



Journal of Public Health Research



eISSN 2279-9036

<https://www.jphres.org/>

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The final version of the manuscript will then appear on a regular issue of the journal. E-publishing of this PDF file has been approved by the authors.

J Public Health Res 2021 [Online ahead of print]

To cite this Article:

Haris I, Afdaliah, Haris MI. **Response of Indonesian universities to the (COVID-19) pandemic – between strategy and implementation.** doi: 10.4081/jphr.2021.2066



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Response of Indonesian Universities to the (COVID-19) pandemic – between strategy and implementation

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Key words: COVID-19, response, Indonesia, university, college, pandemic.

Acknowledgement: The authors would like to thank the editor and the referee who kindly reviewed the earlier version of this manuscript and provided valuable suggestions and comments. We present our response to the comments and suggestions from the reviewer.

Contributions: The authors conceptualized the design of the study. MIH was involved in literature search, and writing of manuscript's first draft. IH and A revised and commented on the first and subsequent drafts. All authors finally reviewed the manuscript critically. The final manuscript was read and approved by all authors

Conflict of interest: the authors declare no conflicts of interest.

Ethics approval and consent to participate: This manuscript does not report on or involve the use of any animal or human data or tissue.

Patients' consent for publication: This manuscript does not contain data from any individual person.

Availability of Data and Materials: The data that support the findings of this study are available from the researcher's database but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of the authors.

Significance for public health

To this day, the coronavirus disease 2019 (COVID-19) pandemic has not shown signs of abating. However, many experts have provided analysis and predictions that will begin to subside, provided that all parties are willing to continue to be ready to play a role, synergize, and work together to overcome it. Including the role of higher education in response of the outbreak of this pandemic. Universities in Indonesia has a strategic role to play in controlling Covid-19 with its various resources and have the potential to make various innovations as a contribution to prevent and to break chains of Covid-19

transmission both at the individual and campus community to the society. This paper provides the effort of higher education in Indonesia in response of the Covid-19 pandemic.

Abstract

Escalated by mid-January 2020, the Coronavirus Disease 2019 (COVID-19) pandemic is having a profound effect on all aspects of society, including the education activities in higher education. Colleges and universities globally are taking various actions to contain the COVID-19 outbreak. These efforts are mainly to secure the well-being of their students and staff, as well as members of their communities. Due to the increasing number of infections has prompted a number of universities in Indonesia to participate in the fight against the virus outbreak. This article provides an overview of the role played by Indonesian universities dealing with COVID-19 pandemic and how Indonesian universities serving the public good for COVID-19 breakthroughs. The research problem of this study focuses on how the strategies developed by the university in responding to COVID-19 and their implementation to reduce the potential consequences of the pandemic impacts. Subsequently, this paper presented the responses of universities in Indonesia in addressing the COVID-19 pandemic. The forms of responses presented in this paper are academic responses, research and development responses and social community services responses. Furthermore, a conceived information of the issues and challenging of involving of universities in collaborating on solutions to crises of the coronavirus pandemic in Indonesian context were portrayed. In conclusion, this paper summarizes the contribution of Indonesian universities and its impacts in fighting deadly virus disease COVID-19.

Introduction

Higher education as part of civil society play vital role to support the process of community empowerment in dealing with COVID-19. As a global disaster, the COVID-19 pandemic requires action for emergency responses, namely medical technical personnel for treatment and care, and management support to deal with communication, coordination, information and rehabilitation problems [1]; [2]. The activity requires good preparation and anticipation to deal with emergencies. Why do universities, besides hospitals and health services, need to be involved in the development of disaster management crisis centers? [3].

In addressing the spread of the COVID-19 pandemic, Indonesian universities are on the front lines [4]. They continue to prioritize the health and safety of students, teaching staff, administrative staff, and the broader community as this situation develops. The universities actively engage with governments at all levels, the private sector and civil society to contribute and supply critical medical supplies, and work with community partners to provide support for the national public health response to COVID-19 [5]; [6]. As an educational institution, universities have an important role in slowing the spread of COVID-19 in the community [7]. They follow the direction of public health institutions and take strong steps to facilitate social restrictions and physical distance while continuing to provide important support for students [8].

