

Pertussis: Incidence and Surveillance in Municipalities of 6 Regional Health Management of Paraíba, Brazil

ORIGINAL

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Abstract

Introduction: Pertussis is an infectious and highly contagious disease of the respiratory tract, caused by a bacterium called *Bordetella pertussis*. It can occur at any stage of life. The prevention of whooping cough is effective part of the National Immunization Program (NIP) in Brazil, which offers the vaccine free of in public health. Data relative to notifications of cases of whooping cough in Brazil are stored and grouped in the Notifiable Diseases Information System (SINAN).

Objective: This study aimed to know the incidence and surveillance for pertussis in municipalities linked the 6th Regional Health Management of Paraíba, and as specific, assess the completeness of data of reported cases and verify the use of antibiotics in all reported cases of disease.

Method: It is a study of epidemiological type of analytical and descriptive character.

Results: The results show that most cases occurred in 2013, a fact overlooked by the Regional which showed no action to contain the disease occurrence. What in epidemiological terms directly affects any action that might promote rapid response on measures to enable new cases.

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Conclusions: It is important to adopt strategies to identify early the incidence of cases as a way to control or suppress the disease to a small group, so it is necessary to have enough information for diagnosis and treatment.

Keywords

Pertussis; Epidemiology;
Incidence.

Introduction

Pertussis is an infectious and highly contagious disease of the respiratory tract, caused by a bacterium called *Bordetellapertussis*. It can occur at any stage of life, but mainly affects children, it is a disease of great importance, in view of its high rate of mortality in children. [1]

This is an endemic and epidemic condition, with outbreaks every 3-5 years. According to the World Health Organization, in 2008, there were 16 million cases (95% of them in developing countries) and enrolled 195,000 deaths (WHO, 2016). In Brazil, in 2011, 2,258 cases were reported and 55 deaths, and in 2012, 5,124 cases and 86 deaths, mostly in babies under six months old. [2]

The prevention of whooping cough is effective part of the National Immunization Program (NIP) in Brazil, which offers the vaccine free in the public health system. [3] The immunity conferred by the vaccine for pertussis component decreases with time. Several studies worldwide have shown that the protection against pertussis decreases from six to 12 years after vaccination, may be too low or zero. [4]

The pertussis vaccine became part of the national vaccination schedule in 1973, however, from the year 2010, it has been noticed the resurgence of the disease in some Brazilian capitals, and the majority of these cases occurred in children less than three months, because they have not yet received the full course of vaccination (at least three doses of pentavalent) or by even have started this scheme, as recommended by the Ministry of Health. [5, 6]

Data relative to the notifications of cases of whooping cough in Brazil are stored and grouped in the Notifiable Diseases Information System (SINAN). [7] SINAN was developed in the 90s, with the objective of collecting and processing data on notification of diseases throughout the country, providing information to identify the epidemiological reality of a given area.

Contributing, thus, to the decision-making at the local, state and federal levels. For this notification, standardized chips are available by the Ministry of Health, which contains information necessary for a full investigation of the case, thus enabling a greater understanding of the disease and its epidemiology where it is occurring.

Given the potential of this disease, no cough should go unnoticed by health professionals, which is necessary a more careful approach of the signs and symptoms, as well as make laboratory tests to confirm the disease and determining the etiologic agent.

Among the tests used for diagnosis of disease, isolation of the pathogen through nasopharyngeal aspirate culture is the most accurate, being carried out with suitable technique. Other complementary tests can be used to help diagnose among them: the white cell count, chest X-ray and PCR, the latter being indicated only when the symptoms are a signal indicative of whooping cough. [8]

The treatment and chemoprophylaxis of pertussis is through antibiotics, which must be prescribed only by trained professionals, given their particular choice of medication and appropriate dosage for infants, children, adults and pregnant women.

The 6th Regional Management of Health in Paraíba state consists of 24 linked municipalities, where it receives enough data to perform a research of analysis of incidence and surveillance of whooping cough. The choice of 6 GRS is because there is no dissemination of the disease data by it and by the difficulty of access to other management.

This study is of great importance for the whole community and health professionals, in order to inform how it presents itself in the region, promote health education in order to decrease the epidemiological indices, and to provide subsidies to trace coping strategies to the disease by managers.

