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ORIGINAL ARTICLE

REPORT MANAGEMENT SYSTEM OF EARLY WARNING ALERT AND RESPONSE SYSTEM PROGRAM EVALUATION, TANAH BUMBU DISTRICT

Evaluasi Sistem Manajemen Pelaporan Program Sistem Kewaspadaan Dini dan Respon, Kabupaten Tanah Bumbu

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ABSTRACT

Background: The threat of outbreaks of infectious diseases is getting significant attention worldwide, and WHO requires all countries to increase early awareness and respond quickly. Indonesia has built a system called the Early Warning Alert and Response System (EWARS) which may detect any threat of an indication of an infectious disease outbreak computerized reported weekly. **Purpose:** This study aims to evaluate to systematically assess the data management and reporting system for implementing the EWARS. **Methods:** The evaluation research conducted interviews with EWARS officers at all levels of the Health Office in Tanah Bumbu District in September-November 2020. This study evaluated the implementation of EWARS, which was variable was a verification of reporting data and a management system with descriptive analysis using a spreadsheet instrument. **Results:** The instrument results showed that the strengths and weaknesses of SKDR implementation data management lie in the low ability of managers to translate instructions, less active monitoring from the supervisor, and the officers have not been trained. The verification in the total cases reported were gaps in the data from the aggregate district health office, Puskesmas, to Service Delivery Points due to unverified. Reporting performance during the assessment period of the Tanah Bumbu District Health Office was abysmal due to unscheduled and

incomplete. The reporting and feedback performance cannot give a clear appeal, instruction and/or warning to a more deficient unit. **Conclusion:** The reporting performance of EWARS officers and EWARS management was poor and improvement needed.

ABSTRAK

Latar Belakang: *Ancaman Kejadian Luar Biasa (KLB) penyakit menular mendapatkan perhatian utama di dunia dan WHO mewajibkan semua negara untuk meningkatkan kewaspadaan dini dan melakukan respon cepat. Indonesia membangun sistem yang disebut Sistem Kewaspadaan Dini dan Respon (SKDR) yang berfungsi dalam mendeteksi adanya ancaman indikasi KLB penyakit menular yang dilaporkan secara mingguan dengan berbasis computer.* ***Tujuan:*** *Penelitian ini bertujuan melakukan evaluasi untuk menilai secara sistematis terhadap manajemen data dan sistem pelaporan pelaksanaan SKDR.* ***Metode:*** *Penelitian evaluasi dilakukan wawancara kepada petugas SKDR semua tingkat Dinas Kesehatan hingga Service Delivery Points (SDP) di Kabupaten Tanah Bumbu pada bulan September-November 2020. Studi ini mengevaluasi implementasi SKDR dengan variable verifikasi data pelaporan dan sistem manajemen dengan analisis deskriptif menggunakan instrumen spreadsheet.* ***Hasil:*** *Hasil instrumen menunjukkan bahwa kelemahan manajemen data pelaksanaan SKDR terletak pada kemampuan pengelola menterjemahkan instruksi yang masih rendah, pengawasan kurang aktif dari atasan, serta petugas yang belum dilatih. Hasil verifikasi dalam total kasus yang dilaporkan terdapat kesenjangan data dari agregat Dinas Kesehatan kabupaten, Puskesmas, hingga SDP karena tidak dilakukannya verifikasi data. Kinerja pelaporan selama periode penilaian Dinas Kesehatan Kabupaten Tanah Bumbu sangat kurang karena keterlambatan dan ketidaklengkapan laporan. Kinerja feedback tidak mampu memberi himbauan, instruksi, dan atau teguran tegas kepada salah satu unit yang kurang.* ***Kesimpulan:*** *Kinerja pelaporan petugas dan manajemen SKDR di Kabupaten Tanah Bumbu masih kurang dan perlu perbaikan.*

INTRODUCTION

The threat of an outbreak of disease will not disappear without a series of responses from both national and international levels. The World Health Organization (WHO), through the International Health Regulation (IHR) 2005 requires each member country to develop, strengthen, and maintain basic capabilities in the field of surveillance and response on every level of administration to detect, report, and manage public health risks that have the potential to cause health problems. Public Health Emergency of International Concern (PHEIC), or a public health emergency troubling the world as early as possible, no later than five years after the IHR was enacted. The lower the response of a country to the emergence of outbreaks in its territory, the higher the potential for epidemics to spread to the domain of other countries (Nkengasong, Djoudalbaye, & Maiyegun, 2017).

