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Evaluation of Implementation of Dengue Hemorrhagic Fever Surveillance

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ABSTRACT

Background: Dengue fever is still endemic in Indonesia. The government launched a DHF surveillance program. There was found some problems in the surveillance system, and the trend of dengue fever in 2016-2020 which had increased at the *Pusat Kesehatan Masyarakat (Puskesmas)* of Bantul II. This study aims to evaluate the implementation of DHF surveillance at the *Puskesmas* Bantul II. **Method**: This research is an evaluation of the CIPP model (Context, Input, Process, Product) with a qualitative-descriptive approach. This research was conducted in June-July 2021 at the *Puskesmas* Bantul II. Data was collected by interviewing 5 (five) informants. **Results:** The implementation of DHF surveillance at the *Puskesmas* Bantul II is based on input, human resources aren't skilled epidemiologists, officers still hold concurrent positions, and haven't received epidemiology/surveillance training. The infrastructure was complete, sufficient, and functioning properly. There is no specific allocation of funds for DHF surveillance. There are SOPs and surveillance guidelines, and DHF activities. Based on the process, the collection, processing, presentation, data analysis, and information dissemination have been carried out. The recommendations haven't been implemented. The Health Office provides regular feedback, monitoring, and evaluation. Based on the output, reporting once a month on time. But its aren't complete, some files are missing and damaged. **Conclusion**: The implementation of DHF surveillance at the *Puskesmas* Bantul II has been carried out, but several aspects of the input, process, and output do not match the indicators, so it affects the outcomes that are not in accordance with national standards.

Introduction

Dengue Hemorrhagic Fever (DHF) is an infectious disease caused by the dengue virus and transmitted through the bite of Aedes aegypti and Aedes albopictus mosquitoes as the main vectors [1]. This disease can affect anyone, both men and women, and generally affects children more than adults [2]. This disease causes symptoms of fever, red spots, dehydration, bleeding, shock, and death [3]. The transition of DHF in the last 50 years has changed from village to city, with an average of 50 million people infected with Dengue each year [4]. According to WHO data, Asia held 75 percent of the world's Dengue cases between 2004 and 2010, while Indonesia was the 2nd country with the most significant number of DHF cases among 30 countries with endemic areas. This distribution

is influenced by the tropical climate and Indonesia's two seasons, namely summer and rainy season, thus supporting the Aedes aegypti mosquito to breed quickly [5].

DHF cases in Indonesia in 2019 were reported as many as 138,127 cases [6]. This figure shows an increase compared to the previous year, namely, 65,602 cases [7]. Deaths from DHF also increased to 919 deaths with a Case Fatality Rate (CFR) of 0.67%. This number is almost 1%, a national standard to be called a high CFR [6]. D. I. Yogyakarta is a DHF endemic area with fluctuating cases yearly. Bantul Regency is one of the districts/cities with high DHF cases. In 2018 there were 182 DHF cases in Bantul Regency, then jumped up in 2019 to 1,424 DHF cases (IR 1.5%) [8]. Bantul sub-district is in the yellow zone with a range of 51-75 cases indicating the high number of dengue cases in the area.

Based on these DHF problems, the government launched various DHF prevention and control programs to be carried out in each region, including *Pemberantasan Sarang Nyamuk Mengubur, Menguras, Menutup* (PSN 3M-plus), 1-house 1-Jumantik movement, Fogging, and so on [9]. The program is supported by a surveillance system. DHF epidemiological surveillance is included in the managerial aspects of programs that play a role in the planning, monitoring, and evaluation processes of the DHF program being carried out [10]. The goal is to find out the disease trend and detect outbreaks of a disease so that the available data and information are accurate and valid [11]. Good implementation of surveillance will reduce the incidence of DHF because appropriate and effective prevention and control efforts are carried out based on the available information [12].

The implementation of surveillance activities is influenced by input, process, output, and outcome components [13]. Unfavorable components can affect the implementation of surveillance [14]. One study stated that surveillance personnel still hold concurrent positions, which causes the officers to be defocused on their work so that the results of the information are not optimal [12]. Other research mentions the lack of surveillance is the absence of computers and references to DHF, the number of staff, and educational qualifications that are not appropriate and have never received special surveillance training. Meanwhile, if the officer is trained, then the mastery of competence is good so that it will produce epidemiological information in accordance with the actual situation [15].

In the implementation of surveillance, the obstacle was that DHF data had not been analyzed due to officers' busyness or lack of understanding. The information obtained has not been disseminated [16]. This is caused by DHF information that has not been updated [17]. In addition, there are obstacles in the form of incomplete data, difficulties in accessing data, not being good at making decisions related to DHF control, and not being informative in presenting DHF data. It makes the surveillance system ineffective in reducing the incidence of DHF [18]. Delays in sending reports to the district/city health officials are also a weakness of the DHF surveillance system [19]. Inadequate surveillance implementation needs to be evaluated to obtain information effectively and efficiently in the form of assessment and planning from P2P program management [20]. Program holders will use the results of the surveillance evaluation to improve the surveillance system being implemented [21]. Evaluation is carried out based on input, process, output, and outcome components to obtain more comprehensive results so that it is known where the problems of a program are [14].

Based on the preliminary study, some information was obtained regarding the implementation of surveillance at the *Puskesmas* Bantul II. This information includes surveillance personnel who hold concurrent positions, inadequate qualifications of surveillance personnel, lack of completeness of reports, delays in reporting from other health units, and lack of dissemination of information to the public. Based on DHF data at the *Puskesmas* Bantul II, the trend of DHF in 2016-2020 had decreased in 2017-2018, but in 2019 it had increased 15 (fifteen) times from 2018, namely 75 cases. Then, in 2020 DHF cases increased again to 122 cases [22].

Based on the above trends, an increase in DHF cases from 2018 to 2020 has categorized the *Puskesmas* Bantul II as a DHF endemic area and has the potential for outbreaks. If the surveillance system in the area is running well, then the number of DHF incidents in 2019-2020 should be prevented. Failure to detect an outbreak early indicates that the surveillance system is not yet optimal [23]. In addition, it is known that the Larvae Free Index (ABJ) in the *Puskesmas* Bantul II area is still below the national standard (<95%), which was 85.1% in 2020. A study shows that houses, where larvae are found in water reservoirs, have a risk of DHF cases of 6.7 times compared to houses where

larvae were not found [24]. Based on these problems, the researchers were interested in evaluating the implementation of Dengue Hemorrhagic Fever (DHF) surveillance at the *Puskesmas* Bantul II.

