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ORIGINAL ARTICLE

OBSTACLE OF COVID-19 DIGITAL SURVEILLANCE AT PUBLIC HEALTH CENTERS: EXPLORATORY STUDY IN WEST JAVA

Hambatan Surveillans Digital COVID-19 pada Pusat Kesehatan Masyarakat: Studi Explorasi di Jawa Barat

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ABSTRACT

Background: The quality of COVID-19 data from surveillance information systems is still an issue in low-middle-income countries (LMIC), including Indonesia, which uses various applications that have the potential to affect surveillance performance. **Purpose:** To explore the procedures and obstacles to using various digital surveillance applications at Public Health Centers (PHCs) in Indonesia. **Methods:** Qualitative research with exploratory studies was used. The setting was in the PHC in Kuningan, Majalengka, and Indramayu, City of Cirebon, Indonesia, with surveillance officer participants and contact tracer data manager, as many as 8. Data was collected by interviewing and using snowball sampling techniques between May 12 and 20, 2022. Data were analyzed using content analysis. **Results:** The initial data collection procedure involves obtaining data from various health facilities. Data recording was with SILACAK and the New All-Recorded application. Data analysis with descriptive epidemiology was reported to the head. Data quality was achieved with monitoring. Obstacles in data collection were rejection, community paradigm, and fear. The obstacles of the application are maintenance, not immediately updating that day, not entering at that time, sometimes it does not run smoothly, there are no tools for visualization, and data distribution per place not yet available. **Conclusion:** In COVID-19 surveillance procedures, from initial data collection, data recording, data analysis, data reporting, and data quality assurance, there are obstacles to data collection in the community and to applications used for surveillance. The District Health Office must compile new procedures that include data management stages, epidemiological data analysis, and visualization.

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ABSTRAK

Pendahuluan: *Kualitas data COVID-19 dari sistem informasi surveilans masih menjadi permasalahan di Negara Berkembang, termasuk Indonesia dengan menggunakan berbagai aplikasi.* ***Tujuan:*** *untuk mengeksplorasi prosedur dan kendala dalam penggunaan berbagai aplikasi pengawasan digital di Puskesmas di Indonesia.* ***Metode:*** *Jenis penelitian kualitatif dengan studi eksploratif tempat di Puskesmas di Kabupaten Kuningan, Majalengka dan Indramayu, Kota Cirebon Provinsi Jawa Barat, Petugas surveilans peserta, contact tracer Data Manager sebanyak 8. Data pengumpulan dengan teknik wawancara dan sampel bola salju digunakan. Pengumpulan data dilakukan antara tanggal 12 hingga 20 Mei 2022. Data dianalisis menggunakan Content analysis.* ***Hasil:*** *Prosedur pengumpulan data awal memperoleh data dari berbagai fasilitas kesehatan. Pencatatan data dengan SILACAK dan Aplikasi New All Record (NAR). Analisis data dengan epidemiologi deskriptif dan dilaporkan kepada Kepala. Kualitas data dengan pemantauan. Hambatan dalam pendataan berupa penolakan, paradigma masyarakat, dan ketakutan. Kendala Aplikasi adalah maintenance, tidak bisa langsung update hari itu juga, tidak bisa masuk pada saat itu, kadang tidak berjalan lancar, belum ada tools untuk visualisasi, dan distribusi data per tempat belum tersedia.* ***Simpulan:*** *Prosedur surveilans COVID-19 mulai dari pendataan awal, pendataan, perekaman data, pelaporan data analisis data, penjaminan kualitas data dan terdapat kendala pendataan di masyarakat serta kendala aplikasi yang digunakan untuk surveilans. Perlu disusun prosedur baru yang meliputi tahapan pengelolaan data dengan analisis dan visualisasi data epidemiologi.*

INTRODUCTION

The global population is still being impacted by the COVID-19 pandemic 2019–2020. On March 27, 2023, the World Health Organization (WHO) reported that there were over 761 million confirmed cases worldwide, 6.8 million deaths, and over 20,000 active cases (1). Of these, 99.80% were classified as mild conditions and only 0.20% were serious or critical. This is consistent with the fact that over 13 billion doses of the COVID-19 vaccine have been given out globally. The data are based on surveillance reporting from various countries. However, reporting surveillance data still has challenges in developing countries, namely the difficulty in identifying, diagnosing, and reporting infectious diseases accurately (2).