Indonesia, which has ratified the IHR, must follow and implement these rules, so the Ministry of Health of the Republic of Indonesia, in collaboration with WHO and the United States Center for Disease Control and Prevention (US

CDC), builds a system for early detection and response to potential outbreaks of disease (Manurung, Reo, Pardosi, & Muscatello, 2020).

According to Kadari & Kardiwinata (2020), this system is known as the Early Warning Alert and Response System (EWARS) also known as the *Sistem Kewaspadaan Dini dan Respon* (SKDR). According to Faridah et al (2020), SKDR is a system that functions to detect threats from indications of infectious diseases outbreaks that are reported on a computer-based weekly basis. It can also display an alert or early warning signals when disease cases have increased beyond the threshold value in an area. An alert or early warning signal that appears on the system does not mean that an outbreak has occurred but is a pre-KLB that requires officers to respond quickly to prevent an attack from happening. The implementation of the SKDR in Indonesia has been carried out since 2009 through the Ministry of Health, the Sub-Directorate for Surveillance and Response to Outbreaks (Directorate General of Disease Control and Environmental Health) which has optimized the Local Area Monitoring (PWS) for outbreaks through SKDR for *puskesmas* (public health center) with the pilot project provinces of Lampung and Bali. The pilot project results show an increase in the performance of the Early Alert System (SKD) and Response in the Province, and the results are measurable. At the end of 2015, the Ministry of Health of the Republic of Indonesia created the EWARS website to facilitate data processing and reporting as an effort to detect disease early and respond quickly (Kadari & Kardiwinata, 2020).

There are 23 types of diseases reported through EWARS, namely acute diarrhea, confirmed malaria, suspected dengue hemorrhagic fever, pneumonia, dysentery, suspected typhoid, acute jaundice, suspected chikungunya, suspected avian influenza in humans, clinical measles, suspected diphtheria, suspected pertussis, acute flaccid Paralysis (AFP) (sudden wilting paralysis), bites from a suspected rabies animal, suspected anthrax, suspected leptospirosis, suspected cholera, unusual disease clusters, suspected meningitis, suspected tetanus neonatorum, ILI (Influenza Like Illnes), HFMD (Hand Foot Mouth Disease)), and tetanus. The more diseases being observed and reported every week, the smaller potential for outbreaks are occurred (Kristiani, Kusnanto, & Probandari, 2016).

The accuracy and completeness of the public health center reports reported every week through a weekly format will be very influential in detecting diseases that have the potential for outbreaks. The higher the report's accuracy, the faster an early warning signal (alert) of an outbreak is detected. The higher the level of completeness of the report, the wider the early warning signals (alerts) for outbreaks are detected. Aggregate data delivery time at the public health center level to the District/City and SMS Center reporting is carried out every Monday (Kristiani, Kusnanto, & Probandari, 2016).

According to the national target at the public health center level, the weekly report completeness is 90%, and the weekly report accuracy is 80% (Polak, Sumampouw, & Pinontoan, 2020). Provinces that have met the indicators in 2018 at the public health center level were Bangka Belitung Province with 100% report completeness and 97% report accuracy; Riau Province was 100% report completeness and 100% report accuracy; Bali Province was 91% completeness of reports and accuracy of reports 86%; Jambi Province was 97% completeness of reports and 95% accuracy of reports; and Jakarta was 98% completeness of reports and 98% accuracy of reports. The province of South Kalimantan itself in 2018 had a complete report of 67%. Still, Tanah Bumbu District had an outstanding performance, with the completeness of the report reaching 99% (Ministry of Health RI, 2020).