Materials and Method

This study uses evaluation research with a qualitative-descriptive approach. The evaluation model used is CIPP, namely: Context, Input, Process, and Product. This research was conducted at the Community Health Center of Bantul II which is located at Geblag, Bantul Village, Kapanewon Bantul, Bantul Regency, D. I. Yogyakarta. The time of research was carried out in June-July 2021. The subjects of this study consisted of two informants, namely 2 (two) key informants: DHF programmers and surveillance officers, and additional 3 (three) informants: the chief doctor of *Puskesmas*, a Laboratory Assistant, and a staff of the Health Office of Bantul Regency. Data collection using interviews, observation, and documentation. The data analysis is an interactive model with data reduction flow - data presentation - data verification presented descriptively.

Results and Discussion

Results

The informants in this study consisted of 5 informants (2 main informants and three additional informants). Table 1 shows that all informants are female, with an age range of 30-54 years, and have worked for a range of 2.4-35 years. More details can be seen in Table 1.

Table 1. Characteristics of Main Informant

Informant Code	Age (year)	Last Education	Position	Years of Work	Informant Status
I1	30	Bachelor of Environmental Health	DHF Programmer	2.4	Main Informant
I2	33	Associate Degree-Nursing	Surveillance Officer	2.4	Main Informant
I3	43	Doctor	Head of *Puskesmas*	11	Additional Informant
I4	54	Associate Degree-Medical Laboratory Science	Laboratory staff	35	Additional Informant
I5	51	Bachelor of Epidemiology	P2P	27	Additional Informant

Human Resources *(Man)*

Based on the research, it was found that the *Puskesmas* Bantul II has DHF surveillance officers and programmers. Surveillance officer input and report data on potential disease outbreaks, including DHF. At the same time, the DHF programmer is responsible for data input to DHF reporting and prevention and control activities as a follow-up in handling DHF. However, surveillance and programmers coordinate with each other. As the following statement:

> *"I am the one who knows the DHF data; Ms. X (Surveillance) doesn't know about it." (I1)*

> *"…so surveillance is also part of the programmer. If surveillance takes care of the data, from that data, it needs follow-up. Well, the one who follows up is the DHF programmer. Later, we will share the data with DHF surveillance and programmers. So synergize, keep communicating with each other." (I5)*

The DBD programmer has an educational background in Environmental Health and holds concurrent positions as a sanitarian. Meanwhile, the surveillance officer has a nursing education background and holds concurrent positions as a nurse at the Medical Center of the *Puskesmas* Bantul II. The DHF programmer received DHF data input training in 2020 from the Bantul District Health Office, the Yogyakarta Provincial Health Office, and another training related to DHF activities. Training on the new reporting system in the form of SISKLB (Outbreak Application) is only taught to surveillance officers. Meanwhile, officers have not received training that builds epidemiology and surveillance competencies. As the following statement:

"The data input training has been completed, but the data processing has not. Training from the district health office in 2020." (I1)

"(There is) SISKLB from the district health office. (Besides that) no training has been given." (I2)

"Like yesterday, the SISKLB was held by Bantul, continuing training. So it's not just DHF (but also) other diseases that have potential outbreaks, for example, chikungunya, malaria, and others. But that's just the surveillance. That's why at the PUSKESMAS, the surveillance and DHF programmers have to go together." (I5)

The Health Office stated that during the COVID-19 pandemic, there was a shortage of human resources. Based on the results of observations, the DHF programmer was assigned as the COVID-19 vaccinator, which is currently being implemented. The impact is the implementation of PE and delays in DHF reporting. As the following statement:

"Then, during the COVID-19 period, there was a shortage of resources." (I5)

"Now if I WhatsApp, sometimes (they) immediately say they are vaccinating, ma'am. All right, what else can we do? We can't force (to immediately carry out PE and send reports), can we?" (I5)

Facilities and Infrastructure *(Material-Machine)*

Facilities and infrastructure for DHF surveillance activities at the *Puskesmas* Bantul II include laptops, Microsoft Office applications, printers, scanners, office stationery, telephones, vehicles, and forms. These facilities are privately owned and belong to the *Puskesmas*. At the same time, the infrastructure owned by the surveillance officer is used for other disease-prevention activities. As the following statement:

"There are no (facilities provided), (my) own laptop, (my) own cell phone, the vehicle is also private property. The Puskesmas has a laptop, you can use it if you want to borrow it, but it's not a special facility for DHF programmers. The scanner is in KIA and (section) registration, but (I) have never used it. There is a photocopy printer at the Puskesmas, but most of the time (we copy) it outside, then (we) pay." (I1)

"There is no SKDR, but there are other things. There are vests, cool bags for measles samples, GPS, boots." (I2)

The DBD programmer himself creates the report format. The format of the report is adapted to the guidelines consisting of the patient's name, age, gender, date of illness, date of hospitalization, date of return, name of the householder, address, village, the origin of KDRS (Hospital Early Alertness), diagnosis, date of PE (Epidemiological Investigations), and date of fogging. Meanwhile, the Health Office provided the PE and KLB (outbreak) report formats. Reporting has been transferred to the SISKLB application. As the following statement:

"There are daily, monthly, and yearly DHF reports. I made all the reports because the old DBD programmer used handwriting. There is no specific format from the Health Office. What's important is the name, date of illness, date of treatment, age, date of return, and origin of KDRS." (I1)

"There is a KLB (outbreak) report format file. Usually, if there is a KLB, we get a report from the agency because the community usually reports it directly to the office." (I1)

"There is no regular report format for the Health Office, only the PE format. Now there is SISKLB, so the Puskesmas should be able to do it, just put it in there." (I5)

Based on the interview results above, the Bantul District Health Office has facilitated the SISKLB application as a potential outbreak disease report that was only used in 2020. In addition, there is a Vector Surveillance System (Silantor) application made by the central government for vector control

reporting, including Larvae Free Index or *Angka Bebas Jentik* (ABJ). However, the Silantor application sometimes experiences system errors, so officers cannot input data. As the following statement:

> *"Yes, we have just started, ma'am. In 2020, we started using SISKLB, but it's still an experiment. In 2021, everyone used SISKLB." (I5)*
>
> *"Except for the ABJ report, ma'am. I often ask. Because recently there is also a SILANTOR system from the center (health office). What system it is (I am not sure), the vector one? They can input it themselves. However, sometimes there are errors, so finally, they sometimes send via WA or manually (paper), and I input (the data)." (I5)*

The Bantul District Health Office provided facilities for DHF activities, such as mini fogging, Abate (temephos), ovitraps, vests, and PSN (mosquito nest eradication) kits. These facilities are in the *Puskesmas* and used during the PSN implementation. As the following statement:

