Contact Tracing Model for Positive Covid-19 Patients with Digital and Local Wisdom

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ABSTRACT
Contact Tracing is one of the effective ways to control the spread of COVID-19 by breaking the chain of transmission in a large crowd or community. The aim of this study was to conduct a contact tracing study of positive COVID-19 patients. The method used was in-depth interviews conducted in the midst of the Coronavirus outbreak. Conducting the face-to-face in-depth interviews could be problematic so that internet technology was alternatively used such as WhatsApp. Online Research Methods (ORMs) is a research method to collect data via the internet, namely YouTube, Facebook, Twitter, Instagram. This study found empirical data that users of the PeduliLindung and non-governmental organization (NGO) application claimed that this application was unsafe and vulnerable to be exploited. This made only 6% of residents use the PeduliLindung application. The data showed that Indonesia was 56 of 63 digital divide countries. In fact, PeduliLindung application was effective in tracing only 60% users to access this application.

Keywords: coronavirus; contract tracking

1. INTRODUCTION
Coronavirus (COVID-19) has become a trending topic in many countries. COVID-19 has become an emergency problem regarding the public health threat and become an international concern [1] - [3]. The beginning of the outbreak was in the city of Wuhan, China [4], [5]. The spread of COVID-19 was very fast [6]. This plague epidemic spread in many countries globally [7] - [9]. The viral infection was transmitted from person to person [4], [10]. The faster and easier mobility was a factor in the spread of the epidemic and got wider [11] so that cases of COVID-19 infection every day continued to increase. The World Health Organization recommended a combination of measurements such as: prompt diagnosis and immediate case isolation, close tracing, and close contact prevention through self-isolation [12], [13].

The World Health Organization (WHO) reported data on 19 April 2020 that: there were 152,551 deaths (6,463) of 2,241,359 confirmed patients (81,153)[14]. On 25 April 2020, there were 25,969 death cases worldwide and 2,840,000 have tested positive for COVID-19. The number of deaths in America on April 25, 2020, reached 50,031 people. Meanwhile, the positive confirmed case for the coronavirus in the US was recorded in more than 870,000 cases. There were 25,969 people who died in Italy and 193,000 were infected. On the same date, there were 22,245 people killed in France with 123,000 positives for COVID-19. The data from WHO regarding the latest cases in several countries on April 19, 2020, were very surprising: Japan (566), Philippines (209), Singapore (523), India (1334), Bangladesh (306), Iran (1374), Saudi Arabia (1132), Pakistan (512) Indonesia (325).

Contact tracing is a term often mentioned in the midst of the spread of the COVID-19 outbreak. In some countries, cases of COVID-19 infection were increasing. The victims of Covid-19 existed in line with the rapid increase in cases and deaths [15]. Governments in many countries attempted to carry out Contact Tracing to control the spread of the virus, which was identified in December 2019 [5], [7], [16]. Many people were monitored and evaluated when they had contact with a positive COVID-19 patient. So, the concept of Contact Tracing is to identify people who have had contact with positive COVID-19 patients.

The concept of Contact Tracing was to prevent the spread of infection in large crowds or communities through termination of transmission lines. The main means of controlling the spread of
infectious diseases such as COVID-19, STDs, Ebola, and tuberculosis was contact tracing. It could be used to detect the number of people infected after close contact with positive case-patients [17]. COVID-19 infected hundreds of thousands of people around the world and still became contagious [4]. The virus was transmitted through droplets (droplets of saliva particles from coughing, sneezing, or while talking), so that close contact with an infected person might spread it. The person who was close to the infected person had the potential to spread the virus again in a crowd because s/he did not realize that they were the carrier. In epidemiological investigations of infectious diseases, investigating, classifying, tracking, and managing contacts by identifying patient routes were essential to prevent further transmission of the disease [18].

2. CORONAVIRUS DISEASE 2019 (COVID-19)

Coronavirus is a group of viruses that causes disease in animals or humans. Several types of coronavirus are known to cause respiratory tract infections in humans ranging from cold coughs to more serious ones such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) [19]. A new type of coronavirus was discovered to cause COVID-19 disease.

The most common symptoms of COVID-19 were fever, feeling tired and dry cough. Some patients might experience aches and pains, nasal congestion, runny nose, sore throat, or diarrhea. Symptoms were usually mild and occurred gradually. Some infected people did not show any symptoms and still felt well [11]. The huge majority (about 80%) of infected people recovered without the need for special treatment. There were about 1 of 6 positive COVID-19 people getting seriously ill and difficulty breathing. The elderly people, pregnant women [15], and people who were prone to pre-existing medical conditions such as high blood pressure, heart problems, or diabetes, were more likely to experience more serious illness [21]. Those with fever, cough, and difficulty breathing should get medical attention [16].

According to research, the virus causing COVID-19 was generally transmitted [22], through contact with droplets from the respiratory tract, not the air. The main way was through respiratory droplets when coughing. The risk of catching COVID-19 from a person who had no symptoms was very low. However, many people with COVID-19 experienced only mild symptoms, especially in the early stages. Therefore, COVID-19 could be transmitted from people who, for example, only have a slight cough but felt well [23]. WHO continued to review research developments on how COVID-19 spread and would share the latest findings.