Based on data from the Sub-Directorate for Surveillance and Response to Outbreaks, there are eight diseases from SKDR reporting at the Puskesmas level in Indonesia with the earliest warnings, including measles suspects (Handayani & Kardiwinata, 2021), Rabies Transmitted Animal Bites (GHPR) (Marpaung et al., 2020), *Influenza-Like Illness* (ILI) (Agustin, Aritonang, & Pane, 2019), acute diarrhea, suspected typhoid fever, pneumonia, and HFMD (*Hand Foot Mouth Disease)* (Karo et al., 2018).

The implementation of the SKDR can be carried out correctly if the system that builds the program is good. The system that builds the program is formed by the components of input, process, and output (Rusdianah & Widiarini, 2019). A systems approach is needed to localize and group work in a program so that it is easy to do and work together to achieve goals (Samsuni, 2017). Based on the report results on the SKDR website, it is indicated that Tanah Bumbu District has a reasonably good reporting performance from 2017 to 2019, which is 97% completeness and timeliness (Ministry of Health RI, 2020).

At the beginning of 2020, reporting was also quite good, but starting in March 2020 the

reporting performance of the Tanah Bumbu District SKDR experienced a significant decline. It coincided with the emergence of the Covid-19 pandemic that hit Indonesia in early March 2020. However, this could not be a reason for the declining performance of the SKDR program, where regional awareness of a disease that could potentially have an outbreak should also increase. The activities of the Covid-19 Task Force should be able to run together with the SKDR program. This study aims to assess the performance of the reporting and management system of the SKDR program in Tanah Bumbu District.

METHODS

The research was carried out in Tanah Bumbu District between September and November 2020 with the analysis unit of the Tanah Bumbu District Health Office and all work units under it, namely the public health center (*puskesmas*) and village health posts (*poskesdes*). The research subjects were SKDR officers from the Health Service, all *puskesmas*, and selected *poskesdes* in Tanah Bumbu District. The research obtained permission and ethical approval from the National Commission for Health Research Ethics, Research and Development Agency, Ministry of Health No. LB. 02.01/2/KE.678/2020.

This research evaluated using an instrument developed to assess a program with a systems approach. The instrument was developed by adopting and modifying the "Data Quality Assessment for Neglected Tropical Diseases: Guidelines for Implementation, Working Draft September 2013" method developed by WHO and ENVISION/RTI (Ariawan, 2016). The instrument was a spreadsheet program using the SKDR reporting data quality assessment method. This assessment activity consists of two parts which area questionnaire for the SKDR officers on data management and reporting. The second was to recalculate the records at each level and compare them with the numbers reported to the higher levels. The substance and content of the assessment instrument were based on the SKDR work guideline published by the Surveillance Sub-Directorate of the Ministry of Health of the Republic of Indonesia (Ministry of Health RI, 2012).

The instrument was divided into two assessment parts, namely data verification and management system assessment. The data verification section contains the calculation of case data, response targets, and responses to the assessed unit and the reporting unit under it. Verification of related data was also about the completeness and timeliness of reporting. The management system section consists of 5 sub-assessments, namely management strengths and weaknesses, reporting performance related to timeliness and completeness of reporting, reporting and feedback performance, linkages with national systems, and program readiness in dealing with emerging diseases case Covid-19.

Research data collection was carried out by interviewing SKDR officers, observing the workings of SKDR officers for primary data, evaluating and documenting SKDR work documents for secondary data, namely evidence of SKDR training certificates, assignment documents, weekly outbreak report form reports (W2) at the public health center, form Integrated Disease Surveillance (STP) and other documents that support program performance. Performance appraisal was determined only for the period of August 2020 (epidemiological week 32-36) to facilitate the assessment and process of implementing programs and experiences related to SKDR were relatively easy to remember by officers. The assessment was carried out using categorical and scoring methods to determine the value of the quality of program implementation. Score values were in the range of 1-3 where the value = 3 for the 'Fully Yes' category, the value = 2 for the 'Partial' category, and the value = 1 for the 'Not at all' category. The assessment of the SKDR reporting performance was carried out in the August period, namely in the 32-36 epidemiological week in 2020.