> *"I haven't had any books yet. I got mini fogging, vests, bags, Abate (temephos), dripping liquid for larvae, and ovitrap. If the Abate (temephos) is only for those who want to take it from the health office, if you don't take it, you won't get it." (I1)*
>
> *"The one who got Mini fogging and ovitrap was the previous DHF programmer, in 2018. I have never gotten it." (I1)*
>
> *"Yes, sure, miss. We have refreshing cadres, PE (Epidemiological Investigation), larviciding using Abate (temephos), fogging as well, specifically those that meet the criteria." (I5)*

These facilities and infrastructure function properly and are considered sufficient. If there is a shortage or damage, the officer will report to the facilities and infrastructure section and then submit it to the Head of the *Puskesmas* Bantul II for policy making. If the *Puskesmas* cannot decide, but these facilities are urgently needed, then the *Puskesmas* will submit a request to the Health Office. As the following statement:

> *"(If the facilities are lacking/damaged) later (will) report it. For example, the DHF programmer borrows a Puskesmas laptop, and then it breaks, then reports it to the goods manager. The goods manager reports to me, or the programmer reports directly to me (that also works)." (I4)*
>
> *"(Reporting) to the Health office is the next step. If the Puskesmas can't or can't afford it, then the infrastructure is really important, then report it to the health office." (I1)*
>
> *"Don't report directly to the office. Because we have a BLUD system. So we manage the finances ourselves." (I4)*

Target *(Market)*

DHF information at the *Puskesmas* Bantul II includes data on endemicity and distribution of cases. Case trends are only disseminated to the health office and the head of the *Puskesmas* in the form of a report. This information is also disseminated to local government, across sectors, and community cadres. However, the meeting was combined with other programs. As the following statement:

> *"(All reports) exist. Not disseminated, only to the health office and the head of the Puskesmas. So the form is just reporting." (I1)*
>
> *"(Programmer) presented to lintas sektor (across sectors). Every year, but this 2021 has never come out. Those invited in cross-sectors include villages, babinkamtibmas (area police), babinsa (area army), sub-districts, cadres, and health centers. It takes the form of meetings, power point presentations on the screen. It usually takes place at the end of the year." (I1)*

Funding *(Money)*

Surveillance and DHF activities at the *Puskesmas* Bantul II do not have a separate budget and are sourced from the Regional Public Service Agency (BLUD). The funds are used for reporting purposes, such as photocopying and buying paper, as well as cadre meetings and cross-sectoral meetings held with other programs. As the following statement:

> *"There is no separate budget. Most of the budget is for counseling, PSN, and then it is sometimes included in cadre meetings that are combined with other programmers, such as MCH (Mother and Child Health), surveillance, infectious diseases, and others." (I1).*
>
> *"There is a photocopy printer at the Puskesmas, but most of the time (we copy) it outside, then (we) pay." (I1)*
>
> *"There is no (special budget for DHF surveillance). Yes, all of the Puskesmas budgets are from the BLUD. Except head office. All of the Puskesmas' revenues are managed by themselves." (I4)*

The Regional Expenditure Budget (APBD) funds are given to the Health Office, which is used for refreshing cadres, monitoring and evaluation meetings, programmer training, PE facilities, and purchasing larvicides/insecticides/fogging materials, which are then given to the *Puskesmas*. As the following statement:

> *"Yes, from the APBD. Our activities at the service also include activities at the health center, Ms. For example, we have a monitoring and evaluation meeting, fogging (buying materials and paying operator), then buying Abate (temephos), buying larvicides, insecticides." (I5)*

The funds are considered sufficient because DHF activities are community empowerment. When carrying out PSN (Mosquito nest eradication), the local sub-district provides the funds. As the following statement:

> *"As for PSN, the budget comes from the village." (I1)*
>
> *"(The funds) are sufficient. Because DHF depends on the case, Ms. If there are a lot of (cases), then we don't have enough (funds), but if there are few (cases), we have a lot left. It's fluctuating, ma'am. So there are no funding constraints. Because DHF is a lot of empowerment." (I5)*

Method

The Standard Operating Procedure (SOP) at the *Puskesmas* Bantul II adjusts DHF surveillance and activities. The SOP consists of surveillance SOP, Epidemiological Investigation (PE) SOP, and fogging SOP. Another program is the 2014 Dengue Hemorrhagic Fever Control Module by the Ministry of Health. As the following statement:

> *"It exists, it's KAK (Terms of Reference) of PSN, DHF profile. For the SOP, (we) go straight to the environmental health section and surveillance as well." (I1)*
>
> *"Yes, SOP of PE until it is followed up by fogging. In Bantul, it's only one cycle, meaning only one fogging and it's done. If it's two cycles, (fogging is done) once and then repeat it for the second time." (I5)*
>
> *"The guideline, (we) use the one from the Ministry of Health." (I1)*

Process

Data Collection

The DHF programmer collects data both actively and passively. Active data collection by conducting PE (Epidemiological Investigation). At the same time, passive data collection is carried out by obtaining reports from the laboratory results of *Puskesmas*, clinics, and hospitals. Epidemiological investigations are carried out by the DHF programmer during periodic inspections of larvae at least once a month or when the programmer receives reports of DHF sufferers from the public or the health office. As the following statement:

"The ones who do PE are me and Mr. X (Sanitarian), but most of the time it's me. This year 6 times. Yes, I make at least once a month. I go around for doing PE." (I1)

"Usually PSN and PE. But there could also be a report from the community to the village head. The village head told the Puskesmas. The Puskesmas asked the village head of the patient if he had been hospitalized yet, had he checked the lab yet, and could see the lab results or KDRS. Usually, when hospitalized, the lab results are already there." (I1)

"For example, if there is a community report saying there are many cases in their area, then I will check with SISKLB. If it isn't there yet, I will remind the Puskesmas and ask to do PE." (I5)

The programmer will contact the hamlet to find out the patient's inpatient status and laboratory results. The investigation was carried out by looking for risk factors for DHF in sufferers. If the source of infection is suspected from the patient's house, the programmer will investigate 20-30 houses around the patient's residence. However, suppose the transmission source is suspected other than the patient's home environment. In that case, the officers will investigate ten houses around the patient and the suspected transmission source. As the following statement:

"PE is asking patient X; went to the house and asked where the patient got DHF. Because previously, there were cases obtained from camp activities. Then do PE neighbors 10-20 houses. If the infection is from around the house, it's (PE) 20-30 houses. But if you roughly get it from outside the house, it's only 10 houses around patients who were investigated (PE)." (I1)

