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Diphtheria Investigation In Buranga Village of Central Sulawesi, Indonesia

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ABSTRACT

Diphtheria is still a health problem because it still often causes outbreaks and causes death. All ages can be exposed to diphtheria but most attack children who are not immunized. The case of diphtheria in Central Sulawesi is a rare case. Even in 2015 and 2016 there was no reported diphtheria event but in 2017 there was reported suspect diphtheria. The purpose of this study was to conduct an epidemiology investigation and find additional diphtheria cases in Parigi Moutong District. This was a descriptive study with observation and interview method. Primary and secondary data were collected. Secondary data were obtained from surveillance data and investigation results while the primary data were obtained from interviews on reported probable diphtheria case. No additional cases of diphtheria were found in Parigi Moutong District. The reported case in May 2017 was an 11-year-old primary school student. The presence of diphtheria typical symptoms (bullneck and pseudomembrane) were found on clinical examination. The patient have heart problems before given anti-diphtheria serum by health officer. However, the culture examination showed negative results. The result was allegedly due to errors in the culture examination procedure performed by health officer. Index case or chains of diphtheria transmission cannot be certainly determined, but we suspected the patient's mother to be the carrier based on history of travelling to diphtheria endemic area. There was 1 probable diphtheria case in Ampibabo Subdistrict of Parigi Moutong District. Training to increase the capacity of health workers in diphtheria management was needed.

Keywords: Diphtheria, Epidemiology, Investigation, Probable

INTRODUCTION

Diphtheriae is a highly contagious disease caused by corynebacterium diphtheriae with symptoms and clinical signs of fever + 38°C, pseudomembrane white gray not easy and easily bleeding in the pharynx, larynx or tonsils, pain swallowing, neck swell like bullher cow neck) and shortness of breath with stridor. Diphtheria still a health problem because it is still often cause extraordinary events (outbreak) and the cause of death. All ages can be exposed to diphtheria and unmunited children. In 2000, there were 30,000 cases and 3000 deaths worldwide. In 2013, the number of diphtheria incidents based on WHO data was 4,680 cases of widespread and mostly concentrated in Asia, found in India 3,313, Indonesia 775, Iran 190, Pakistan 183 and Nepal 103 cases. In 2013, Indonesia with the keyword diphtheria and 2014 until october the case of diphtheria supplies 365⁽¹⁾.

In the coverage of diphtheria immunization in a low area will have an impact on a state of diphtheria outbreak in the region, while on a fairly good coverage will be rarely found diphtheria disease. The decrease in diphtheria caused by the immunization program does not mean that the type of bacteria is absent or disappeared in a person's body, but an infected person, corynebacterium diphtheriae bacteria can still colonize even if the person has been immunized. Even that person could potentially be a carrier and a source of transmission of diphtheria disease and impact on extraordinary events (outbreaks) in an area⁽²⁾.

The case of diphtheria in Central Sulawesi is a rare case. Even 2015 and 2016 did not report the occurrence of diphtheria but in the year 2017 was reported suspect of diphtheria in Ampibabo subdistrict of Parigi Moutong district. One of district in Central Sulawesi. Diphtheria case In May 2017 in Buranga Village Ampibabo subdistrict was the first case in Ampibabo subdistrict of Parigi Moutang district. In May 2017 the outbreak was determined in Ampibabo subdistrict of Parigi Moutang district with reference to the criteria of outbreak according to PERMENKES 1501 in 2010 that the emergence of a certain infectious disease that previously did not exist or not known in a region, with the existence of an outbreak in a region it is necessary to conduct an epidemiological investigation.

Based on the above, epidemiological investigation of the case is necessary to be carried out immediately. General purpose of epidemiological investigation of diphtheria outbreaks in Ampibabo subdistrict of Parigi Moutong district in 2017 is carrying out the action of outbreak of disease outbreaks in Parigi Moutong District.

