipalities in the period from 2008 to 2014. Among the cases disposed of in the system, 2 were confirmed, one through laboratory tests and the other by clinical diagnosis (personal experience), compared to this weakness. We prefer to work with the set of reported cases. (Table 1)

In the table 2, we can see that the incidence of pertussis in the region was higher in children under one year old and all cases in children under six months. Trevizan; Coutinho [2] states that the highest concentration of cases in the age under one year is expected, since it makes up the classic risk group. Corroborating, a study published in 2013 in Bolivia showed that in the first epidemiological weeks of that country, cases of children under three years were already being recorded 10. It is plausible that people with the immune system not formed yet or weakened, are more susceptible to suffer any opportunistic disease. Pertussis, unlike other infectious disease, affects more women, but it was not found in the literature phenomena that justify the occurrence of the disease in a particular sex.

It was observed that in most of suspected pertussis cases of 6th RHM, the vaccine schedule was updated to age, this does not imply that the children

were immunized, because like most of the cases were in infants under six months, these children had no time to receive the necessary vaccination scheme, three even taken the first dose, the Bolivian study showed a direct relationship between disease and vaccination, the vaccination coverage was directly linked to the disease number [10].

Table 1. Average coefficient of suspected cases of whooping cough in the 6th RHM-PB by age group, from 2008 to 2014.

Age	Cases	Average	Population 2011	Incidence*
<1	10	1.42	3444	41.48
1-4	7	1	14458	6.92
5 to 9 y	5	0.71	19762	3.61
10 to 14 y	2	0.28	21090	1.35
15 to 19	1	0.14	20703	0.69
20 to 29	2	0.28	40178	0.71
30 to 39	0	0	33030	0
40 to 49 y	0	0	26733	0
50 to 59 y	1	0.14	18703	0.76
60 and +	1	0.14	27647	0.52
TOTAL	29	4.14	145269	2.85

Source: Regional Health Center of the 6th Region of the State of Paraiba, 2014. * For 100,000 inhabitants.

Table 2. Pertussis suspected cases according vaccination status and age, 6th RHM-PB, 2008 to 2014.

Age	Unvaccinated	1	2	3	3+1	3+2	Ignored
Up to 3 months	3	2	0	0	0	0	3
4 to 6 months	0	1	1	0	0	0	0
7 to 60 months	0	0	0	0	6	0	1
Op of 60 months	3	0	0	0	3	4	2
Total	6	3	1	0	9	4	6

Regional Health Center of the 6th Region of the State of Paraiba, 2014.

The vaccination status of a population is a determining factor to an infectious disease like whooping cough, it can come to disseminate when this preventive measure is not adopted. Trevizan, Coutinho [2] pointed out that only one dose does not confer protection factor, requiring three doses for adequate protection. But it was found that some

Table 3. Pertussis suspected cases according to age and symptoms, 6th RHM of Paraiba, 2008-2014.

Variables	<6m		>6m		Fisher
	Yes	No	Yes	No	
coughing	5	5	10	9	1
Coughing (winch)	3	5	8	11	1
Cyanosis	8	2	7	12	0.065
Vomit	3	6	12	7	0.2841
Apnea	3	6	8	11	0.9855
Temperature	4	5	7	12	1

Source: Regional Health Center of the 6th Region of the State of Paraiba, 2014.

Table 4. Pertussis suspected cases by age group and presence of hospitalization, 6th RHM of Paraiba, 2008-2014.

Age	Yes	No	Total	Yes	P
				%	
Up to 6 months	7	3	10	70.00	0.00555
Over 6 months	2	16	18	11.10	
Total	9	19	28	32.10	

Table 5. Nasopharyngeal Material collection for detection of pertussis for suspected cases, 6th RHM of Paraíba, from 2008 to 2014.

Material Collection	Cases	%
Unknown	3	10.30
Yes	12	41.40
No	14	48.30
Total	29	100.00

Source: Regional Health Center of the 6th Region of the State of Paraiba, 2014.

children over 60 months were never vaccinated and some had incomplete immunization scheme. The pertussis vaccination program for pregnant women was a major public health intervention to reduce morbidity and mortality in neonates [11].