"When doing PE, check the bathroom. If there are larvae, they will be given an Abate (temephos), continue with a short education, and told to do 3M plus." (I1)

During the COVID-19 pandemic, the *Puskesmas* conducted PE directly in the field or online (WhatsApp) according to the area's conditions. The obstacle faced is that some residents refuse to be visited because they work at the same time or are afraid of exposure to COVID-19. This can be known based on the following interview results:

"Still (doing PE), sis, some of them are (done) directly. (Employees) at the Puskesmas, who knows. It (PE) can still be done if it's a green zone. But if it's a red zone, then the PE (will be done) online. Then the PSN (is done) independently. So (we) asked the cadres to check each other's houses, the G1R1J, and then sent them to the Puskesmas via WA (WhatsApp)." (I5)

"The problem is if the person (host) is at work. PE is done during working hours, right? Especially now with COVID-19, so when people are visited they are afraid. They think we bring disease or want to isolate people. Sometimes someone is at home, the maid, or the babysitter, so they refuse because they don't have permission from the house owner." (I1)

If the programmer finds residents suffering from typical symptoms of DHF while carrying out PE, they will be directed to go to the nearest healthcare facility. The programmer only enters DHF data according to laboratory results. This can be known based on the following interview results:

"Coincidentally, we have never met one. The ones we have been visiting have never had symptoms. But even if there are (those suffering from DHF), we tell them to refer them to the nearest health facility. So if someone has symptoms of DHF, then the environment is suitable for (the development of DHF), the house looks unhealthy, for example, there are lots of larvae, they are told to refer them to the health facility. So if that's still an assumption, we won't include it. What we put in is the one with KDRS." (I1)

Passive data collection was obtained from laboratory results information from the Hospital (KDRS). KDRS originates from patients who are being treated or patients who are referred to the hospital by the community health center. Patients who come to the community health center will have a clinical examination by a doctor. If the patient has typical symptoms of DHF, laboratory tests (DLO, NS1, and IgM-IgG) are performed. The laboratory assistant conveys the results to the doctor.

If the clinical symptoms are not good, signs of dehydration, and laboratory results show that the platelets are less than 103 ml, then they are referred to the hospital. As the following statement:

> *"(Patients) come, register, are screened, see a doctor, take anamnesis and physical examination. If it leads to DHF, it can be checked in the laboratory. There are two laboratories, NS1 can check complete blood or IgM IgG if it's already the 5th day." (I4)*
>
> *"But we have two methods. Use the NS1 for the rapid test and sismax to count the platelets. For NS1, the designation is different. It's for antibody testing, but for DLO (sismax), it's for platelet testing. So it's a different designation." (I3)*
>
> *"We'll see the lab results, whether they meet the referral or outpatient treatment criteria. if the clinical symptoms are bad, signs of dehydration, the lab results of platelets are down to less than 100, or there is an increase in hematocrit of more than 20%, then be hospitalized (refer)." (I4)*

Doctors communicate with surveillance and programmers after it is known that there is a DHF patient. As the following statement:

> *"Yes, obviously. If there is DHF, there must be communication with the DHF programmer. The programmer also communicates to the surveillance." (I4)*

The referred patient will be rechecked in the laboratory. The results will be submitted to DHF programmers in the form of KDRS via online (WhatsApp group) consisting of DBD programmers at *Puskesmas*, hospitals, P2P Health Office, and Bantul surveillance. As the following statement:

> *"For example, the platelets drop, then they are referred to the hospital, then if they are positive for DHF, then there will be feedback from the hospital. If there is feedback, then it is returned to the DBD programmer." (I3)*
>
> *"We have a group. There are various hospitals in Bantul, in Yogya too, but not all. If later there is KDRS it will be photographed and then shared through the group. The hard file will come later." (I1)*
>
> *"The group's contents are people from the Puskesmas, so as soon as a KDRS comes in, all the Puskesmas know. Then it's clear there is (name) of the village, so the Puskesmas in question has recapitulated itself. I also recorded myself." (I5)*

The obstacle in data collection was the KDRS hard file which was sometimes late. The hospital would send the soft file online, which would affect data input. As the following statement:

> *"No, it's just that sometimes the WA (WhatsApp message) comes first, and the hard file comes last. It will affect the input. The problem is when the health office asks for it, but we don't have the files. It's a hassle." (I1)*

The DHF programmer enters data into the computer (Microsoft Excel). Programmers cannot yet operate the SISKLB application because the training was only given to surveillance officers. DHF data is inputted into the SKDR by the surveillance officer. As the following statement:

> *"(input to SKDR) with code a90" (I2)*
>
> *"Yes, I input it into Excel." (I1)*
>
> *"In the past, Miss X (Surveillance) participated in the training. I haven't been taught yet because Ms. X is busy, right? So there is no time to teach me yet." (I1)*

Data processing

Surveillance officers only collect DHF data, while data processing and handling are left to the DHF Programmer. As the following statement:

> *"(Data processing to handling) That's the job of DHF Surveillance (DHF programmer)" (I2)*

DHF programmers process data once a month in the form of descriptive processing based on age, hamlet, village, diagnosis, PE, fogging, and case deaths. The results of data processing are then presented. As the following statement:

"Yes. I immediately categorized it because the Head of Puskesmas and the Health Office ask for it every month. (They) don't always ask for it, it's just like I'll send it automatically. (I sent) to the head of Puskesmas, the health office, and myself for archives." (I1)

"Based on hamlets, villages, those in PE, fogging, the diagnosis. It depends on the request from the Health Office. For example, how many from DF, DDF, DSS, and how many deaths. If the Kapus (head of Puskesmas) requests it, it's usually based on age group, hamlet, village." (I1)

Data presentation

DHF programmers present data using a computer (Microsoft excel) once a month in the form of tables and graphs. The previous DHF programmer made a data presentation in the form of a map. The results of the presentation of the data are reported to the Health Office and the Head of the *Puskesmas*. As the following statement:

"Often made tables, graphs. In the past, Mr. X (a former DHF Programmer) made the map, I've never made one before. The recap must be included in the profile if the report must be requested every month. use excel, I will report the soft file." (I1)

"Routine once every one month. In excel form. The data is by name, address, hamlet, per village, all of them." (I4)

Data Analysis

The DHF programmer performs data analysis independently (only for himself) but is not written into the report. In this analysis, the DHF programmers found that there was an increase in cases in Ringinharjo Village from 2020. The DHF programmers also found that DHF cases increased during the rainy season, but sometimes in the dry season, there are also DHF cases. As the following statement:

"In terms of self-analysis, yes, but if I put it in writing, no." (I1)