All universities in Indonesia, both public and private universities, large and small universities, also conduct urgent and collaborative research to help deal with this global outbreak [9]. With the financial support they have, research teams from various universities in Indonesia undertake extensive interdisciplinary projects to inform clinical and public health responses, develop and evaluate diagnostic and vaccine devices, ventilators, personal protective equipment and manage and deal with misinformation or hoaxes. Universities in Indonesia continue to work closely with partners and

provincial and district governments in reducing risk and finding solutions for COVID-19. As an organization, universities in Indonesia have generally switched to work-from-home protocols and continue to provide critical and timely support to their clients and members [4]; [10]; [11].

Indonesian Universities responses to COVID-19

Although the number of cases of coronavirus in Indonesia has yet to slow down, but the spread of the COVID-19 is increasingly still massive in some region in Indonesia [12]. No exception, state and private universities which are under the coordination of Indonesia national higher education service institutions [11] has also by COVID-19 impacted, especially in academic activities.

Academic responses to COVID-19 pandemic

Two weeks after the first two cases in Indonesia were confirmed on March 2, Indonesian Minister of Education and Culture, Nadiem Anwar Makarim issued on 16 March 2020 Ministerial Regulation No. 1 of 2020 on Prevention of Coronavirus Disease (COVID-19) in Higher Education in Indonesia and followed by Circular Letter Number 4 of 2020 concerning the Implementation of Education Policy in the emergency spreading of the coronavirus [11].

Responding to this regulation, at the time most of Indonesian universities is limiting face-to-face teaching as the COVID-19 outbreak worsens. However, in order to maintain academic activities is still lively, some colleges/universities in Indonesia are already moved to online instruction, so that students can keep up their studies. Classes are to be moved online, where possible, in an effort to reduce the number of people on campus. In-person teaching or courses, block courses and contact courses will temporarily halt as long as it doesn't impact the quality of teaching [13]; [14].

In response of the COVID-19 outbreak some universities opted to cancel classes and instead would teach students online. As of 14 March, numerous top rank universities in Indonesia have closed their classes, such as Universitas Indonesia, Universitas Gajah Mada, Institut Teknologi Bandung, Universitas Gunadharma, Universitas Atmajaya, London School Public Relations, Universitas Hasanuddin on 16 March 2020, at least 702 universities across Indonesia confirmed that conventional face-to-face lectures would be cancelled and would be replaced by online classes [15]. Among of these 702 universities, where their lecturer arranged distance learning for students who are at home and offer online lectures instead of large-scale lectures, consist of 65 state colleges/universities and 637 private colleges/universities (see table 1).

The COVID-19 pandemic has required all people in colleges/universities across Indonesia to act determinedly. Following government guidelines, all colleges/universities suspended face-to-face teaching and closed non-essential facilities on campus [16]. All of these activities are the respond of Indonesian universities to reduce situations where viruses can be spread is crucial at this time and this is vital to protect the safety, health and wellbeing of the entire community-staff, students, partners and the communities in which the Indonesian universities/colleges are located [17]; [18]. (Whole Indonesian universities is pulling together to ensure their students are safe and continue to receive excellent teaching, and researchers across all parts of them are focusing on tackling the virus and its effects on society [19].

Response to COVID-19 with research and development

A number of universities are doing research to produce ventilators in the country. The ventilator needs a later surge along with the spread of Corona's virus, a COVID-19. The number of patients infected by COVID-19 due to many hospitals in Indonesia is

lack of tools and special medical personnel to handle this pandemic. In light of COVID-19, the main concern is the availability of medical aids, such as the availability of ventilator. The ventilator can help patients with breathing difficulties get adequate oxygen intake. A ventilator can offer the best chance of survival for patients with the worst effects of the infection [20].