METHODS

The approach used in this investigation was a descriptive approach by reviewing secondary data from Health Office of Parigi Moutang district, Anuntaloko hospital and Ampibabo health center. Primary data were obtained by interviewing probable diphtheria cases and interviews based on contact history, to relatives/close relatives of the patient, health workers handling patients, school friends, teachers and the case environment.

Instruments used for data collectors were diph-1 form for case investigation. Form Diph-1 there was information about the identity of the complainant, the identity of the patient, the history of the illness, the medical history, and contact history.

RESULTS

Description of Buranga Village, Ampibabo Sub-district

The Buranga village has an area of 4,460 Ha with a population of 2798 people. The majority of the Buranga population entrust their economic life with a profession as farmers and fishermen.

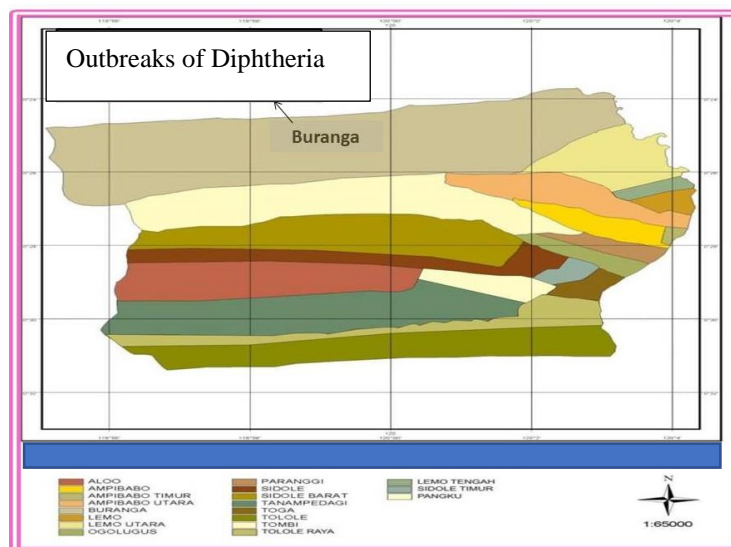


Figure 1. Map of location diphtheria outbreak in Ampibabo Sub-district of Parigi Moutong District, Central Sulawesi Province

Ampibabo subdistrict has one public health center with working area covering 19 villages with total population in 2016 number 22,605 people.

Definition of Diagnosis and Determination of Diphtheria Outbreaks

To confirm the diagnosis of diphtheria, clinical and laboratory checks are made to diagnose the disease by clinical examination based on symptoms and signs of illness and laboratory by taking swabs and nasal swabs. Certainty of outbreaks based on the book "Guidelines for Immunization and Surveillance Technical Guidelines for the Prevention of Disease Outbreaks" states that one case of diphtheria (probable or confirmation) is outbreaks and each outbreak should be addressed to reduce morbidity, mortality and disease transmission.

Description of diphtheria Outbreaks

a. Case identification

Diphtheria cases in Ampibabo subdistrict of Parigi Moutang District in May 2017 amounted to 1 case shown in table 1.

Table 1 Difteri case in Ampibabo subdistrict of Parigi Moutang District in Mei 2017

Name	Age	Sex	Date of Illness	Clinical Symptoms	Classification of Case	Immunization Status	Prophylactic contact and swabs taken nose and throat	Treatment	Outcome
GAAP	11 years	Male	5 Mei 2017	Fever, Pseudomembrane, bullneck, swallowing pain	Probable Diphtheria Tonsil (laboratory results have not come out yet)	Complete (Parents description)	10 people	3 Vials ADS, Prophylactic	in the recovery period

b. Chronology of Probable Diphtheria Case

Chronology of probable diphtheria patients case patients began to heat and feel pain swallow on May 5, 2017 based on the information the case still had to go to school before taken to ENT doctor and diagnosis of diphtheria suspect. The doctor's diagnostic showed symptoms of fever, pseudomembrane, bullneck, sore and chapped lips in the patient and directly referred to Anuntaloko hospital based on the results of the examination and the doctor reported this incident to the Head of Parigi Moutang Health office then reported to the Provincial Health Office of Central Sulawesi.