(Table 3)

Children under 6 months showed severe symptoms of the disease, the presence of cyanosis, although not significant, was higher in children under 6 months. There was no significant difference in the presence of apnea, winch, vomiting, temperature by age, but symptoms were higher for those over 6 months.

The infants younger than 6 months, according to the Surveillance Epidemiology Manual 2009 are more likely to develop severe forms of the disease, such as classic paroxysms, sometimes associated with cyanosis, sweating, repeated vomiting, apnea, seizures etc. **(Table 4)**

Significant association was found between age and Hospitalization Cases ($p < 0.00555$). There is a higher frequency of hospitalization among those with up to 6 months. Young infants, especially infants under six months often have severe forms of the disease, often lethal. These infants require hospitalization, isolation, permanent monitoring and specialized care. According to the database there were only 01 death, recorded in Patos county - PB. The Guide of Epidemiological Surveillance 2009 recommends that patients hospitalized with pertussis should stay in respiratory isolation, during the period of communicability, since the outpatients should be away from their activities, until five days after antibiotic use or for three weeks after the the beginning of paroxysms, if the antibiotic was not used already.

A study conducted in 2012, showed that in Chile the incidence of pertussis is potentially serious in children under months old, setting up as a serious public health problem in this country, this reality can also be pointed in other nations of Latin America [12]. **(Table 5)**

The table above shows that 60% of suspected cases attended did not make the collection or ignores if made this examination. Of the 12 cases that made the collection, only one was positive. Chemical analysis is a basic procedure for pertussis detection, and should be performed at an appropriate time, in the case of culture *bordetella* shows fastidious growth, often required the real time PCR for safe diagnosis. The lack of collection may become a factor that allows the spread of an endemic disease in the region that, although it has not been officially recognized yet, may be in progress at the time.

In the Netherlands, the serum prevalence increased beyond the reported cases, which suggests that the laboratory tests for pertussis are considered infrequently and even more cases of pertussis are lost [13-15].

Study in Argentina covering the years 2002 to 2011 showed that children under one year old constitute the predominant group among all the confirmed cases, which corresponded to 84% of the amount, with much higher incidence rate in relation to data contained in literature [16-19].

The procedure of collection of nasopharyngeal material in regional municipalities is carried out as follows: the user is sent to the laboratory of his/her respective municipality, or to the laboratory of the county seat, Patos, where they perform the collection of material and forwards it to the Central Laboratory of State of Paraíba - LACEN/PB located in João Pessoa, the material continues with the identification of the patient and adequate transportation as protocol.

After examination of the completeness of the information passed on the 6th RHM through notifications it was identified a low degree of completeness in the variables of vaccination status, results of culture and communicating. These findings reflect the lack of information in SINAN forms, filled precariously by some professionals, leaving aside important information, not only for this study, and to

obtain concrete results about the epidemiological disease profile in the region, resulting in the absence of prevention measures, dissemination of the disease and increase in cases. Also draws attention as the use of SINAN as a local database to be a valuable source of epidemiological information, despite its limitations. It is necessary to implement actions to improve the quality of information through the complete filling of all fields of the notification form [20].

Conclusions

Pertussis is a disease that is still present and evolving in 6th RHM, victimizing children under six months of age presenting severe symptoms of the disease.

The research suggests that the laboratory examination be respected in the municipalities of the 6th RHM, being held at an opportune time for all suspected cases of whooping cough may be in a hospital or basic health units in order to meet the disease epidemiology and surveillance tools.

The study allows new shares to be adopted by the 6th RHM as a way to review the work against the disease in focus for the coming years and maintain high vaccination coverage, as well as having benefits for a new approach to awareness means and guidance to the population to combat whooping cough. The results showed that, first of all, there is a serious deficiency of the administrative organs of public health to collect, process and display information from clinical consultations proceeded in health facilities.

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