"From 2020, (DHF cases) in Ringinharjo have increased. (the season of transmission) is during the rainy season, but (transmission) is also uncertain, sometimes in the (season of) rain, sometimes in the (season of) heat. The month is also uncertain." (I1)

It was confirmed by the Bantul District Health Office, which stated that the season of transmission in Bantul is the dry and rainy transitional season. So countermeasures are carried out in March, July, and October. As the following statement:

"That's the season when it's going to be rainy, and it's going to be dry. And rainy season. Yes December, January, and February. The treatment is if we refresh the cadres, we will go to that month, ma'am. There are three times (March, July, and October). Well, that's what I did. I also put "gertak" (simultaneous movement) there too. So it is hoped that the environment will be clean in March when it is going to rain." (I5)

Based on the analysis results, DHF Programmers carried out the same treatment for the three villages: education to carry out PSN at their respective homes. As for the villages with the highest cases and the lowest ABJ, DHF Programmers routinely give Abate (temephos) to community cadres. As the following statement:

"The treatment is the same in the three villages that I did. But the fastest cadre among those I explained was Sabdo. Usually, if I give info or give advice, Sabdo does it right away. In Ringinharjo, it's just normal. Special treatment for Ringinharjo, I still give them Abate (temephos). But they answered that they hadn't used it yesterday, why did they give it again? So they really don't use the Abate (temephos) they are given." (I1)

The obstacle faced in dealing with DHF is the lack of public awareness of adopting a clean and healthy lifestyle. People tend to choose to fog rather than cleaning up their surroundings. As the following statement:

> *"Nothing, I'm just confused about how to build public awareness for a clean and healthy life." (I1)*
>
> *"It is difficult to raise awareness among the public not to fog carelessly. So sometimes it's okay. Just let it be. What's important is according to (rules), (if) there is a case, do a PE, if the data meets the criteria for fogging, then it's fogged immediately" (I5)*

In fact, several community institutions carried out illegal fogging without prior notification to the *Puskesmas* or Health Office. As the following statement:

> *"Sometimes the fogging comes directly from the health office, sometimes the Puskesmas doesn't know. But now it seems more stringent for fogging regulations." (I1)*
>
> *"Because, fogging out there is free to do is, from B*** (NGO) there is actually (fogging done) maybe it wasn't the Health Office that held it, but from the NGO." (I5)*

Interpretation and Recommendation

Interpretation is carried out by the DHF programmer independently while analyzing the data. The DHF programmer will provide a report to the Head of the *Puskesmas*. Then, recommendations are given by the Head of the *Puskesmas* at the Leadership Coordination Meeting once a month at the Bantul District Health Office. As the following statement:

> *"Usually I don't analyze that in detail, it's usually the Head of the Puskesmas. I report it every month." (I1)*
> *"There is a Rakorpim, a leadership coordination meeting. Leadership means each head of the Puskesmas comes. It discusses the essential problems of the Puskesmas, once a month it is held." (I5)*

Information Dissemination

The DHF programmer reports DHF data with the following contents: name, age, gender, address, symptoms, date of onset of illness, date of treatment, date of return, laboratory results, and recovery status. The report is given to the Head of the Community Health Center and the Bantul District Health Office, Section P2P DHF Programmer once a month via email. As the following statement:

> *"If I schedule it myself, it's the 1st. So if it's been sent, we'll take a screenshot of the email. Because sometimes the Health Office doesn't know if we send it because it's hidden, you can't see it. All data sent includes by name, by address, including data processing. (I1)*

DHF programmers also disseminate information through meeting forums to cross sectors, including district government, sub-district government, BABINSA, BABINKAMTIBMAS, and community cadres. The meeting was held together with other programs from the *Puskesmas* Bantul II. As the following statement:

> *"(Programmers) presented across sectors. Every year, but in 2021 it never came out. Those invited across sectors were villages, Babinkamtibmas, Babinsa, districts, cadres, and health centers. It was a meeting, a PowerPoint presentation on the screen. That's usually at the end of the year." (I1)*

In addition, surveillance officers report weekly data (W2) every Monday via SMS, email, and the EWARS application. As the following statement:

> *"Once a week every Monday. There is a format to send." (I2)*
> *"using e-wars, will be sent via sms or email" (I2)*

Feedback

The Bantul District Health Office provides feedback to the *Puskesmas* through a monthly forum meeting, through a Leadership Coordination Meeting. As the following statement:

> *"There is a Rakorpim, a leadership coordination meeting. Leadership means that each head of the Puskesmas comes. It discusses the essential problems of the Puskesmas, once a month it is held." (I5)*

In addition, the Health Office also conducts DHF monitoring and evaluation as feedback to discuss DHF disease trends and provide new information related to DHF developments, innovations, and activities. Monitoring is carried out every three months. As the following statement:

> *"We do monitoring and evaluation every three months to give feedback. We invite officers. This year only 3 times, ma'am. If we can't meet face to face, we'll take a photo and then send it via WA (Whatsapp), 'here's your data,' that's how it's done. If the monitoring and evaluation discuss DHF data, for example, the most data, then they will answer. Or new information invites from provincial officers. Or there is a new system." (I5)*
>
> *"Other training is often held, about Wolbachia, DHF data every 4 months. Every year 4-5 times." [11]*

Output

Report completeness

DHF reports at the *Puskesmas* Bantul II are daily, monthly and annual reports. All reports are computerized. As the following statement:

> *"There are daily, monthly, and yearly DHF reports. I made all the reports because the old DBD programmer used handwriting. There is no specific format from the Health Office. What's important is the name, date of illness, date of treatment, age, date of return, and origin of KDRS." (I1)*

Data reports on DHF sufferers are available from 2016 to 2021. Meanwhile, ABJ reports are available from 2019 to 2021. It is because the DHF programmer previously inputted data manually (handwritten). Some data is missing and cannot be read so that data cannot be re-entered. As the following statement:

> *"I have e-data from 2019 because Mr. X (former DHF programmer) used to handwrite on a lot of paper. I also recapitulated the DHF of 2016-2018, I input them into Excel. Some of them are not clear, and the writing is not complete either. It's in the warehouse now." (I1)*

Report accuracy

DHF programmers schedule their DHF reports via email on the 1st of each month. The Bantul District Health Office does not provide a specific schedule/time limit for submitting reports. As the following statement:

> *"I scheduled it on the first [1]. So when it's sent, we'll take a screenshot of the email." (I1)*
>
> *"The Health Office doesn't give a specific schedule." (I1)*
>
> *"SISKLB is available at any time. You can enter data at any time. It can also be daily." (I5)*