Based on surveillance data reporting involving various digital technologies in pandemic management and response, countries have adopted and integrated digital technologies for pandemic planning, surveillance, testing, contact tracing, quarantine, and healthcare, including in Indonesia with various applications used. However, understanding of the hurdles and difficulties in using various applications to produce quality surveillance data is still limited (3).

The data are not real-time since multiple apps are used to assist surveillance in Indonesia, a Low-Middle Income Country (LMIC) that is still plagued by data interoperability problems and reporting delays. COVID-19 recording and reporting system in Indonesia in support of the implementation of surveillance that applies in Indonesia by the Decree of the Minister of Health of the Republic of Indonesia Number HK.01.07 / MENKES / 413/2020 on Guidelines for Prevention and Control of COVID-19, is the online application New All Record TC-19 (NAR TC-19), which gathers limited demographic information (gender, age, and residence) from those who test positive for rapid antigen diagnostic test (Ag RDT) or polymerase chain reaction (PCR), COVID-19 Daily Reporting Online System (https://s.id/laporhariancovid), Information System for Tracking Cases (https://silacak.kemkes.go.id/). Peduli Lindungi, a system that keeps track of travel history, PCR/Ag RDT findings, and immunization status information, comes next.

In its implementation, the use of applications to support the implementation of surveillance systems

in Indonesia is still not optimal. This is seen from several studies related to the evaluation of surveillance systems in Indonesia show that there is still no maximum in the process of data collection, data analysis, and data presentation is in tabulated form, data presentation variations and interpretation are not carried out, there is a gap between guidelines and the implementation of the COVID-19 surveillance system, the survey system is simple, acceptable, reporting is on time, positive predictive value can be calculated, the system is sensitive because it can detect cases and can represent the incidence of cases in the Public Health Center working area (4,5). In the implementation of surveillance for case search and close contact using the SILACAK application in Indonesia, there are still differences between actual cases and manual recording. The number of daily cases from the first and third weeks inputted SILACAK is less than manual data (6).

Evaluation of application use was specifically carried out by the Ministry of Health and the COVID-19 Task Force team which showed that nationally there is a data gap between reporting with NAR applications and actual data. There is a difference in case data in the NAR Application with actual cases; in the 33rd week there was a difference of 18.80%, in the 34th week as much as 17.95%, and in the 36th week as much as 21.61%. The COVID-19 pandemic and disparities in regional infrastructure are probably connected to the timeliness and completeness of reports (7).

The purpose of this study is to explore the procedures for using various surveillance applications and inhibiting factors using various applications so that there is a non-achievement of the surveillance indicator target. Thus, the results of the research can be used as a basis for intervention and improvement of the COVID-19 surveillance information system at the Public Health Center in Indonesia.

METHODS

Study Design

Qualitative research is especially well-suited for investigating novel subjects when there is still a paucity of current knowledge (8), as in the case of the coronavirus epidemic and digital surveillance. Understanding the process for utilizing digitally based surveillance information systems and challenges associated with gathering data through a variety of apps that enable surveillance by data managers, contact tracers, and surveillance officers at the Indonesian Public Health Center is necessary. Regarding this investigation, semi-structured in-depth interviews served as the basis for a qualitative analysis. The study aimed to "rely as much as possible on participants' views of the situation" using a qualitative methodology. This was accomplished through the use of a flexible interview technique, which allowed researchers to collect candid information and delve into participants' opinions, feelings, and beliefs (9).

Time and Study Setting

The research period is November 2022 to February 2023. The setting of this research is the Public Health Center in the District of Kuningan, District of Cirebon, City of Cirebon, District of Majalengka, and District of Indramayu, West Java Province Indonesia, which all received increased capacity of digital surveillance information systems and have surveillance officers, contact tracers and data managers.