3. CONTACT TRACING

Contact tracing is a concept for detecting people with high potential for contracting the virus from positive COVID-19 patients. In COVID-19, it takes 7 to 14 days to show symptoms. At the initial stage, people generally experienced light symptoms such as fever, cough, and headache. Contact tracing could be a tricky type of job since it required tracing back a positive patient's contact with other people. When you said 'close contact' it did not mean everyone they met on the street or at the shop or the person across the street from a positive patient.

4. DIGITAL AND LOCAL WISDOM

Digital technology is a non-manual tool operated by humans but an automatic operating system with a computerized system or a computer-readable format. Digital technology is basically a fast counter system that processes all forms of information as numeric values (digital code). Meanwhile, digital communication technology is technology based on computer electrical signals, where the signal is intermittent and uses a binary number system. Binary numbers will form a digital code (1 and 0 based on whether or not an electric current is regulated by the transistor). The digital code will later be processed by a computer. For example, a video camera image converted from light waves into digital form in pixels.

Wisdom means kindness and local means local area. The definition of local wisdom is values, ideas, full of wisdom, wise local views, good values embedded and obeyed by community members. Another understanding of local wisdom is that it is part of the community's culture that cannot be separated from the language of the community. Local wisdom in this research is that digital tools for contact tracing are safe for individuals. Individuals are not exploited with digital data online, with no data theft ranges.

5. RESEARCH RESULTS

President Joko Widodo (Jokowi) ordered his staff to track the coronavirus or aggressive tracing using information technology. He did not want Covid-19 tracing carried out conventionally. He gave an example that New Zealand had done tracing using a digital diary, then South Korea developed mobile GPS. Jokowi wanted the same thing to be implemented in Indonesia so that tracing could be better be monitored. President also asked for data management for handling Covid-19 to be improved so that everything was one door access or integrated. The available data could be
used as the basis for decision making by the government.¹

The President also ordered the Covid-19 Acceleration Task Force and TNI / Polri (National Armed Forces of Indonesia/Police of Republic of Indonesia) to focus on the red zone area or high level of virus spread. There were three areas under Jokowi's attention because of high levels of corona spread, namely East Java, South Sulawesi, and South Kalimantan. The president targeted 20,000 Covid-19 specimens per day, however, only 10 thousand specimens had been accomplished.²

A. Digital Diary

On June 4, 2020, President Joko Widodo wanted aggressive tracking of the COVID-19 case in Indonesia carried out using technology. As New Zealand did, namely Digital Diary. The digital diary mentioned was a smartphone application called NZ COVID Tracer, launched by the New Zealand government on May 20, 2020. NZ COVID Tracer was an application developed by the Ministry of Health to support contact tracing (contact tracing) quickly and effectively by creating a digital copy of places visited by positive patients.³

This application could be installed on mobile phones using android or Apple operating systems. People could download NZ COVID Tracer on Google Play and the App Store. The users needed to sign up using email and create a password first, including filling the personal data (optional). The digital diary scanned the QR code through this application. The users of this application traveled to a certain place, for example, a restaurant or shopping center, where there was a QR code poster that could be scanned by the user.

By scanning the QR code provided by the government, the movements of the NZ COVID Tracer application was tracked. The travelling history of the application users could be seen in the menu of this application. Here, the information regarding traveling history would be deleted automatically after 31 days.

B. Mobile GPS

On June 4, 2020, President Joko Widodo also wanted COVID-19 cases tracing more aggressively by using technology. One of Jokowi's references was using South Korean-style mobile GPS. The application of this global positioning system was initially used in South Korea in mid-March, in Daegu and North Gyeongsang, the two locations where the two places had the worst COVID-19 infections in South Korea, even in the world. The background was that more than 2,000 people who tested positive for COVID-19 in Daegu and North Gyeongsang were waiting for hospital treatment. In such conditions, the government instructed people who were positive for COVID-19 to do quarantine while waiting for the availability of hospital beds. In the days before the Coronavirus occurred, the South Korean government already had a system to collect a number of transaction data to investigate tax fraud. Every credit card and banking transaction in South Korea was recorded by the government.

During the epidemic of COVID-19, the system was directed to trace where people transacted, for example, whether people had access to food and restaurants, or also to buses and subway trains. All services in South Korea were mostly non-cash, so the data where transactions from certain people were traced by the authorities. In addition, CCTV in South Korea was also widely available.

C. Digital Gap

President Jokowi ordered the coronavirus tracing using information technology in June 2020. However, this idea did not run well because of the digital divide. In August, President Jokowi was surprised by IDM survey results. Jokowi referred to the Institute for Management and Development (IMD) survey which showed that Indonesia was in 56th position of 63 countries. The IMD (Institute for Management and Development) as the World Digital Competitiveness survey in 2019 reported that Indonesia ranked 56th of 63 countries. Indonesia was lower than the neighboring countries.