On May 6, 2017, a specimen (swab) was collected on patients including elderly patients given erythromycin. Then On May 7, 2017, samples were taken on 10 contacts (friends and family) and given prophylaxis (eritromicin). Then on May 10, 2017, at 03.00 am, the case was given by ADS because of the patient began to experience lung and heart disorders, at 11.00 am case condition has improved (no fever and bullneck is gone) although there is still a little bit of pain.

c. Potential and Estimation of the source of transmission

Based on the results of interviews with the parents of the case, Health Office of Parigi Moutang district and Ampibabo Public Health Center that around March, 2017 the group of comparative studies of the public health center accreditation consisting of 58 people from the Health Department of Parimou District, 23 public health centers throughout Parimou District visited East Java (Surabaya, Malang, Probolinggo and Madura) endemic areas of diphtheria. Suspected infected from the mother who became a carrier, Taking a swab of nose and throat done on the mother of the patient, the laboratory results have not been out. Close relatives who have close contact with patients are also in the taking of swabs of the nose and throat to be aware of the transmission of diphtheria, but the results of laboratory tests have not come out.

Based on the above speculation, it can be said that all health workers at 23 Public Health Center in Parigi Moutang district potentially transmit the bacteria to all the people around it besides high population mobilization also become potential of infected to all area of Parigi Moutang district. In addition, children with probable Diphtheria cases may potentially transmit to their schoolmates at Public Elementary School of 1 Buranga, close relatives and neighbors around the house who make contact with the patient.

d. Diphtheria Epidemiology in Parigi District

1) Based on time

Disease outbreaks was reported on 5 May 2017 with the discovery of a patient based on the diagnosis of Anuntaloko hospital in Parigi Moutang District.

2) By People

The diphtheria sufferer is an 11 year old boy with a GAAP Initial with complete immunity status.

3) By Place

Outbreaks of diphtheria occurred in the village of Buranga in the work area of Ampibabo public health center. The Probable case found was a pupil at Public Elementary School of 1 Buranga, Ampibabo subdistrict. Investigation conducted to neighbors in the neighborhood of residence and school sufferers were not found people who were ill with symptoms resembling diphtheria.

e. Countermeasures that have been done

After receiving a report of suspected diphtheria, surveillance officers from the Parigi Moutang District Health Office conducted Epidemiological Investigations in the case and took specimens on housekeeping contact on suspected diphtheria and also given prophylaxis. Countermeasures that have been done include:

1) Coordination

Coordination is done by Health Office of Parigi Moutong district with Palu Provincial Health Office. Hospital-level coordination was performed with the physician who handled the patient and at the public health center level was conducted with the epidemiologic surveillance officer of the public health center. Coordination time between public health center and health office is 1 day after found probable cases. Youth time tracking by Health Department is 1 day ago specimen taking done 1 day after case tracking.

2) Epidemiological Investigations

Epidemiological investigations were performed using diph-1 form and also continued with swab collection and prophylaxis in patients and close contact. Epidemiological investigations are conducted by interviewing, taking swabs on patients and close relatives or families, profiles, and contact surveys.

The contact survey was conducted at Public Elementary School of 1 Buranga. The case was a student of Public Elementary School of 1 Buranga in class VI. The number of Grade VII students is 29 people. Based on the results of the April 2017 student absentee review, there were about 12 students who experienced illness in April-May 2017, of 12 sick students in April - May no students were sick on the same date as the patient so with the help of School Health Unit teachers summoned names of students who missed in April-May 2017. After being interviewed, 12 students suffering from sickness said they had swelling behind their ears and stiffness when they opened their mouths, but no swallowing pain, and no pseudomembrane, the results revealed they had Parotitis, as well as with sick students outside of class VI. When the visit was made on May 12, 2017, my colleagues were not present because of illness, according to the teacher and friends of my colleagues also experienced Parotitis.

