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Implementation of Dengue Hemorrahagic Fever (DHF) Case Reporting in Buleleng District

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ABSTRACT

Background: Reporting cases of Dengue Hemorrhagic Fever (DHF) based on case definition the Ministry of Health of the Republic Indonesia is a strategy to increase the ability to predict positive cases. Our study aims to examine the implementation of case reporting so as to improve the predictive ability of positive cases.

Methods: We conducted operational research at Kertha Usada General Hospital and Buleleng District Hospital. The sample is individuals diagnosed with DHF by a hospital having their address in Buleleng District and undergoing inpatient treatment at Kertha Usada General Hospital and Buleleng District Hospital in the first week of October 2021. We collected data through a review of medical record documents using a checklist.

Result: We evaluated among 10 cases, 6 cases (60.0%) of whom were over 12 years old and 7 cases (70.0%) were men. Based on clinical indicators, among 10 cases, all cases (100%) actually had fever between 2-7 days, 5 cases (50%) really had headaches, 4 cases (40%) really had abdominal pain and 8 cases (80%) actually vomiting. Based on laboratory indicators, among all 10 cases (100%) there was a decrease in platelets <100,000 u/L and in 1 case (10%) there was an increase in hematocrit >52%.

Conclusion : The positive predictive value obtained is 100% with very good positive predictive ability. Reporting cases based on the Ministry of Health of the Republic Indonesia case definition is expected to be carried out an ongoing basis because it can improve the ability to predict positive cases. Periodic training and technical guidance are required to equalize perceptions of case definitions so as to improve reporting quality.

Keywords: Dengue Hemorrhagic Fever; Case Reporting; Implementation.

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Introduction

Buleleng is the district with the highest DHF morbidity rate in Indonesia in 2020. The reported Incidence Rate (IR) in 2019 was only 251 per 100,000 population. This figure has doubled in 2020 which reached 512 per 100,000 population. Case Fatality Rate (CFR) from 2019 to 2020 also increased from 0.06 to 0.21% [1].

The target for successful dengue control in Indonesia is IR <49 per 100,000 population and CFR <1% [2] This target, when compared with the conditions that occurred in Buleleng District is still very far from the target for successful dengue control even though the CFR is below 1%. One of the national strategies currently being optimized is strengthening the surveillance system for early detection of dengue cases and outbreaks [3]. However, currently the performance of the DHF surveillance system in Buleleng District in predicting positive case finding is still low [4].

The ability to predict positive cases is one of the important attributes in a surveillance system known as Positive Predictive Value (PPV). PPV is the proportion of the population identified as cases by the surveillance system and in fact cases [5]. Surveillance with a low PPV will report many cases that are actually other diseases and not the target disease of surveillance. As a result, there is a waste of facilities and infrastructure, especially if the fake case is investigated as an outbreak [6].

PPV is closely influenced by the case definition. The case definition is one of the most important indicators in a surveillance system. The definition of dengue cases that currently applies nationally uses the standards of the Ministry of Health Republic of Indonesia in 2017 which adopts the DHF diagnosis criteria from the World Health Organization (WHO) in 2009 [3]. DHF surveillance at the Buleleng District Health Office has used the national standard case definition. However, DHF cases reported by surveillance network hospitals are still not in accordance with national standards. Several cases of DHF that were reported during the evaluation were found to be cases of Dengue Fever [4].

This condition can lead to over-reporting due to dengue fever cases being reported as cases of DHF, so it has the potential to cause errors in the preparation of the DHF control program plan. This can also lead to a pseudo-epidemic as the reported cases tend to exceed the expected number of cases. It is necessary to review the implementation of case reporting as a first step in controlling DHF [4]. The results of the study are expected to improve the predictive ability of positive cases so that it can reduce the morbidity of DHF [7]. Our study aims to examine the implementation of case reporting based on case definition the Ministry of Health Republic of Indonesia in 2017 to improve the predictive ability of positive cases.

Methods

Our research is an exploratory descriptive study that aims to describe the current reporting system and examine the potential that can interfere with system performance so that it can provide evidence to improve the performance of the case reporting system in the future.

We conducted research at the Kertha Usada General Hospital and the Buleleng District Hospital, which are surveillance network hospitals of the Buleleng District Health Office. The study was conducted from August to October 2021. These two hospitals are health care facilities that report the highest incidence of dengue fever in 2020. Buleleng District is located in the northern part of the Bali Island which has a tropical climate. [8]. The population of Buleleng Regency is 823,395 residents, consisting of 414,607 male residents and 408,788 female residents. [9].

Health services in Buleleng District are carried out by public health centers and hospitals. There are 20 public health centers consisting of 4 inpatient public health centers units and 16 non-inpatient public health centers units. There are 7 hospitals managed by the local government as many as 2 units, 1 unit managed by military agencies and 4 units managed by the private sector with 4 type D units, 2 type C units and 1 type B unit and all of them have emergency service capabilities. emergency level 1 (100%)[8].

The DHF control program in Buleleng District is implemented using the guidelines the Ministry of Health Republic of Indonesia in 2017. Since 2018, they have implemented these guidelines to conduct surveillance and investigation of dengue outbreaks. The case report uses the case definition of the Ministry of Health Republic of Indonesia in 2017 which was adopted from the DHF diagnosis criteria according to WHO in 2009.

The study population was individuals diagnosed with DHF by the hospital in October 2021 at the Kertha Usada General Hospital and the Buleleng District Hospital as many as 53 cases. Samples are individuals diagnosed with DHF by a hospital having their address in Buleleng District and undergoing inpatient treatment at Kertha Usada General Hospital and Buleleng District Hospital in the first week of October 2021. The samples were taken at simple randomness with 5 cases each at Kertha Usada General Hospital and Buleleng District Hospital. The case was then traced through a review of medical record documents.