The data from the data collection was entered into a spreadsheet instrument, and the analysis results were presented in the form of a spider graph showing qualitative data from the recording and reporting process where the results can be used as a priority for determining which areas should be improved. Bar graphs showed quantitative data from the results of data verification, which can be used to enhance the quality of data. Aggregate data showed the overall performance of the reported data at each level.

RESULTS

Strength and Weakness

Characteristics of respondents (2 Health Offices of Tanah Bumbu Regency and 28 Puskesmas officers) showed that most of the officers had an educational background in D3 Midwifery and D3 Nursing (33%). The rest were

S1 Public Health, S1 Nursing, D3 Environmental Health, and D4 Midwifery. Experience of officers in managing SKDR Most of them became SKDR officers for less than one year (62%) and the remaining only 29% of officers served in SKDR for more than one year. Some officers have a dual-task load where one officer can own or be responsible for several work programs in their working unit, such as being an active nurse in a nursing service unit at a public health center and an SKDR manager. Most officers have a maximum workload of two programs (57%), and the rest (43%) carry out more than two programs at once. During the August assessment period (epidemiological weeks 32-36), the Provincial Health Office received 61 reports from all district/city health offices (94%), of which 12 out of 13 districts/cities had sent reports for all five weeks assessed (August 2020 period). One such district was Tanah Bumbu District, which only sent reports one week out of five weeks of epidemiology assessed by the instrument. Tanah Bumbu District was the only district that did not use the SMS center as a one-way reporting tool to the SKDR website. The SKDR Management System at the Tanah Bumbu District Health Office can be seen from Figure 1 showing a low score on management strengths and weaknesses (score = 1.83), reporting accuracy and completeness (score = 1.00), Reporting Performance (score = 1, 40), and linkage with the national system (score = 1.50). It was shown that in the period assessed, the officer could not show the W2 recap from the public health center report, and even 4 of the five weeks of epidemiology that were assessed were not reported to the SKDR website. Reporting performance received by the district level through WhatsApp (WA) groups from the public health center reached 80% with only 12% on time and in an inappropriate format. The weakness of management lies in the structure and function, it can be seen that only one staff person manages the SKDR without good monitoring from superiors and other staff who help re-check the reporting data that will be recapitulated and sent the officer did not know about the existence of the SMS center, the officer claimed to continue what the previous manager had done.

Reporting Performance

The performance of the Tanah Bumbu district SKDR reporting in 2020 generally decreased compared to previous years. Figure 2 showed reporting omissions occurred in April and May, followed by reporting in the following months,

which also showed performance below 80% of completeness and timeliness.

Reporting Performance and Feedback

There were 14 health centers in Tanah Bumbu District spread over 13 sub-districts. The results presented were the average results of all observed health centers. Based on the verification of the aggregate reporting data of the Puskesmas, the number of cases reported was 62%, which means that there was a gap between the recap data and the reported data of 38%. Some public health centers also did not report weekly SKDR data through the Health Office's SKDR manager but sent integrated surveil to the Health Office.

Response targets and responses showed a low percentage because alerts could not appear when the public health center reports manually via WA and not through the SMS center. The management performance of the aggregate public health center in Tanah Bumbu District (Figure 1) lies in the reporting performance (score = 1.50) and the linkage with the national system (score = 1.00). The difference with the district level was only in the strength of management which has a slightly higher score (score = 1.97), where the Head of the public health center monitored the structure and function.

The reality on the ground showed that some public health center heads did not know the current condition of the SKDR reporting system, officers worked without any other staff to help check the data before it was reported. Some of them did not even report the SKDR. Some health centers also often have staff transfer to other programs so that new officers have difficulty understanding their duties well. The main weakness at the public health center level was the linkage with the national system, where officers did not use the SMS center from the center as a means of submitting reports. It happened because the officers' ignorance, and instructions from the Health Office only asked the public health center to send reports through the WA group SKDR Dinkes-Puskesmas. Service Delivery Point (SDP) was the smallest unit of a reporting system and was the initial data source of a reporting process.