Results of visits to the School sufferers were not found suspected diphtheria. The vulnerable classmates are 29 students and the total number of students is 200 Students and 16 Teachers. Based on absence history and School Health Unit data, no sick students with diphtheria symptoms were found.

Table 2. Parotitis case found in SDN 1 Buranga of Ampibabo Subdistrict

Class	Number of sick Parotitis	Number of Students
VI	12	29
V	2	28
IV	1	33
III	3	36
II	2	40
I	-	34
Total	20	200

Information: The number of students based on memories or estimates

f. Description of Risk Factors

1) Immunization Coverage

Immunization coverage from 2013-2016 in Ampibabo subdistrict reaches 98% .But the number of immunization targets does not match the intended target. This can be seen in the graph below:

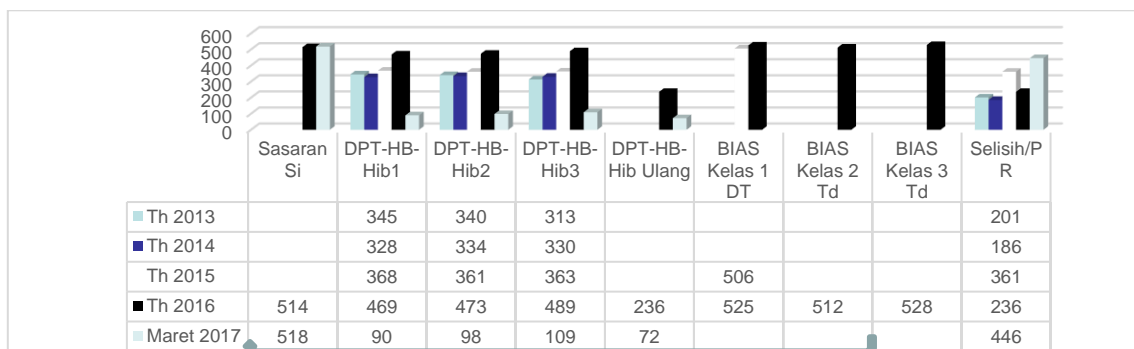


Figure 2. Analysis of DPT Immunization Achievement of Ampibabo Public Health Center in 2013-2017

2) Community knowledge

Society has not recognized diphtheria disease, because the disease is the first time it occurs in the area, so the disease is considered a common disease that is not endanger.

3) Cold Chain Management

Information of ice temperature obtained at Ampibabo Public Health Center based on temperature record book is 3-6°C. Vaccine storage also been in accordance with the criterion of storage. Perrelating temperature and

flower ice routine done every day and every week once. Storage of vaccine in cold chain also correct that stored in Freeze sensitive can not stand frozen. Cool chain conditions are also very good but the distribution process and the way the vaccine storage is still not according to the proper procedure.

DISCUSSION

Certainty of Diagnosis and Outbreak Determination

Diphtheria cases that occurred in the district. Ampibabo subdistrict of Parigi Moutong district is the first case of diphtheria. Based on the operational definition of diphtheria diagnosis, the case is a probable case with symptoms of swallowing pain, fever, and pseudomembrane. Determination of disease outbreaks in accordance with the book "Guidelines for Immunization and Surveillance Technical Guidelines for Disease Outbreaks" stated that one case of diphtheria (probable or confirmation) is outbreak and every outbreak should be addressed to reduce morbidity, mortality and transmission. In addition, cases of probable and diphtheria confirmation should be immediately addressed so that transmission can be stopped immediately.

The results of the laboratory inspection by health laboratory office showed that all of the germs of diphtheria were negative. Some things that can cause these results to be negative, such as antibiotics are antibiotics erythromycin before swabs and other bacterial development that can inhibit. Based on the results of the research on the occurrence of diphtheria outbreak in Cikalong Wetan, Cianjur district of West Java in 2011, only 6 positive cultures of 324 swab throat cultures, whereas there were 7 cases of diphtheria deaths at the time of the outbreak. Therefore, regardless of the results of negative laboratory or not, the case of diphtheria should be addressed properly in order not to spread and cause death.