Informant

Surveillance officers who are already available at the Public Health Center in their implementation are assisted by contact tracers and data managers at the district level with the support of the SILACAK Application. Participants were taken from surveillance officers, contact tracers, and data managers as many as eight people representing five Regencies/Cities (Kuningan, Majalengka and Indramayu, city and district of Cirebon, West Java Province) of the research location.

Data Collection Methods

Most interviews were conducted remotely due to physical distance constraints. The use of a snowball sample technique in which one respondent proposed that another respondent be interviewed later was implemented since it was challenging to recruit interviewees because of social separation and remote employment. Between May 12 and May 20, 2022, information about surveillance information system protocols and application use barriers was gathered through interviews with surveillance officers, contact tracers, and data managers. Each interview took an average of 30 minutes. Participation in the study was entirely voluntary for the participants. Eight interviews totaling four hours and 37 minutes of recorded data were provided, they clarified, with their agreement to record interviews for future research. The steps involved: Theme Surveillance Procedure with sub-themes, Initial process of data collection, data

collection process, confirming data on close contacts, risk group or suspect, recording data, data analysis, data visualization, data reporting, and data quality (10). Obstacles in data collection were theme use of surveillance information system with sub-theme, information system support for surveillance systems and perception of available information systems.

Research Instrument

The instruments used in this research were an in-depth interview guide and a focus group discussion (FGD) guide.

Data Analysis

The first author assessed the data using content analysis and the four stages of data management for theme analysis decontextualization, recontextualization, classification, and compilation as outlined by (11). All three authors of the research team discussed the findings at every level of the process, and it took several iterations before the final version was generated and approved by the authors. This procedure was made easier with the usage of ScreenQ.

Consideration of Ethics

Ethical Committee Institute of Health Science Kuningan, Indonesia: Following suggestions from the institutional ethics team at IHSK, Indonesia, this research was carried out. No.147/EP/STIKKU/2022. Following ethics committee approval, ensured the study will be conducted while adhering to the following ethical principles: respect for the subject's right to self-determination, privacy and dignity, anonymity, and confidentiality.

RESULTS

Surveillance Procedure

a. Initial Process of Data Collection

The data collection process begins with a find database base from health facilities which will then be distributed to all Public Health Centers for follow-up by tracer personnel. Here is an excerpt of a statement:

"… before tracking, we (contact tracer) get data from various health facilities, such as hospitals. After getting data information related to confirmed cases, then the data are reported to the Public Health Centers (PHC), and from the PHC it is usually shared in the Contact Tracer WhatsApp group..." (AM: Surveillance officer in PHC)

After obtaining data from the PHC, health workers (tracers) will coordinate with the village and ask for permission to carry out contact tracing. Usually, there is a person assigned by the village to accompany the health worker to the patient's address. Here's an excerpt of a statement:

"…furthermore, consolidate with the village for licensing, etc. After licensing, sometimes, the local government assigns someone to take us to the patient's address." (AM: Surveillance officer in PHC)

b. Data Collection Process

In the process of contact tracing, first, an interview is carried out with the patient followed by an interview with close contact with the patient, whether physical contact or not. Here are excerpts from statements:

"…conducting interviews with patients, such as, how to initially be exposed to COVID-19…" (AM: Surveillance officer).

"…Then, close contact tracing is carried out, which is close to the person whether they have been in physical contact or not…" (AM: Surveillance officer in PHC).

c. Confirming Data on close contacts, risk groups, or suspect

To ensure that the patient's contact is not infected, contact is recommended to take an antigen test at the nearest health facility or health center. Here's an excerpt of a statement:

"… then, the close contact is recommended to be tested for antigen at the Public Health Center to confirm or anticipate that the contact is infected or not …" (AM: Surveillance officer in PHC).

The antigen test results will be notified to the patient and the patient told to self-isolate for 14 days, both for positive and negative results. Here's an excerpt of a statement:

"…if the antigen test result is positive, it is recommended to self-isolate for 14 days, if it is negative, then isolation is still carried out but not necessary for 14 ...ys..." (AM: Surveillance officer in PHC).

d. Recording Data

Data recording and reporting are carried out by entering data into the SILACAK application system and or NAR (New All Records).