The SDP of this SKDR program was village health post (*Poskesdes*)/village polyclinic (*Polindes*)/maternity homes/village midwifery posts (*Posbindes*)/other health service units at the village/urban village level. This unit usually consists of officers and reports their work to the Puskesmas. The aggregate SDP Tanah Bumbu

Regency reported the case data was 94%, while the response target and response were 0%.

The management weakness of SDP was that all aspects of the management system assessment have a low score compared to all units above it. This could be seen from the person in charge of the unit, usually a nurse/midwife who did not have enough knowledge to determine the diagnosis, so reporting tended to be inaccurate.

Another weakness was weak data management; for example, most SDPs do not recalculate and do not recap data that has been reported in W2 form or the like. The only source of documents that the research team could verify from the report was the register of visits by the people who received treatment.

Linkage to the National System

Tanah Bumbu District was not linked to the National system because all public health center reporting was still through the district WhatsApp group and collected by the Health Office and then manually inputted into the SKDR website. It was the leading cause of report submission time which is often late, and the response becomes invalid in terms of time.

Program Readiness in Dealing with New Infectious Diseases (Covid-19)

The readiness of the program to deal with cases of new infectious diseases (Covid-19) was generally moderate to poor (Figure 1) at all levels (District Health Office = 2.25; Puskesmas = 2.00; SDP = 1.48), which was marked in the absence of a clear structure in assignment and supervision. Almost all officers were not technically trained in surveillance and control, and there were frequent changes in rules related to control guidelines that often confuse officers in the field.

DISCUSSION

This evaluation instrument was developed based on the guidelines for implementing the SKDR from the Surveillance Sub-Directorate of the Ministry of Health of the Republic of Indonesia (Kadari & Kardiwinata, 2020; Ministry of Health RI, 2012). The process of making and developing the instrument involves all teams for improvement. The instrument was developed referring to the evaluation objectives related to organizational strengths and weaknesses, reporting and feedback, and reporting quality related to conformity, completeness, and timeliness (Kusumawardani, Laily, Sipahutar, Domingga, & Martini, 2020; Sheel et al., 2019).

The team's point of assessment in the evaluation included: Knowledge of officers on their duties, the delegation of tasks and instructions, data management, data quality, reporting quality, and linkages with guided national systems. Some of these things were translated into several instrument questions and given a score according to the quality of the answers and the completeness of the documents that can be shown. The difficulty in this research was finding proper and appropriate documents to be used as documentary evidence as a basis for assessing the instrument. Several public health center in Tanah Bumbu District could not provide sufficient evidence for the performance statements submitted. The research team circumvented this by verifying the final report submitted and the main data source for reporting, as well as other work processes whose activities can be recorded, such as screenshots of WhatsApp reports, reporting formats, village health post (*poskesdes*) registers, and other documents deemed supportive. This caused the assessment of each team tends to be subjective. Objectivity was obtained by discussing the assessment results with other teams to get different views from other teams. Uncertainty and inequality of judgment are not something wrong and avoided, but part of productive decision-making (Engebretsen, Heggen, Wieringa, & Greenhalgh, 2016).
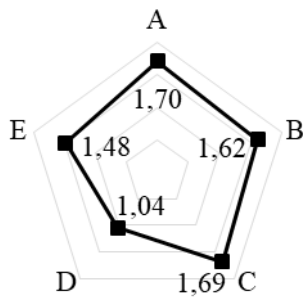
The main challenge in the evaluation was to adjust the focus of the assessment related to SKDR to officers who did not run the program in accordance to the SKDR guidelines, for example the linkage component to the national system which in this case was the SMS center. which was used as a single tool of reporting cases that were automatically inputted in the SKDR web-based application. Findings in the field stated that the Tanah Bumbu Health Office did not carry out SKDR reporting through the SMS center. Still, through the Community Health Center-Services group WhatsApp, all reports in the group would be recapitulated by the Health Service officer and the officer. They would do manual input on the SKDR website. Research in Salatiga also showed that public health officers only send reports to the Health Office via SMS (Wikansari, Santoso, Pramono, & Widarsih, 2019). It could lengthen the reporting workflow and slow down the reporting process itself. Like a sms SMS center, the single-channel was created to deal with reporting constraints. This method was considered quite