We collected data on subject characteristics (age, gender), clinical symptoms and biomarkers of laboratory results through a review of medical record documents using a checklist by trained enumerators. Cases were studied regarding clinical symptoms and laboratory biomarkers. The clinical symptoms and the results of the biomarkers found were then validated using the case definition of the Ministry of Health Republic of Indonesia in 2017 to confirm the truth of the case. The definition of a DHF case from the Ministry of Health Republic of Indonesia in 2017 consists of fever up to 40°C lasting for 2-7 days, headache, abdominal pain, vomiting, platelet count <100.000 u/L, hematocrit increase > 20% from the baseline value, and or pleural effusion, and or ascites, and or hypoproteinemia albuminemia.

We trained four medical record officers to serve as enumerators for data collection. They were trained to evaluate DHF cases based on the Ministry of Health Republic of Indonesia in 2017 case definition. We did data entry using IBM SPSS version 22. Case findings were assessed using the Ministry of Health Republic of Indonesia in 2017 case definition indicator. Positive predictive value was assessed from the proportion of true positive cases based on the standards of the Ministry of Health Republic of Indonesia in 2017 among all samples. The presentation of the data is done using a frequency distribution

Result

Table 1. Characteristics of evaluated samples

Variable	n = 10 (%)
Age (years) median ± min-max	12,50 ± 1 – 45
< 12 years old	
≥ 12 years old	4 (40,0)
Gender	6 (60,0)
Male	
Female	7 (70,0)
	3 (30,0)

We evaluated among 10 cases, 6 cases (60.0%) of them were over 12 years old with a median age of 12.50 years, the youngest age was 1 year and the oldest was 45 years old and 7 cases (70.0%) were male

Table 2. Distribution of true positive cases based on the guidelines the Ministry of Health Republic of Indonesia in 2017

Number Case	Correct clinical indicators				Correct laboratory indicator	
	Fever 2-7 days	Headache	Abdominal Pain	Vomitting	Decrease in platelets	Increased hematocrit
1	True	True	False	False	True	True
2	True	True	False	True	True	False
3	True	False	True	True	True	False
4	True	True	True	True	True	False
5	True	False	True	False	True	False
6	True	False	True	True	True	False
7	True	False	False	True	True	False
8	True	True	False	True	True	False
9	True	True	False	True	True	False
10	True	False	False	True	True	False

Based on the clinical indicators of the 10 cases evaluated, all cases (100%) actually had fever between 2-7 days, 5 (50%) out of 10 cases did have a headache, 4 (40%) out of 10 cases really had abdominal pain, 8 (80%) of the 10 cases actually experienced vomiting and based on laboratory indicators, all cases (100%) actually had a decrease in platelets and 1 (10%) out of 10 cases actually had an increase in hematocrit.

Discussion

We found 6 (60.0%) of the 10 cases were over 12 years old. Our findings are in line with research [10];[11];[12] who also found the same thing that more people with DHF were teenagers to adults. This is due to the high mobilization carried out by adolescents and adults so that they are more susceptible to infectious diseases especially DHF [13].

We found 7 (70.0%) of the 10 cases were male. Our findings are in line with research [14] based on the results of a sero survey where the male population suffering from dengue was found to be 81.89% and women 78.19%. This is because male antibodies are genetically and hormonally less than optimal in producing immunoglobulins.

We validated case reports using the guidelines the Ministry of Health Republic of Indonesia in 2017, from 10 case samples used, all cases (100%) had met at least one criteria for

the main clinical symptom of DHF, namely fever and one main laboratory biomarker criterion, namely a decrease in the number of platelets below 100.000 u/L. Based on the results of the validation it was concluded that all cases (100%) were true DHF. The positive predictive value obtained is 100% with very good positive predictive ability. Our results are in line with research [15] who also found dominant clinical symptom in the case was fever and a decrease in the number of platelets and concluded it was a case of DHF based on the case definition the Ministry of Health Republic of Indonesia in 2017.

Conditions and realities in the field must prioritize patient safety. Reporting and diagnosis of cases using standard case definitions will be more effective if they can be synergized based on field findings so that theory and reality do not overlap and are expected to be flexible [16]. The implementation of a program there is often a discrepancy between the expected target and the results obtained. This is something natural and must be handled wisely so that the theory with field findings can be well received [17].

Hospital surveillance officers in reporting in the future are expected to have a good understanding of the definition of dengue cases. It is necessary to emphasize a good understanding, especially the duration of fever and the level of fever, for example in cases with a fever of 3 days but a temperature <38.5°C

including cases of Dengue Fever or DHF as well as assessment of laboratory results, especially the hematocrit value, because it is quite rare significant increase in hematocrit value in cases of DHF [3].

Surveillance officers can also strengthen the evaluation of cases before reporting by looking at the results of additional diagnostic examinations of patients such as chest X-rays that indicate pleural effusion, X-rays and ultrasound of the abdomen that indicate the occurrence of ascites and blood chemistry examinations that indicate hypoproteinemia or albuminemia [18].

Conclusion

Reporting cases using the case definition the Ministry of Health Republic of Indonesia in 2017 is expected to be carried out continuously because it can improve the ability to predict positive cases. The main challenge is the limited ability of officers to identify cases due to the unavailability of special officers who master surveillance issues, thus affecting the quality of reporting. Hospitals are expected to recruit epidemiological functional staff to carry out adequate surveillance and allocate a special budget for incentives to surveillance staff so as to increase motivation. Hospitals and health offices are expected to work together to conduct training and technical guidance on a regular basis to share the perception of case definitions.

Acknowledgement

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