The following is an excerpt of a statement:

"… After obtaining close contact data, the data are entered into the SILACAK application system and NAR (New All Record....." (AM: Surveillance officer in PHC)

e. Data Analysis

Data processing and analysis to see the number and distribution of cases using descriptive epidemiology. Here's an excerpt of a statement:

"… For data processing, using descriptive epidemiology, namely the number of cases and the distribution of cases..." (AL: Surveillance officer in PHC).

Then, the data were analyzed by calculating the virulence level, which was seen from the number of positive results per number of all tests and the severity was seen from the comparison of the number of deaths with active positive cases. Here's an excerpt of a statement:

"..for analytical epidemiology, the virulence level is calculated, which is measured by how large the positive rate of close contacts tested, and the severity is measured from the number of cases that died compared to the number of positive cases..".(AL: Surveillance officer in PHC).

f. Data Visualization

Data visualization is seen from the map of the distribution of cases in the form of images of the area and the number of active cases and active cases died. The images and data are made to be reported in presentations at Public Health Centers or Health Officers'. As in these excerpts from statements:

"… in the form of a visualization… a map of the distribution of cases only, more to the picture and the number of active cases who died. There is a visualization graph when the data is presented at the PHC or the Health Office for the Sub-District COVID -19 Task Force, it's quite simple ..." (AL: Surveillance officer in PHC).

"…Until now, it is not specifically available, however, the Public Health Center (PHC) data processing officers use Ms. Excel to perform data processing manual... "(DK: Surveillance Supervisor in DHO).

g. Data Reporting

Data reporting is carried out by data managers by presenting basic material data or data visualization submitted to PHC or sub-districts for monitoring and evaluation. Here's an excerpt of a statement:

"…the data manager submits to the Public Health Centers or sub-district head, the data manager presents data or visualization basic materials when monitoring and evaluation..."(AL: Surveillance officer in PHC).

h. Data Quality

In terms of data quality, the health office conducts monitoring to assess the performance of health workers. Here's an excerpt of a statement:

"…. monitoring is carried out by the Health Office, to assess the performance of the contact tracer and tracing program..." (AM: Surveillance officer in PHC).

i. Obstacles in Data Collection

There are many data collection problems in the field, including the refusal to track cases, the paradigm of people who are unfamiliar with COVID-19, and the fear that people will be excluded. Here are excerpts from statements:

".. In the field of course there will be rejection, the community's paradigm towards COVID is common, so many people don't want to be interviewed because they are afraid of being shunned by other people ..." (YL: Surveillance officer in PHC).

Problems also exist in the information system, such as maintenance, so it cannot input and update data on the same day. Here's an excerpt of a statement:

"… In SILACAK Application, there are also obstacles, starting from maintenance, not being able to immediately update that day, not being able to enter at that time"(YL: Surveillance officer in PHC).

Use of Surveillance Information System

a. Information System Support for surveillance systems

There is a lot of information system support that can be used in surveillance. There are online-based information systems such as the SILACAK application, NAR, and Google Sheets. The convenience of this information system makes it easier for tracers to upload data and see the progress of cases. Here's an excerpt of a statement:

"…. The information system used is online and offline, to go online using the SILACAK application, NAR, create a Google sheet so that all tracers, data processors, and surveillance can upload and see the development of the graph of confirmed cases and close contacts…" (AL: Surveillance officer in PHC).

Application for recording and reporting electronically using the SILACAK application. The app contains important information about COVID-19. Here's an excerpt of a statement:

"... The SILACAK application serves as a support for recording and reporting electronically, and contains important forms of information about

COVID-19 during tracing ...” (AM: Surveillance officer in PHC).
The application to support the recording and reporting of daily case findings and swab checks uses the New All Record (NAR) application. Here’s an excerpt of a statement:
“… a New All Record (NAR) application that serves to support recording and reporting related to daily case discovery and swab checks …” (AM: Surveillance officer in PHC).
All data that is recorded and reported to the application information system becomes the basic data to be analyzed and reported by the data manager to the head of the Public Health Centers and sub-district. Here is an excerpt of a statement:
".. The data are basic data that will be processed and reported to the head of the Public Health Centers and sub-district” (AL: Surveillance officer in PHC).