Therefore, this study has as general aim to know the incidence and surveillance for pertussis in municipalities linked the 6th Regional Health Management of Paraíba, and as specific, assess the completeness of data of reported cases and verify the use of antibiotics in all reported cases of the disease.

Methods

This study is an epidemiological type of analytical and descriptive character, which sought to examine the incidence and surveillance of whooping cough through secondary data, with a quantitative approach.

The survey was conducted in epidemiological surveillance department of the 6th GRS, located in Patos, Paraíba [PB]. It is responsible for coordinating actions of 24 municipalities tied to it. The study population consisted of 38 cases reported to the Notification Diseases Information System -SINAN. As inclusion criteria, was adopted all reported cases residing in the 6th GRS, from 2008 to 2014, and as exclusion criterion, those living outside the local management of study. After applied these criteria, it was amounted a sample of 29 cases. To collect data, we used the database of the 6th GRS and the file of Notifiable Diseases Information System (SINAN).

We collected epidemiological data regarding the purpose of the study, as a city of the occurrence of the disease, antibiotic use, and complete filling of data to characterize the completeness of cases. Data collection occurred from September to October 2014. For the data collection process, the researchers took into account the requirements contained in Resolution 466/12, which regulates research involving human beings, ensuring the security and privacy of involved. [9] For this, we used a Risk Protection and Confidentiality Agreement (TPRC), to be given access to information, examination, observation of personal data and documents. The study was approved by the Research Ethics Committee of Patos Integrated College and the Platform Brazil, under protocol number - CAAE: 310071145.5.0000.5181.

Data analysis was based on study of descriptive epidemiology. For qualitative variables were made the absolute frequencies (n) and relative (%), shown in tables and/or graphics. We calculated the average incidence of the period from 2008 to 2014, the number of cases divided by 7 and as the denominator the population of the center of the period, 2011, 100,000 times.

Results and Discussion

In **Table 1** it is observed that most of the cases occurred in 2013 with the municipalities of Santa Luzia and Catingueira with higher incidence, a fact overlooked by the Regional which showed no action to contain the disease occurrence. What in epidemiological terms directly affects any action that might promote rapid response as the measures to enable the incidence of new cases.

Studies show that about 50 million cases, with approximately 300,000 deaths occur each year in the world, and its lethality in children can approach 4%, whooping cough is the third leading cause of death among the immunopreventable diseases, what leaves it as an important condition of com-

Table 1. Average coefficient of suspected cases of whooping cough in the 6th GRS-PB, according to municipality from 2008 to 2014. The columns for the years represent the total number of cases each year.

Municipality	2008	2009	2010	2011	2012	2013	2014	Total	Average	Population 2011	Incidence
Catingueira	0	0	0	0	0	3	0	3	0.42	4812	8.91
Junco do Seridó	0	0	0	0	0	0	1	1	0.14	6643	2.15
Maturéia	0	0	0	0	0	0	1	1	0.14	5939	2.41
Patos	2	0	1	0	2	0	5	10	1.42	100674	1.42
Santa Luzia	0	0	0	0	0	11	0	11	1.57	14719	10.68
S. Jose de Espinharas	0	0	0	0	0	1	0	1	0.14	4734	3.02
São Mamede	0	0	0	0	1	0	1	2	0.28	7748	3.69
6a region	2	0	1	0	3	15	8	29	4.14	145269	2.85

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

pulsory notification, and should be notified immediately. [10]

Because, as we know, that it is a disease of compulsory notification and where your infection rate is still high, the earlier they are carried out actions that enable the recognition, prevention and prophylactic measures, the lower the amount of individuals and subjects who may be infected with the pathogen.

Hence the importance of the 6th Regional Management of Health, to identify these notifications, and then map out a plan of actions in the municipalities where the incidence of cases are relatively high compared with the other, it should also be noted that the look of managers and health professionals do not should only summarize to points where the disease is more frequent, but also in other cities, since there may be a probability of the significant increase in the number of new cases.

The degree of spread of this disease is pretty strong, the point still remains a considerable problem in many countries. In the United States, for example, since the end of the 80s, several epidemics of whooping cough have occurred relatively frequently. [11] Therefore, there is the need to notify and treat immediately suspected or confirmed cases, in order to decrease the radius of infection that this condition can reach in a given space.