cheap, fast and efficient (Hapsari, Riana, Purwanto, Kandel, & Setiawaty, 2017).
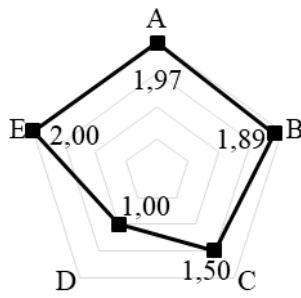
The evaluation also assessed the completeness and timeliness of reporting. It was important because the performance was an indicator of the program's ability to detect early symptoms of an extraordinary event (Hussain-Alkhateeb et al., 2018). The document identification was in reports and W2 recaps with details of the diseases reported, the number of cases reported each week, and the reporting date each week. The document should be able to determine when there is an unusual pattern of increase in cases in the week before, and then it will generate an alert signal for Surveillance managers in the district. (Hapsari, Riana, Purwanto, Kandel, & Setiawaty, 2017).

The SKDR website can display these alerts if reporting is routine, complete and timely. It becomes an obstacle if the reporting system at the public health center and the district would not appropriately be implemented, then the alert may be late or even not appear. In this study, most public health center had reported to the Health Office, but the reporting process did not go through the SMS center but through the WA group. The recorded WA data should be recapitulated and reported by the Health Service officer in the W2 form. The fact found in the field was the job was not done. Even the health officers did not make weekly bulletins. The biggest obstacle for developing countries is not having enough officers with good knowledge and skills to support program performance (Jayatilleke, 2020).
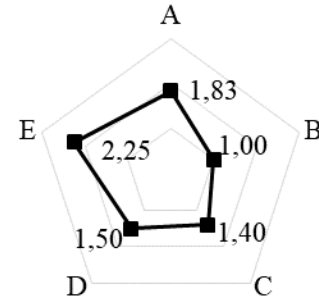

Service Delivery Point Agregate   PHC Agregate   Tanah Bumbu District Health Office

Description:
A = Strength and weakness of management
B = Punctuality dan report completed
C = Reporting performance

D = Link with national reporting system
E = Readiness of Health Official to encounter emerging diseases (Covid-19)

Figure 1. Data Management and Report of EWARS on All Level

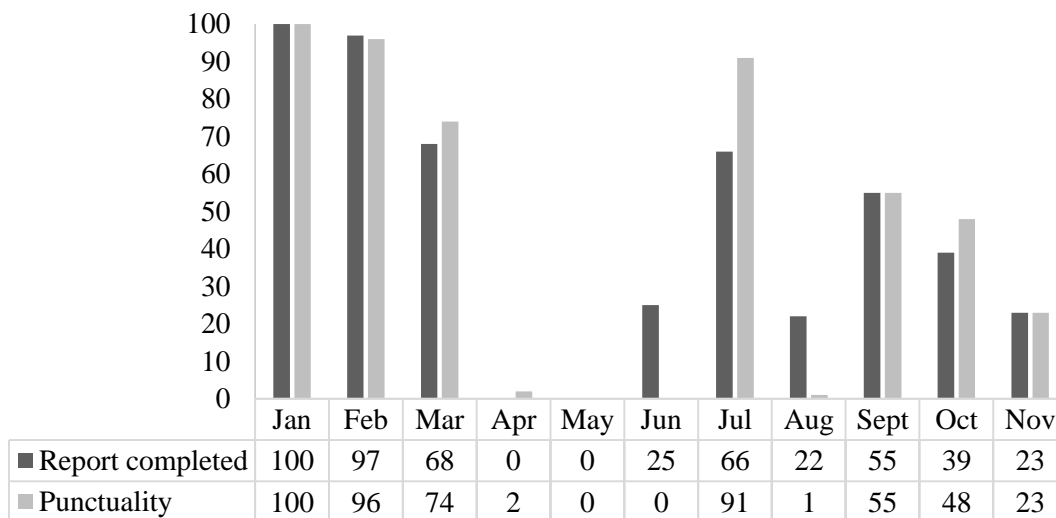|	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov
Report completed	100	97	68	0	0	25	66	22	55	39	23
Punctuality	100	96	74	2	0	0	91	1	55	48	23