DHF programmers are rarely late in submitting reports to the Health Office. If the programmer is late in submitting his report, the Health Service will contact and remind him via WhatsApp. As the following statement:

> *"Usually, (they are) diligent ma'am. If (they) haven't filled in (SISKLB and Silantor), I'll ask (via WhatsApp) ma'am." (I5)*

Outcome

Incidence Rate of DHF

The DHF programmer calculates the Incidence Rate per village every month. As the following statement:

> *"I make it, every month, but if it's requested. Usually it's Mrs. X (Head of Health Center) who asks" (I1)*
>
> *"Yes, of course, because it is the main performance indicator, Ms. It is calculated per year, how many (numbers) are IRs. But for every evaluation, we also (count) IRs, these are IRs until this month. That's IR in Bantul. The Puskesmas will also calculate the IR according to each population for their evaluation." (I5)*

Based on the calculation results, the area with the highest Incidence Rate in 2020 is Ringinharjo Village with a total of 677 per 100,000 residents. It supports the calculation results of IRs throughout Bantul Regency in 2020, which are above the national standard, which is 127.99 per 100,000 population.

***Case Fatality Rate* of DHF**

The DHF programmer calculates the CFR (Case Fatality Rate). Based on calculations, the area with the highest CFR in 2016-2020 is Bantul Village (1.67%). Meanwhile, in other villages, there were no cases of death. These deaths occurred at a young age. As the following statement:

> *"Yes, most of the people who died were children" (I1)*
>
> *"(In Bantul Regency) now there are adults (who have died), but sometimes when the adults are audited it turns out that the cause is not DHF. So, if there is a death case, it must be audited first." (I5)*

Free Larvae Index (FLI) or *Angka Bebas Jentik (ABJ)*

The DHF programmer calculates the FLI for each village. Based on the calculation results, the area with the highest average FLI is Sabdodadi Village (86.86%). These results have increased since 2019. As the following statement:

> *"(FLI) has increased. it was the first beginning, astagfirullahaladzim (Forgive us, God). The worst is Ringinharjo. Each house must have larvae." (I1)*

Outbreak of DHF

The *Puskesmas* Bantul II has never experienced an outbreak of DHF. It was confirmed by the Health Service that the last outbreak occurred in 2010 due to a very significant increase. As the following statement:

> *"not yet. As long as I'm here, there haven't been any outbreak cases." (I1)*
>
> *"Now there isn't any. The last one was in 2010. If there are two increases, it means every day of an outbreak, ma'am. Because DHF is already a common problem, it's already endemic here. There are cases every day. The year 2010 was due to a high increase, a lot. Before 2010 there were fewer than 1000 cases. Now there are more than 1000. Now there is no five-year cycle." (I5)*

Discussion

Human resources are the main actors who play a role in a program to achieve program objectives [25]. The results showed that DHF surveillance at the *Puskesmas* Bantul II was carried out by DHF Programmers who coordinated with surveillance officers. It causes overlapping of duties, principles, and functions as surveillance.

There is no clear definition of the duties of DHF programmers as DHF surveillance and the surveillance officers themselves. Each program's duties, principles, and functions have not been listed in the KAK (Terms of reference) of the Prevention and Management of Infectious Diseases [26]. It is evidenced by programmers who do not carry out DHF SKDR and in-depth studies related to the

causes of DHF in their working areas. The division of tasks is a must and absolutely necessary to avoid duplication, work delays, implementation deviations, and work slack at one point [27].

Based on educational background, DHF programmers are environmental health workers, and surveillance officers are nurses. It is not in accordance with KMK No 1116/MENKES/SK/VIII/2003, which states that surveillance personnel at the *Puskesmas* level consist of one [1] skilled epidemiologist [11]. However, these programmers and officers have technological capabilities that support computerized data collection and processing in DHF surveillance activities. The ability to process data with a computer will produce appropriate, accurate, and useful information for the organization/agency [28].

Due to his educational background, the DHF programmer also holds a sanitarian position, so he is not optimal in fulfilling his duties as DHF surveillance. It is proven by the tight time spent in the field until the afternoon, such as taking water samples, carrying out surveillance in Public Places (TTU), and carrying out PE (epidemiological investigations). The number of tasks and responsibilities given to employees can increase workload and have an impact on less than-optimal results achieved because employees only have a little time to complete them [29].

Then, DHF programmers only ever participated in DHF data input training. The new reporting system training in the form of SISKLB held by the Bantul District Health Office was only attended by surveillance officers. It causes DHF programmers to have not mastered the reporting system. In addition, surveillance officers also have never received special epidemiology and surveillance training. Training for surveillance personnel is needed to support the skills of officers in the field [30].

The DHF surveillance problem that occurred during the COVID-19 pandemic in Bantul Regency was a lack of human resources, which affected the fulfillment of their duties, both in data input and reporting, as well as in prevention efforts, such as epidemiological investigations into the area. A deficit in health workers will create a high workload for SDMK (human health resources) and affect service quality [31].

DHF surveillance facilities and infrastructure at the *Puskesmas* Bantul II come from the private sector, the health center, and the health office. The infrastructure is deemed adequate and functioning properly. Reporting on poorly or damaged infrastructure is structured and has a clear flow. It is in accordance with KMK No 1116/MENKES/SK/VIII/2003, which states that at the *Puskesmas* level, there are computers and equipment, communication devices (phones), reporting forms, surveillance equipment (printers, scanners, photocopiers), transportation facilities [11].

The Bantul District Health Office has created an application for reporting potential outbreaks of disease cases called SISKLB and Silantor. The health office has conducted SISKLB training for *Puskesmas* surveillance officers and Silantor training for DHF programmers. It causes a problem where the surveillance officer has not introduced the application to the DHF programmer so that the DBD programmer cannot operate it and is still reporting DHF manually (Microsoft Excel). The use of applications for DHF cases that are less than optimal has an impact on DHF cases that are not properly monitored.

The use of technology in health services produces several positive impacts, namely accelerating the performance process of *Puskesmas* staff, increasing the effectiveness and efficiency of performance, and disease data organized and properly systemized. However, the use of technology has obstacles to the internet network and officers who are technologically illiterate [32].

Based on the results of the research, programmers have routinely disseminated information on DHF to the Head of the *Puskesmas* and the Bantul District Health Office in the form of a report. In addition, information is disseminated to cross-sectoral and community leaders. It is in accordance with KMK No. 1116/MENKES/SK/VIII/2003, which states that information needs are given according to the user [11].