According to WHO data, the incidence of pertussis has tripled in Latin America and North America between 2006 and 2008, in 2012, the 1,759 cases in Brazil have caused 39 deaths, most babies, which alert us that precautionary measures against the disease can be taken. [12] **(Table 2)**

Table 2. Use of antibiotics in suspected cases of Pertussis, 6th GRS of Paraíba 2008-2014.

Antibiotic	F	%
Yes	22	75.90
No	4	13.80
Unknown	3	10.30
Total	29	100.00

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

According to the table above, it is noted that more than half of the cases made use of antibiotics. Antibiotic therapy is still an effective prophylactic measure, especially in response time that antibiotics may contribute to the improvement of infected individuals, but counterpart the use of these substances prior to the results for serology of pertussis, commits the data and research in regards the confirmation of the disease or not.

For, even before the confirmed result, it is common in hospitals which treat suspected of whooping cough people, medical professionals come with an-

tibiotic therapy regimen for treatment, so we believe that the data on the number of cases could be higher as compared to the presented here and reported by the Compulsory Notification System.

The Ministry of Health recommends the use of erythromycin as the drug of first choice in the treatment and in chemoprophylaxis of whooping cough and, as a second option, clarithromycin. [13] Erythromycin is the more efficient and less toxic antibiotics. This antibiotic is able to eradicate the agent in the body in 1 or 2 days, when its use is initiated during the catarrhal period or in the early paroxysmal period, thereby promoting the reduction of the period of communicability of the disease. [14]

In the records of SINAN, as well as in the database does not have the variable on which types of antibiotics were used and at what stage the individual has used, since the use of antibiotics prior to collection for laboratory analysis compromises the quality of the material, perhaps it justifies the fact that only one case has been confirmed by laboratory in 6th GRS. (Table 3)

Table 3. Completeness of data of suspected cases in the 6th GRS - PB, 2008-2014.

Variables	Cases with information		Cases without information	
	N	%	N	%
Name	27	93	2	07
Date of birth	27	93	2	07
Results of culture	12	41	17	59
Vaccination status	21	72	8	28
Case evolution	27	93	2	07
Communicants	10	34	19	66

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

Through data completeness, it is found that some important data are no longer reported in the suspected case notification, as: result of culture, vaccination status and communicating. This lack of information does not allow us to know concretely the epidemiological profile of the disease in the region.

It is important, because it is a public body, in particular that stands out in health actions, that the 6th Management recognizes its importance, and search to centralize actions against whooping cough, as well as qualify the professionals in the municipalities in which are part of the same, so that they are able to act as soon as possible in the notification of suspected cases, trying to obey the calling for the Ministry of Health, which says that the nasopharyngeal sample must be performed in the catarrhal stage, before the start of antibiotic therapy or up to 3 days of starting treatment.

But despite the failure in the transfer of information of notified cases, because of poor filling of SINAN records by professionals, the results of this study show that is having an increase in whooping cough in the municipalities of 6 of Paraíba Regional Health Management for the period from 2008 to 2014, this already warn the sign that there needs to be more in-depth study to identify where the deficit of the shares, and can particularly improve the measures that enable a reduction in the number of cases.

The findings of this study highlight the lack of information in the SINAN forms, filled precariously by some professionals, leaving important information not only for this study, but to obtain concrete results on the epidemiological profile of the disease in the region, resulting in lack of preventive measures, spreading the disease and increase in cases.

The Compulsory Notification System is still important 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. [15]

The diagnostic of confirmation is made by bacterial culture, which is the gold standard in the diagnosis, or its isolation by polymerase chain reaction (PCR) in real time in oropharyngeal secretions, preferably harvested in the catarrhal stage of the

disease, before antibiotics or at most three days of treatment as recommended. [16]

Additional tests can help to confirm or disposal of suspected cases, which is of fundamental importance to have reliable results so that we can treat and combat centrally the disease, respecting the treatment indicators for each step in that the patient is unhealthy. [17]

Leukogram: in the catarrhal period, there may be a relative and absolute lymphocytosis, usually above 10,000 lymphocytes/mm³. The total leukocytes, at the end of this stage, reach a value generally greater than 20,000 leukocytes/mm³. In paroxysmal period, the number of leukocytes may amount to up to 30,000 or 40,000/mm³, associated to the lymphocytosis from 60 to 80%.