b. Perception of available information systems
The information system used in general is already good and convenient to use. By using this application, data visualization becomes composed and easy to find when needed. Here’s an excerpt of a statement:
“… My opinion regarding the existing surveillance information system is good, the patient data carried out during tracing becomes neater and easier to find when needed…” (MN: Head of Disease Control in DHO).
The disadvantage of the SILACAK application is that there are often problems so that it cannot be used every day and has to wait 2x24 hours to be reused. Here’s an excerpt of a statement:
“… applications from the SILACAK system sometimes do not run smoothly every day, for data input, it takes 1-2 days or 2x24 hours …” (MN: Head of Disease Control in DHO).
This information system is already good, but it is only suitable for basic material data for reporting. The drawback is that there is no menu for visualization. Here’s an excerpt of a statement:
“… The system is good enough for basic materials because the scope is only for reporting, but there are no tools for visualization....” (AL: Surveillance officer in PHC).
Another drawback is that there is no menu for presenting data distribution by place. Here are excerpts of statements:
“… distribution data by place is not available yet…”(YL: Surveillance officer in PHC).
“…Now, the dashboard in SILACAK district only brings up numbers, the number of confirmed cases that are tracked, then also, what is the proportion of close contacts that are tracked, yes, there are a lot of them, so it needs to improve the algorithm of the available surveillance system...” (DK: Surveillance Supervisor in DHO).

DISCUSSION

Surveillance Procedure

Control of COVID-19 in Indonesia is carried out based on the Regulation of the Minister of Health Number HK.01.07 / Menkes / 413/2020, concerning Guidelines for the Prevention and Control of Coronavirus Disease 2019 (2020), in which every suspect, probable, and confirmed case epidemiological investigation must be carried out using a form. The results of epidemiological investigations are used to provide input for policymakers to overcome or terminate transmission more quickly.

The data sources, which include notifications and case reporting from laboratories, general practitioners, and hospitals, are the most common sources of information for case-based communicable disease reporting systems and other sources (healthcare-based or not) can also be included in a public health reporting system (12). Furthermore, epidemiological investigations were carried out with close contact tracing by Public Health Center Tracers. The data unearthed by contact tracing officers when conducting epidemiological investigations include patient identity, clinical symptoms, comorbidities, travel history, contact history, and the identities of people who have close contact with patients.

One case-based intervention called contact tracing has the potential to impact the number of COVID-19 instances that effectively reproduce, or the number of secondary cases that result from a single primary case. Contact tracing will also affect the likelihood of extinction of the outbreak, which is 0 new cases in 20 generations (13). Comprehensive contact tracing is a major factor associated with fewer COVID-19 deaths, according to analyses involving 138 nations. They offer empirical proof that, after adjusting for pre-pandemic health capacities, non-pharmaceutical public health policies, economic factors, and country-specific features, countries with higher intensities of contact tracing had reduced case fatality rates (14).

As stipulated in the COVID-19 Prevention and Control Guidelines made by the Indonesian Ministry of Health (2020), for every case that has been carried out epidemiological investigation must be carried out for close contact tracing. Close

contacts that have been found must be recorded and reported daily, regarding their health status, and the date of last contact with the suspect / probable / confirmed case. Contact tracing officers report confirmed cases and close contacts through the Contact Tracing Application (SILACAK version 1.2.5).