Based on the regulation of the ministry of health no. 328/2020 concerning self-assessment, the Human Resources Department (HRD) sent emails to all employees a night before employees worked, whether they were at big or small risk. Using this method, the company could save up to 80% -90% of the cost of the swab test. By having measurable data, it could separate who should be tested or not. The cost was inexpensive around IDR 25,000 per month per employee. For example, if there were 1,000 employees, the company cost was around IDR 2 million per month, while comparing rapid test or a swab test for all employees, this could reach IDR 2 billion.

D. Peduli Lindung (Protection Care) App

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¹ https://nasional.okezone.com/read/2020/06/04/337/2224330/president-jokowi-sent-already-had-system-to-track-covid-19
There were 9 countries besides Indonesia that developed applications like PeduliLindung (protection care), namely New Zealand, Iceland, Norway, Singapore, Australia, Israel, India, Austria, and the Czech Republic. However, the ranking was based on 0-5 rating and placed the second position, currently, the number of downloads of PeduliLindung was still around 6% or not more than three million.

According to data from DigitalReach, an organization engaged in the digital sector and its relation to human rights in Southeast ASEAN, there were 11 COVID-19 contact tracing applications running in six ASEAN countries. The applications are PeduliLindung (Indonesia), Staysafe.ph (Philippines), Mor Chana and Thai Chana (Thailand), TraceTogether, SafeEntry, and Trace Together Token (Singapore), Gerak Malaysia, MySejahtera, and MyTrace (Malaysia), and Bluezone (Vietnamese).

The Implementation in South Korea, Singapore, and China was based on mobile device data regardless of the operator, while in Israel and Taiwan it was based on telecommunication operator network data. In China, for example, the government installed CCTV, drones, and digital barcodes in the application to check the health status of its citizens. Israel even issued an emergency policy to use mobile device GPS data on the HaMagen application to trace residents and quarantine infected residents. Singapore with the Bluetooth-based TraceTogether application between mobile devices was to track and trace the movement of Covid-19 cases. All data in Singapore were available to the government and could be used to directly debit fines from citizens’ bank accounts, if necessary. The South Korean government even used credit card transaction data, mobile device location data, CCTV and conversation data to provide information if citizens were close to Covid-19 carriers.

How to use PeduliLindung was available for Android devices and the status was early access or currently developed applications that might be unstable. Here was how to use the PeduliLindung application starting from downloading, registering, and inviting family and friends to join this application:

1. Open Play Store and search for "PeduliLindung apps" or click the link to start downloading.
2. After download and installation is complete, open the application.
3. On Peduli Lindung home page, tap the "BE PARTICIPANT" menu.
4. Enter the phone number and then tap "SEND OTP".
5. Enter the OTP code sent via SMS and then tap "VERIFY".
6. Then, PeduliLindung asks for approval to access Bluetooth, cellphone, and location (GPS).
7. Continue to tap "HOME PAGE".
8. On the home page, tap the share icon to invite friends and family to participate. The download links will be sent to them via SMS, WhatsApp, Twitter or email.
9. Peduli Lindung also has save battery option via Power Saving mode.
10. Make sure that PeduliLindung application is always open to make it function continuously.

On March 31, 2020, the PeduliLindung application was downloaded more than 100,000 times. In the Play Store, this application was last updated on March 27th ago. Currently, it was downloaded by 2.3 million users in two weeks and more. It was such a huge number, but was still small compared to the population of Smartphone users in Indonesia. The Aarogya Setu application for example in India reached 65 million downloads within 15 days, although it had 5 times more than the population in Indonesia. However, from this data it could be said that public interest in PeduliLindung application was very low.

Although the Ministry of Communication and Information stated that the PeduliLindung App was safe and has passed Apple’s Android and iOS strict procedures. Besides security factors, the effectiveness factor became considered by users. The Big Data Institute of the University of Oxford said that there must be at least 60 percent of the total population in a country using the application to see that it was effectively used. Meanwhile, only 6% had just downloaded in Indonesia (10 June 2020, official data from the Ministry of Communication and Information Technology) and this was accompanied by a severe digital technology gap.

6. CLOSING

The application developed by Indonesia ranked the second position based on 0-5 rating but the number of PeduliLindung downloads was still around 6% or not more than three million. On

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4 https://tirto.id/mengenal-aplikasi-pedulilindungi-cara-kerja-dan-menggunakannya-eJWT
March 31, 2020, PeduliLindung application was only downloaded more than 100,000 times. On the Play Store, the app was last updated on March 27 and downloaded by 2.3 million users only in two weeks. Although the number seemed huge, it was still small compared to the population of Smartphone users in Indonesia. The Aarogya Setu application in India reached 65 million downloads within 15 days, although it had 5 times more than the population in Indonesia. The digital divide made the PeduliLindung application ineffective against COVID-19.

Although the Ministry of Communication and Information had stated that the PeduliLindung App was safe and passed Apple's Android and iOS strict procedures. PeduliLindung App and NGO users found that this application was still vulnerable and endangered users. In addition to the safety factor, effectiveness also became a consideration for the user. The Big Data Institute of the University of Oxford stated that there must be at least 60% of the total population in a country using the application to see its effectiveness. Meanwhile, only 6% have just downloaded in Indonesia.

REFERENCES