Chest X-ray: recommended in children under 4 years, to aid in the differential diagnosis and/or the presence of complications. It is characteristic the image of "blurred heart" or "feathering", because the edges of the cardiac imaging are not clear, due to pulmonary infiltrates.

In order to explain these laboratory procedures, are essential that scholars on the subject to abide the following explanations of who deeply experienced the subject under discussion "The easiest and sensitive for the diagnosis is by PCR respiratory secretion, but also culture. It should be used, but this can lead to diminished sensitivity if the patient is already in use of antimicrobials or vaccinated patients. Serology only have benefit in vaccinated patients for over 02 years, and should be taken in two phases, the first sample preferably harvested in the catarrhal stage.[8]

The PCR, is important to note, diagnoses both dead bacteria as the living. Therefore, it is possible that it may be before the detection of a bacterium that is already dead, but that caused an infection several weeks ago. Therefore, the test should be given only when the symptoms are a signal indicative of pertussis. [8]

The collection of material suspected of pertussis cases should be proceeded preferably at the begin-

ning of the peculiar symptoms of the disease (catarrhal period). This fact should be undertaken prior to antibiotic therapy or at most two or three days. Performing the collection, it should be introduced a flexible swab, ultrathin and sterile in the nostril of the patient to find a contact with the posterior wall of the nasopharynx. Subsequently, perform rotational movements. [18]

To be considered its high rate of effectiveness, vaccination matches as a mandatory component in immunization and public health programs. Vaccination is still the best strategy among the tested in preventing this disease, because it causes a greater reduction in the number of cases in all age groups and achieves greater impact among children under one year, the most vulnerable to complications from whooping cough. [19]

The immunization coverage rates for pertussis vaccine increased in recent years in 17 countries. [20] However, this increase was not uniform in Brazil, according to data from Monitoring System of indicators of the Pact's for Health (SisPacto) indicate that this rate decreased from 103.1 to 91.8%. [21]

These aspects can be attributed to sociodemographic factors, in which significantly hinder the adherence to preventive measures for the disease. Family size, low parental education and long distance between the residence of the children to the Family Health Strategies, may be associated with reduction in vaccination coverage. [22]

It is important that have the awareness by the community as a whole and the importance of vaccination and their vaccination schedules for children, it is necessary that health professionals can act in a cohesive way, knowing and meeting the aspirations that the community where he works, because from that knowledge he can adopt measures that can contribute to favorable numbers as vaccination in the prevention of notifiable diseases, including whooping cough.

It is noteworthy that is notoriously evident that most cases of infection with whooping cough are in

children younger than 1 year of age, the answer to this data to be so high is precisely in the vaccination, and their vaccination schedules, the fact is that due to the young age many children are vaccinated later or do not have the vaccine scheme closed to the disease which leaves them more suggestible.

The immunity conferred by pertussis component does not last for the entire life of the individual, and it decreases with time. On average, 5 to 10 years after the last dose of vaccine, the protection may be scarce or absent. [1]

Conclusions

Despite the difficulty in obtaining some epidemiological data on pertussis and the lack of updated data on epidemiology in the municipalities that are managed by the 6th Regional Health of Paraíba, we could identify that pertussis is still a serious health problem, as some factors can further contribute to this disease each day more aggressive. Since the disease is an important cause of morbidity and mortality, especially in children under one year of age, which requires increased attention of government agencies in health in the adoption of measures to enable the prevention and identification of the disease, thus preventing new cases arise.

Therefore, it is important to adopt strategies to identify early the incidence of cases, as a way to control or suppress the disease to a small group, so it is necessary to have enough information for diagnosis and treatment, fact that, in our study, we observed that some information and parameters regarding the diagnosis and notification of the disease, were not followed or did not figure in the notification form, a fact that contributes to the deficit of positive results, in which enable us to know epidemiology of the disease and surveillance tools.

The study allows new shares to be adopted by the 6th GRS as a way to review our 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 of the population to combat whooping cough.

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