Table 1
Matrix of interview results identification of problems

Problems	Practitioners (Surveillance Team Public Health Centers)
The procedure of Surveillance Systems	
Data Collection	If the antigen test result is positive, it is recommended to self-isolate for 14 days, if it is negative, then isolation is still carried out but not necessarily for 14 days
Input Data/Recording Data	After obtaining close contact data, the data are entered into the SILACAK application system and NAR (New All Records). For data processing, descriptive epidemiology, namely the number of cases and the distribution of cases.
Data Analysis	For analytical epidemiology, the virulence level is calculated, which is measured by how large is the positive rate of close contacts tested, and the severity is measured from the number of cases that died compared to the number of positive cases.
Data Visualization	In the form of a visualization... a map of the distribution of cases only, more to the picture and the number of active cases who died. There is a visualization graph when the data are presented at the Public Health Centers or the Health Office for the Sub-District COVID-19 Task Force, it's quite simple.
Data Reporting	Until now, it is not specifically available; however, the Public Health Centre (PHC) data processing officers use Ms. Excel to perform data processing manually. The data manager submits to the Public Health Centers or sub-district head, the data manager presents data or visualization basic materials when monitoring and evaluating.
Use Surveillance Information Systems Available	
Information System Support for surveillance systems	The SILACAK application serves as a support for recording and reporting electronically and contains important forms of information about COVID-19 during tracing.
Perception of available information systems	The system is good enough for basic materials because the scope is only for reporting, but there are no tools for visualization, and distribution of data by place is not available yet

The use of SILACAK starts from the primary healthcare level by utilizing health workers and collaboration with volunteers, the Indonesian National Military and the Indonesian National Police. SILACAK was used in stages and in July 2020 it was used by 34 provinces (15). The process of inputting confirmed cases is carried out every one to two days, depending on the discovery of new cases (notifications) in the Public Health Center work area and the condition of Contact Tracing Applications (CTAs).

Although effect size depends on other model factors (e.g., proportion of asymptomatic persons, testing delays), and interventions following CTA notification, CTAs have the potential to be successful in decreasing SARS-CoV-2-related epidemiological and clinical outcomes (16). While the integration of technology-based contact tracing applications to combat COVID-19 and break transmission chains promises to yield better results, these technologies face challenges such as technical limitations, dealing with asymptomatic individuals, lack of supporting Information, computer and technology (ICT) infrastructure and electronic health policy, socioeconomic inequalities, deactivation of mobile devices' WIFI, GPS

services, problems with standardization and interoperability, privacy concerns, security risks, political and institutional reactions, hazards related to ethics and the law, voluntariness and permission, misuse of contact tracing apps, and prejudice (17). The importance of privacy, when it comes to sharing medical information, cannot be denied (18). Some potential users view their privacy concerns as a barrier. Advocates for privacy have expressed worry about data security problems arising from the use of contact tracing applications (19). This becomes an obstacle in the data collection process so that the data targets input by surveillance officers are not achieved.

After the data are inputted into the SILACAK application, the next procedure is to analyze surveillance data. These basic analyses require decisions to take the kind of information that needs to be collected. Most contemporary survey systems are maintained electronically, and highly integrated computer systems and networks are widely available. A surveillance system can be operated on personal computers and over the Internet. Software to meet the most basic analytic needs for surveillance, including mapping and graphing, is now widely available (20). However, the problem is that community health center surveillance officers cannot use computer devices optimally to support data analysis. This is because knowledge and skills in carrying out data analysis are still low.

Based on the results of research on data analysis of surveillance results conducted by the Public Health Center, from the results of case tracing, it is carried out manually, namely by calculating surveillance indicators' positivity rate, fatality rate, and visualization of descriptive data using the Ms. office application so that it is not optimal. Surveillance indicators have not been achieved optimally in data synchronization, the ratio of the number of cases with close contacts and identification of case clusters is not optimal, and there is no significant difference between manual recording and SILACAK App. Although monitoring had been running optimally and had been able to reduce the CFR (6), as the outbreak evolved, the manual reporting process became unsustainable (21). This is due to internal factors of surveillance officers, namely knowledge of the main indicators in controlling COVID-19 which must be reported in surveillance. Then, there is a skill factor in using computer devices to support data processing and data presentation using applications that suit your needs. This low level of knowledge and skills is due to the level of education and lack of training.