Figure 2. EWARS Reporting Performance of Tanah Bumbu District 2020

Response verification alert was a response and feedback. This indicator assessed how many alerts appear given a minimal response to the verification of the reported data. It is necessary to do to control case management so it doesn't worsen (Prianto, 2020). The instrument in this study assessed that public health center officers only reported cases that appeared to the service without any recount and verification to officers in village units or laboratory test results. Similarly, at the district level, the research team did not find any W2 recap documents or bulletins that should have been produced during the period being assessed. Regarding feedback, officers at the top level only provide general advice regarding reporting without a special mechanism for reporting data shortages or delays. It was different in Fiji, which showed good and consistent integration of early warning and response systems in each district and linkages with the national system. It was proved by the end of cyclone Winston in Fiji, the state managed to detect only three outbreaks and overcome them, and no other significant outbreaks were missed (Sheel et al., 2019).

In the case of the Covid-19 pandemic that occurred throughout Indonesia, the program's willingness to deal with new infectious disease cases became an essential highlight for the program, especially the surveillance program to slow down the transmission rate while increasing emergency response. The disease has not yet been included in the SKDR, but a Committee for Handling Covid-19 and National Economic Recovery has been formed (Setiati & Azwar, 2020). The special committee regulates regulations and protocols for all aspects of efforts to deal with Covid, which will then be implemented at the local government level. Regulations continued to evolve and be revised according to the nature of transmission and the development of the virus itself (Djalante et al., 2020).

In general, program readiness was at moderate to low scores at all levels, especially at the public health center and SDP levels. It can be seen structurally that officers were only given an Instruction letter (SK) for the Rapid Action team or SK for surveillance. Officers were not trained, but still, they attended several meetings related to how to determine suspects, Asymptomatic People (OTG), Travelers (PP), close contacts, and others including filling out the form and changing the rules periodically. Frequent changes to the regulations have resulted in officers feeling confused and overwhelmed. The latest difficulty faced by officers was a new rule which stated that close contacts did not have to be swabbed. According to officers, it gives an opportunity for people who are categorized as close contacts and have symptoms similar to Covid-19, to refuse to be examined and swabbed. Effective communication skills of officers in educating the public should be further improved to break the chain of transmission of this disease (Ataguba & Ataguba, 2020).

CONCLUSION

The strengths and weaknesses of data management on the implementation of SKDR lie in managers' ability to translate instructions that were still low less active supervision from superiors and officers who have not been trained. The verification results in the total cases reported that there were data gaps from the aggregate of the District Health Office, public health center, to SDP were good to poor. Reporting performance during the assessment period of the District Health Office was abysmal. Reporting and feedback performance could not give alerts, instructions and/or firm alerts to one of the units below it, which was often late in providing reports, let alone not using the SMS center facility provided by the Center. Most of the readiness to deal with new infectious disease cases was still not ready, with no clear structure, untrained officers, frequent changes in rules that make officers confused and indecisive in carrying out their duties, and were marked by cases that did not improve.

CONFLICT OF INTEREST

All authors declared that there is no conflict of interest

AUTHOR CONTRIBUTIONS

DA drafted the concept, arranged the research flow, developed the instrument and wrote most of the manuscript. DF and SH developed the instrument. The GM prepared survey equipment in the field and compiled a questionnaire. YS compiled the questionnaire and wrote the script. HK formulated the calculation of the instrument. All authors who carried out data collection in the field had read and agreed to the entire contents of the manuscript.

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