The facts are not all hospitals in Indonesia have equipped enough with ventilators; due to very expensive ventilator prices. The current ventilator price ranges from IDR 300 million - IDR 800 million per unit (US\$ 19,000 - US\$ 51,000). As of March 2020, Indonesia has only 8,413 ventilators that are scattered in 2,867 hospitals across Indonesia and mostly gathered in Java Island. In fact, their positive numbers of COVID-19 patients continue to increase as well as wider. The government of Indonesia has planned it will buy thousands of ventilators to help ease the pressure on hospitals caused by the coronavirus crisis [21].

In response to these conditions, some universities in Indonesia make an effort to develop a ventilator that can be used easily by medical personnel. Bandung Institute of Technology cooperated with and obtained technical consultation from the medical personnel at the Faculty of Medicine, Padjajaran University has developed the prototype of the emergency ventilator product named Vent-I (Ventilator Indonesia) [22]. Vent-I is a ventilator takes over the body's breathing process when disease has caused the lungs to fail, which particularly for patients who can still breathe themselves (if a COVID-19 patient is in the clinical symptom of Stage 2), not intended for ICU patients. In the initial presentation there are three functions demonstrated, namely CPAP (Continuous Positive Airway Pressure), CPC (Continuous Pressure Control), and SPC (Synchronize Pressure Control). The function of CPAP on the ventilator can be used by patients who are overcrowded but still can breathe themselves to avoid having to be treated in ICU. To the quality assurance of this product will perform a series of Vent-I testing. The initial target of the team was to make 100 Vent-I fruit in house to be donated to the hospital in need [23]; [24].

The ventilator team of the Department of Physics Engineering, the Surabaya Institute of Technology creates simple and low cost mechanical ventilator tools or a ventilator robot. This ventilator Robot is based on the open source design of the U.S. Massachusetts Institute of Technology. While for electronic systems and ITS monitor systems are fully developed by ITS team. Currently, the ventilator team is conducting the final stage test. These ventilator robots will be mass-produced to meet the needs of health facilities in the face of COVID-19 pandemic [25]; [26].

University of Gadjah Mada (UGM) is driving research to make a blueprint of local ventilator production. UGM has reverse engineering in order to engineer and formulate a ventilator-like blueprint. The local ventilator development is currently entering the system improvement stage. This simple ventilator can be used to help the initial treatment for patients who have not been hospitalized [27].

Other universities that also do ventilator development include University of Indonesia, Universitas Padjadjaran), and Universitas Airlangga, which collaborated with Institute of Technology of 10 November Surabaya (ITS).

At the Center for Innovation of Medical Equipments and Devices (CIMEDs) Faculty of Engineering at Gadjah Mada University, researchers are in high gear working on development of face shield helmet for medical personnel. This protective face helmet is used to protect the medical personnel from the fluid splashes and inhale directly from the COVID-19 patients. CIMEDs UGM has produced more than 600 helmets and distributed to a number of hospitals in Yogyakarta. In addition CIMEDs UGM also makes coverall suits or medical personnel clothing to handle coronavirus patients.

Meanwhile, researchers in Universitas Airlangga are currently researching five compounds to cure for COVID-19 sufferers. In progress, there are still 2 more steps to be done to test the effectiveness of 5 types of such compounds. There are five contender of this best compound which will later publish in advance to get inputs from Unair itself and international parties. It seems that the five compounds, each of which have their own similarities to chloroquine and the Avigan, and this compound also has anti-oxidant properties that serve as keeping cell membranes and proteins. The process of preparation and testing of the five compounds is predicted to take up to one year.

Due to high demand of Virus Transport Medium (VTM) to help smooth sample test from COVID-19 patients, the researcher in the Bogor Institute of Agricultural (IPB) has initiate to produce and donate VTM to the needy institutions such as health service and hospitals. The team of medical Microbiology Laboratory, the Faculty of Veterinary Medicine is now continuing to produce VTM to be donated to the hospital across Indonesia. VTM is very important role in checking COVID-19. VTM is a viral preservation medium in the sample of the patient's swab. VTM is used to place specimens taken from patients using the Swab method [26].