Use of Surveillance Information System

The COVID-19 Surveillance Information System in Indonesia uses the SILACAK and New All Record applications with different functions. The SILACAK application has the main function of accommodating the recording and monitoring of close contacts of COVID-19. Data input is at the Public Health Center level which is carried out by tracers with supervision from the Person in Charge of Test, Track, and Isolation (PC TLI) at each health service facility. The incoming close contact data are the result of tracing or tracking each confirmed case (positive for COVID-19) recorded in the New All Record (NAR) COVID-19 laboratory examination result system as well as direct reports from patients at the Public Health Center. In April 2021, the NAR-SILACAK system integration was carried out, so that the confirmed case data that have been recorded on the NAR application are automatically entered into the SILACAK application and tracers can directly carry out close contact tracing domiciled in their Public Health Center (PHC) work area. Furthermore, close contacts found from the results of the confirmation case interview will be inputted by the tracer into the SILACAK application (15).

Tracing and monitoring of close contact cases of COVID-19 in Indonesia is carried out in full through the SILACAK Application. The use of contact tracing technology is in line with a directive from WHO in February 2021 on COVID-19 Contact Tracing, which states that the use of digital technology is important in supporting the surveillance process of contact tracing of COVID-19 cases, considering that tracing is one of the key components of emergency response actions against the spread of infectious diseases. Some have stated that, in the containment of COVID-19, digital contact tracing (DCT) is a useful adjunct to manual tracing (22). Digital contact tracing automates tracing on a scale and speed not easily replicable without digital tools. It reduces reliance on human recall, particularly in densely populated areas with mobile populations (23).

The use of a case tracking information system is the SILACAK application, which is the only tracing tool in Indonesia that must be used by contact tracer officers at Public Health Center guided by e-books and video usage guidelines (24). This guideline is intended to reduce the occurrence of errors in the operation of information systems caused by human factors (human error). System operation errors due to human error can threaten system integrity and data quality. The hardware

most often used by contact tracing officers to access SILACAK is laptops and mobile phones.

The acceptance of applications in information systems is very important because it will affect surveillance performance. The acceptance of the SILACAK application by Public Health Center officers shows that the perception of usefulness that has been considered quite good is performance and effectiveness of performance, simplifying user work, as well as the benefits of the system as a whole, and the convenience of good use. In the perception of convenience, the indicator that is felt to be quite good by users is the ease of learning, using, and flexibility of the SILACAK application, while the indicator that is still felt to be lacking is that the SILACAK application is not easy to control. This means that tracing officers have accepted the SILACAK application well to assist in contact-tracing activities (25).

Reporting in surveillance information systems is an important stage for conveying the performance results of case-tracking activities. In case tracking report by the Public Health Center through the SILACAK application, data are automatically received by the data manager at the Public Health Office and will be displayed on the dashboard. The data displayed on the dashboard are in the form of numbers and point diagrams of the number of cases and close contacts. A dashboard is a way of displaying various types of visual data in one place. Usually, a dashboard is intended to convey different, but related information in an easy-to-digest form. And oftentimes, this includes things like Key Performance Indicators (KPIs) or other important business metrics that stakeholders need to see and understand at a glance (26).

Data dashboards are being used extensively in the pandemic, collating real-time public health data, including confirmed cases, deaths, and testing figures, to keep the public informed and support policymakers in refining interventions. COVID-19 dashboards typically focus on time-series charts and geographic maps, ranging from region-level statistics to case-level coordinate data (23). Various types of numbers can be presented in the drill-down pages of the dashboard style, which can automatically summarize data. On various drill-down pages, you can find more specific or supplemental information, including recordings of specific surveillance data streams or advise (27).

CONCLUSION

COVID-19 surveillance procedures in Indonesia start from initial data collection, data collection, data recording with the SILACAK and New All Record (NAR) applications, manual data analysis with MS. Excel, data reporting, and data quality assurance but there are obstacles to data collection in the community and obstacles to applications used for surveillance.

We recommend to the District Health Office that it is necessary to compile an algorithm and new procedures that include data management stages with epidemiological data analysis, analytics, and data visualization based on case distribution maps and epi-contacts.

CONFLICT OF INTEREST

There is no conflict of interest in this writing.

AUTHOR CONTRIBUTIONS

CH, FMS: Conceptualization, Methodology, Software, CH, FY: Data curation, Writing–original draft preparation. CH, FMS: Supervision: CH, FMS, FY: Writing-reviewing and editing.

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