Programmers have not yet provided information regarding trends, distribution, and determinants of DHF cases to the public in general. Programmers only provide education to health cadres, which is then conveyed to the community. Surveillance information needs to be provided to the community so that they understand the problems that exist in their area and participate in overcoming them [33].

There is no specific allocation of funds for the implementation of DHF surveillance at the *Puskesmas* Bantul II. If the DBD programmer organizes an activity that requires funds, then the funds come from the BLUD. The *Puskesmas*, as a BLUD, has the opportunity to improve its health services to the community by managing income and spending funds independently [34].

Based on the results of this study, funding for DHF surveillance is still not in accordance with KMK No. 1116/MENKES/SK/VIII/2003 which states that there is a budget for DHF surveillance. However, the *Puskesmas* has no budget/funding constraints, this is evident from all activities being carried out properly. The allocation of funds can be used to provide infrastructure to optimize health services [35].

DHF surveillance at the *Puskesmas* Bantul II has an SOP. This is in accordance with KMK No 1116/MENKES/SK/VIII/2003, which states that *Puskesmas* must have SOP for DHF surveillance. With an SOP, activities can be well designed and carried out correctly, precisely, and consistently to achieve the goals set previously [36].

The other guideline used is the 2014 Guideline Control Module from the Ministry of Health. The printed book was given to every programmer at the *Puskesmas*, but after changing the programmer, the book was lost and was not given back by the Health Office. However, this is not a problem because the DHF programmer has a manual in the form of a soft file.

Data collection is the most important thing in surveillance activities because the resulting information is determined from the data collected [33]. The results showed that data collection at the *Puskesmas* Bantul II was carried out actively and passively. In the data collection process, several medical personnel such as doctors and nurses play an important role in determining the diagnosis, and laboratory assistants carry out examinations until the patient is tested positive for DHF. It affects passive data collection.

DHF data at the *Puskesmas* Bantul II is sourced from KDRS. Programmers are facilitated by the existence of technology in the form of WhatsApp so that delays in printing KDRS can be sent in advance in the form of a soft file. KD/RS reports must be reported within 1x24 hours. KD/RS delays can result in delays in data processing and analysis and less than optimal dissemination of information by surveillance to related parties [37]. One of the obstacles that caused KDRS to be disseminated late was that the Director of the Hospital/Head of the Department had not signed it yet. This is related to administrative issues [18].

Programmers also collect data by conducting PE (epidemiological investigations) when there are reports of DHF cases in their work area. Based on Permenkes No. 1501/MENKES/PER/X/2010 Epidemiological investigations are carried out in accordance with the development of the disease and the need for epidemic control efforts so that an overview is known, the groups of people who are threatened, the causative factors, and the right way of handling it. Programmers do PE at least once a month, which means it is in accordance with the guidelines [11].

After collecting data, then the data is processed to produce information. This process is very important because unprocessed data will not produce any information and cannot detect a case of disease early [33].

Programmers have been processing DHF data once a month. Then the results of the processing are given to the Head of the *Puskesmas* Bantul II and the Bantul District Health Office. This is in accordance with the guidelines which state that after data collection is carried out, data processing is carried out [11].

Programmers only do data processing descriptively based on Time, Place, and Person (WTO). Analytic data processing has never been done. Analytical data processing with statistics can determine the factors that cause DHF in the *Puskesmas* Bantul II more specifically. The processing results can be used for more efficient, effective, and targeted countermeasures [38].

Data processing directly affects the countermeasures carried out. The results of this study stated that the treatment carried out in each village and from time to time was the same. The absence of specific countermeasures is probably due to the unclear factors that cause DHF. Thus, data processing which was only descriptive, indirectly affected the fluctuating incidence of DHF and the ABJ (free larvae index) results which were still below standard.

The programmer presents the data according to the processing, namely using tables and graphs. Presentation is also done once a month to adjust data processing. This is according to the guidelines: presenting data after data processing [11].

Presentation using tables and graphics makes it easier for readers to understand information and reduces misinterpretation [39]. Programmers do not present data with maps. Meanwhile, people tend to be attracted to easily understood and visualized information. The distribution of cases based on location in geospatial form can be visualized using a map [40].

The programmer performs data analysis independently and is not included in the report. The analysis carried out is about the season of transmission and the trend of cases in the work area. The programmer performs an analysis based on the processed and presented data. This is according to the guidelines: conducting data analysis after presenting the data.

Based on the study results, the transmission season that occurred in Bantul was during the rainy and dry transitional seasons and the rainy season. However, along with climate change, dengue transmission can occur anytime. The existence of uncertainty in determining the season of DHF transmission may be influenced by the not yet processing of distribution data based on time in the form of a maximum-minimum pattern of DHF cases. The transmission season can be determined using the maximum-minimum pattern. Cases will form a pattern where the most frequent cases gather at several points in time [17].

The results showed that the trend of dengue cases increased from 2018-2020 to 122 cases. The increase in DHF cases was followed up by PE and larvae inspection. Then do PSN 3M plus. However, this activity was hampered during the COVID-19 pandemic, so PSN was carried out independently. This is difficult to do if the community, cadres, and local government do not cooperate.

Another problem is the high demand from the community for routine fogging. This is exacerbated by the existence of several community organizations that carry out illegal fogging without prior notification to the *Puskesmas* or Health Office. Meanwhile, the *Puskesmas* and the Health Office conduct fogging based on the SOP of PE. Based on PE guidelines, fogging is carried out if there are one or more DHF sufferers with/or three suspected dengue infections and larvae (= 5%) are found in an area [41]. Excessive use of fogging can have a resistance effect on mosquitoes [42]. Resistant mosquitoes are more difficult to kill [43].

The programmer performs independent interpretation as well as analysis. The programmer did not provide specific recommendations but reported directly to the Head of the *Puskesmas* and the Bantul District Health Office. This is not in accordance with the guidelines, which state that surveillance officers must make interpretations and recommendations based on available information.

The party giving the recommendation should be a person who is an expert in their field [44]. In this study, those who are entitled to provide recommendations are DHF program holders who know more about DHF data. However, DHF programmers haven't implemented it yet. Important recommendations are conveyed to related parties in efforts to overcome or improve health programs [44].

The programmer reports to the Head of the Health Center and the Bantul District Health Office once a month on the first day of the month. The report is provided in Microsoft Excel via email and Whatsapp. This is not in line with the District Health Office's statement that data reporting uses the SISKLB system, which is reported as soon as there is a case. The existence of incompatibilities in the data reporting system causes the accuracy and validity of the data to decrease. The reporting system must be integrated so as to minimize data errors [45].