Source and mode of Transmission

The case index in this case is thought to be the Mother of the Patient who is suspected of being a carrier. The patient's mother is suspected of transmitting to Patients Although there is no strong epidemiological evidence yet. However, based on the information from the local Health Department that the patient's mother had conducted a comparative study to the diphtheria endemic area in March 2017. The incubation period of diphtheria for 2-5 days, 2-4 weeks from the incubation period, while the period of transmission of carrier can be up to 6 months.

The research conducted by Setyowati (2011) shows that the factors that significantly influence the occurrence of positive diphtheria contact in Jember District are age with p-value 0.042 and closeness of contact with p-value 0.001. While the factors that most influence the occurrence of positive diphtheria contacts are closer contact with 12.4 times greater risk of diphtheria in home contact compared to the contacts of neighboring diphtheria, school friends and playmates⁽³⁾.

Countermeasures that have been done

a. Coordination

Coordination conducted by the Provincial Health Office of Palu and the District Health Office of Parigi Moutong has been correct. Coordination is done to confirm the case and prepare the planning before going down the field. Coordination also needs to be done to confirm truth information received. Coordination time should be done quickly and accurately after the report has been received by the health department. So that activities will be done in the field can be more optimal done.

b. Epidemiological Investigations

Epidemiological investigations are conducted with Interviews to be able to look for additional cases, case indices, how to spread cases, information about possible people who have been in contact with the patient. Interviews were carried out on patient's families and surveillance officers of Public health center.

The process of taking a swab is done in the throat and nose. Swabs are taken only in families who are homeless with sufferers. It certainly needs to be improved, because swabs are not only taken on close contacts at home, but also on close contact from the representation of neighbors, school friends, playmates, even the health workers handling cases swabs on close contact are performed after prophylactic administration, it is advisable to take the swab first before prophylaxis for bacteria to be detected. taking swabs on close contact is done after prophylactic administration, it is advisable to take a swab first before prophylaxis for bacteria to be detected. In addition, the availability of erythromycin at the public health center level also needs to be considered so that patients can receive eristromisin for free without having to buy in pharmacies.

Limited time during investigation so investigation is not maximal in case of additional search, considering the patient contact not only in the village where the patient lived but scattered in different villages and other districts.

c. Risk Factors

1) Immunization Coverage

Risk assessment is very important ie immunization status, intergrated service post not open routine, refrigerator temperature > 8°C, no village area, high population mobility. The findings on the immunization coverage of DPT 1,2,3 in Ampibabo subdistrict is quite good. The distance of the vaccine interval of at least 4 weeks is also in accordance with the guidelines for the implementation of immunization. Although Immunization coverage in Ampibabo subdistrict reaches 98% but large coverage does not reach the intended target. This can be seen from the same number of targets each year without increasing the number of target whereas every year the number of babies and toddlers in ampibabo subdistrict there must be an addition, so it still allows the presence of infants or toddlers who are susceptible diphtheria.

One study showed that although a toddler had been given full DPT immunization, when a child was one year older, as many as 80% had no adequate body defense against diphtheria bacteria⁽⁴⁾. To ensure long-term protection against diphtheria, at least 0.1 IU/mL of DPT immunization is required. This results in children aged 1-2 years are very susceptible to diphtheria, even for children aged 5-6 protection against diphtheria is not there. Boster DPT-HB-Hib is very important to give to children aged 18-24 months to provide additional immunity⁽⁵⁾. Therefore, the complete immunization of DPT needs to be properly considered in order to cover the intended target. Immunization coverage should be maintained high and evenly throughout the region. This aims to avoid the occurrence of enclave areas that will facilitate the occurrence of extraordinary events (outbreaks)⁽⁶⁾.

Research conducted by Isnaniyanti on Factors related to diphtheria events indicates that immunization factor is the most dominant factor that can cause the occurrence of diphtheria. This is in line with the research conducted sustainably that children with incomplete immunization status are more prone to suffer diphtheria than children has complete immunization status⁽⁷⁾.

The RCA results show that the Immunization and bias targets do not meet the intended target because immunizations are only children who are immunized while unrecorded or immunized children are not targeted for immunization. Of course this should be noted again considering the number of infants, children and toddlers every year undergoing a change. So it can really be sure children / toddlers protected from diphtheria disease.

Information obtained from the Immunization coordinator is known that Ampibabo public health center has routinely performed BIAS where before the BIAS Immunization team from the public health center will record the school students who are targeted by BIAS to calculate the need for vaccine. BIAS is done for immunization of DT in grade 1 and Td students 2 and 3. BIAS is conducted following the regulations of the Ministry of Health every November. Providing complete DPT will provide protection against the difetri. If there is a history of DPT then if the diphtheria attacked will only experience mild symptoms⁽⁸⁾.

2) Community knowledge

Knowledge is the result of knowing and this happens after people have sensed a particular object. Public knowledge about diphtheria is a knowledge level or known to include understanding, signs and symptoms, and prevention. Knowledge can be obtained from counseling, information from print media, electronic, etc. In general people do not know about the prevention of diphtheria. Based on the results of interviews on the community is not familiar with diphtheria disease because diphtheria cases in the Buranga village, Ampibabo subdistrict is the first time. Diphtheria can only be prevented by performing complete basic immunization. Therefore the community, especially mothers should be given knowledge about the prevention of diphtheria by immunization. A good immunization knowledge that a mother has will influence in deciding to complete her child's immunization status. Other studies show statistically significant test results and there is a relationship between maternal level and the importance of basic immunization with adherence to immunization in BPS Hj. Umi Salama in Kauman Village⁽⁹⁾.

Muryani (2011) study on mother knowledge of diphtheria associated with Pest Disease Prevention Behavior shows the result of relation between mother's knowledge level to behavior of prevention of diphtheria disease. This is consistent with the results of several studies in DIY that the occurrence of extraordinary (outbreaks) diphtheria shows that the behavior has a role of up to 30-35% of health status, including behavior of diphtheria prevention⁽¹⁰⁾.

3) Cold chain management

Based on Permenkes number 42 of 2013 on immunization implementation of vaccine distribution from public health center to service place is carried by using carrier vaccine filled with cool pack with the appropriate

amount. When distribution, the tool used also determine the quality of immunization service. Research conducted by Wisnuwijoyo and Prihatmo (2004) suggests poor cold chain governance will affect the efficacy of vaccines. It can be said that one of risk factor of immunization service quality is not optimal that is cold chain governance that is less. Based on interview result with immunization management officer at Ampibabo public health center that only have two vaccine carrier whereas other sub health center use thermos es to bring vaccine to integrate service post respectively. respectively. This could potentially lead to a vaccine being damaged. Immunization can not provide protection if the vaccine is not handled or stored properly⁽¹¹⁾.

CONCLUSION

There was one case of Probable diphtheria in Buranga village, Ampubabo subdistrict, Parigi Moutong district, Central Sulawesi province. Early prevention and detection efforts have been carried out in the case area. No additional cases found during Epidemiological investigation. The case index or transmission chain can not be determined with certainty, but the case of Probable Diphtheria is suspected to be transmitted from carrier carrier mothers based on the history of travel to the diphtheria endemic area.

Training for Health officers about Diphtheria, ways of taking swabs and management of Diphtheria. Cooperation with hospitals and private clinics for early detection of diphtheria and other potentially infectious diseases. Provide information to the public about the dangers of diphtheria, the way of treatment and prevention and the extension of the school to the importance of immunization during BIAS. Complete immunization status for children aged 1-3 years (screening), immunization for children aged 4-6 years (2 times) and Supplementary immunization to Buranga primary school children (school case) (all elementary school children) in Ampibabo Subdistrict (1 time). Improving surveillance system for early awareness of suspect cases of diphtheria (cases of fever accompanied by pain swallowing) and public health center/hospital immediately report the case to the District Health Office/city if found cases of Diphtheria suspect. Conducting ORI in Ampibabo subdistrict.

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