Programmers also disseminate information across sectors. However, its implementation coincides with other programs. This causes a lack of focus on resolving DHF problems with cross-sectoral and community leaders. Meanwhile, the role of government, policymakers, and society are needed in optimal DHF vector control [46]. In Green's theory, it is stated that a person's healthy life behavior is influenced by enabling factors (health workers) and reinforcing factors (people's behavior) [47].

The feedback provided by the Bantul District Health Office took two forms: the Rakorpim (Leadership Coordination Meeting) and evaluation monitoring. This is in accordance with the guidelines that the Health Office at the District level provides feedback to the *Puskesmas* level.

The Rakorpim is held once a month by inviting the chairman (Head of the *Puskesmas*) and discussing essential issues in his working area. So that the discussion that was carried out did not only focus on DHF. In Coordination Meetings, leaders can exchange information regarding new problems and the countermeasures undertaken to add insight into making a policy. The role of the Head of the *Puskesmas* in DHF prevention as a decision maker [48]. In making decisions, the Head of the *Puskesmas* must pay attention to all aspects because the programmer will implement the decision [49].

Meanwhile, monitoring and evaluation are carried out every three (3) months by inviting programmers and discussing specific problems of DHF. This activity is used to discuss and resolve DHF problems in their working area. Monitoring and evaluation are important to be carried out to find out the achievements of a program in accordance with the objectives that have been planned [50].

Solving problems using the discussion method provides several benefits, including 1) assisting in making decisions; 2) knowing the point of view of others; 3) improving systematic thinking; 4) equating perceptions and goals [51]. Thus, feedback through monitoring and evaluation activities in the form of meetings and discussion forums is deemed effective.

DHF reports at the *Puskesmas* Bantul II include daily (DP-DHF), monthly (K-DHF), and annual reports. The surveillance officer holds the W2 report. Reports using computerization make it easier for officers. The use of a computerized system provides several advantages, including 1) lower costs; 2) minimizing errors; 3) increasing the speed and accuracy of service; 4) facilitating the planning and organization of operational and distribution activities; 5) higher efficiency [52].

The completeness of reports is an important indicator of surveillance activities. Complete reports are more sensitive for detecting disease trends [33]. The study results show that DHF reports are only available from 2016-2021 (now), whereas, before 2016, there was no input. The data was input by the previous DHF programmer manually (handwritten), causing some data to be lost and unreadable. So it can be said that DHF reports at the *Puskesmas* Bantul II are incomplete.

The problem of loss and damage to data due to the change of programmers needs to be evaluated. If there is a change of programmer, the data owned by the previous programmer must be given to the replacement in the form of complete data. This can be minimized by storing data using a computerized system. Then the data is stored on a laptop/hard disk or flash disk, a special facility for DHF programmers.

The report's accuracy is measured by the programmer's sending the report to the District Health Office according to the schedule. If the reporting is correct, then handling can also be carried out quickly [10].

The results showed that the Bantul District Health Office did not provide a specific schedule due to the SISKLB reporting system. The key to the successful implementation of a program so that it is on time is proper scheduling [53]. Reporting needs to be done by scheduling so that programmers have boundaries and responsibilities to carry it out.

However, Programmer Bantul II sets a schedule for reporting every first day of every month. Setting a schedule independently is a good step in setting limits on yourself to carry out your responsibilities as a programmer. Based on the testimony of the Bantul District Health Office, the DBD programmer at the *Puskesmas* Bantul II is always on time to make monthly reports.

The Incidence Rate is an indicator of success in controlling DHF with a national standard of <49 per 100,000 population [10]. The results showed that the highest Incidence Rate at the Bantul II Community Health Center in 2020 was Ringinharjo Village, with 677 per 100,000 population, while the total IR of three villages was 230 per 100,000 population. These results are in line with the IR in Bantul Regency, which is always above the national standard.

The IR calculation is supported by the ABJ (Free Larvae Index) results at the *Puskesmas* Bantul II, which are still below standard. The lack of public awareness influences this to implement Clean and Healthy Behavior (PHBS). One of the factors that influence people's behavior is community

leaders as a reinforcing factor [47]. In the prevention and control of DHF, community empowerment is carried out involving Jumantik (larva monitoring interpreter) cadres. Cadres are tasked with monitoring and directing the community to carry out PSN [54].

The different behavior of cadres in each region also produces different ABJ results. This is proven by the ABJ results of the three villages in the *Puskesmas* Bantul II working area, where the highest is Sabdodadi Village (86.6%). Based on the DHF Programmer's testimony, Sabdodadi Village cadres tend to be independent, proactive, and more obedient after receiving education. Cadres direct and guide the community directly so that it has an impact on people who are responsive and concerned about their environment [55]. Meanwhile, the lowest ABJ result was Ringinharjo Village (80.59%). Based on the DHF Programmer's testimony, Ringinharjo Village cadres tend to be passive and need to be encouraged to act. This shows that there is an alleged relevance between the role of cadres and ABJ results.

Based on these problems, programmers need to conduct more in-depth studies regarding the factors that cause differences in the behavior of health cadres so that they influence their roles in the three villages. Programmers can conduct studies related to motivation, support, allocation of funds, infrastructure, and other factors that may influence the behavior of cadres.

The CFR for Bantul Regency is always below standard (<1%). The highest CFR at the Bantul II Community Health Center in 2020 was Bantul Village (2.17%), but the total CFR of the three villages was still below standard (0.56%). This is influenced by easy access to healthcare facilities so that patients can be immediately treated and given treatment. Patients who are treated quickly can reduce the risk of death [56].

The outbreak of DHF at the *Puskesmas* Bantul II has never happened again since 2010. This is probably influenced by a misunderstanding of the criteria to be called outbreak or KLB. KLB criteria have been regulated in Permenkes No 1501/MENKES/PER/X/2010.

Based on the results of the IR, ABJ, CFR, and DHF outbreaks above, the programmer or Health Office needs to create a program that focuses on preventing DHF. The goal is to prevent an increase in DHF and prevent outbreaks so people who have been infected with DHF will not get sick again.

Conclusion

Based on the results of this study, the researcher can conclude that the implementation of DHF surveillance at the *Puskesmas* Bantul II has been carried out, but several aspects of the input, process, and output do not match the indicators so that it affects the outcomes that are not in accordance with national standards. Researchers provide input/recommendations for conducting surveillance training, especially processing DHF data in statistical analysis, monitoring the completeness of DHF programmer reports, advocating and educating cross-sectoral and local governments regarding policies on the use of fogging, conducting in-depth studies to look for specific causes of DHF, as well as disseminating information and educating the general public regularly, not only to community leaders, health cadres, and across sectors.

Declaration

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