At present, IPB can prepare and produce the 250-500 VTM per day. As of today, IPB University has donated 4,130 VTM and swab. IPB targeted the creation of new VTM around 2,500 units. All of this VTM will contribute to the hospitals in the city and district of Bogor, the health office of the city and Bogor district, as well as hospitals in other regions [28].

Universitas Padjadjaran becomes a sample inspection site COVID-19 through central Unpad Laboratory which has been verified as a laboratory with Bio-safety Level 3 (BSL3) from 24 March 2020. Examination in BSL3 Unpad Laboratory will increase the examination capacity that has been running in university hospital of Unpad in cooperation with the Health Office of Province West Java and Bandung Institute of Technology. Laboratory of BSL3 Unpad, targeted around 30 thousand samples can be examined with a rate inspection of about 1000 samples per day. This BSL3 laboratory has been established by the Ministry of Health as one of the COVID-19 examination Laboratory for West Java and ready to support inspection services [29].

The completed laboratory built in 2019 with funding from the Islamic Development Bank (IDB) has perfected the technical preparation of laboratory tests for COVID-19 samples using Real-time Polymerase Chain Reaction (PCR). As has been widely known, lab tests for COVID-19 samples can be performed in two ways, namely rapid test using blood samples and PCR-based examinations with a sample of Apus or a throat swab. According to international standard standards, the PCR examination of the Apus throat sample is still a reference for diagnosing the exposure of Corona viruses [30].

The University of Indonesia's expert and researcher team succeeded in developing protective equipment prototypes (PPE) in the form of face protectors using battery-powered air purification respirator technology. The tool is thought to be able to work for six hours continuously and can be pinned to a bag or belt specifically in its operation. Personal protective equipment (PPE) result of University of Indonesia's innovation is expected to protect the medical personnel in charge of treating the patients COVID-19.

PPE equipped with Air Purification Respirator was initiated early by a research team from the Faculty of Mathematics and Natural Sciences and collaborated with a team of researchers from the Faculty of Medicine and faculty of Nursing under the coordination and funding support of the Directorate of Innovation and Science Techno Park University of Indonesia [31].

The development of PPE Air purification respirator was backed by a high case of medical personnel who became victims of a COVID-19 transmission while on duty. The PPE is equipped with an air purifying module, a data panel as a filtered air quality gauge indicator, full face mask, complete with air hose, and battery module as a power supply tool.

Amidst of the outbreak of the Covid-19 pandemic, one of the problems faced was the lack of VTM (viral transport medium or viral carrier media). Some orders made by competent parties never arrived. Seeing this condition, the Faculty of Pharmacy, Gadjah Mada University held a VTM procurement program to support testing of the Covid-19 virus. Viral transport medium (VTM) is a carrier for nasal and throat mucus specimens of patients that will be swab tested to be sent to the laboratory where further testing is carried out [32].

Patients suspected of being infected with SARS-CoV2 were taken for nasal and throat mucus specimens to be followed by a PCR (Polymerase Chain Reaction) test. Positive results through the rapid test version need to be further confirmed by this PCR (Polymerase Chain Reaction) swab test. The PCR swab test is a test with the most valid relative results for diagnosing infection with SARS-CoV2, the virus that causes Covid-19. At present, there are two laboratories at UGM can already be used for Covid-19 detection.

The VTM procurement program is to support PCR (Polymerase Chain Reaction) swab testing of the Covid-19 virus. The developed process was carried out in the Faculty of Pharmaceutical Sciences (APS) Laboratory of UGM. The VTM was made at the UGM Faculty of Pharmacy to meet the needs of the VTM in several PCR swab Testing Laboratories in some hospitals Indonesia [33].

The assembly of VTM refers to the American Centers for Disease Control and Prevention protocol. In its manufacture requires several tools including bio-safety cabinet, water bath, and sterile filter size of 0.20-0.45 micron. While the ingredients used include Fetal Bovine Serum (FBS) which is then heat activated, Hanks Balanced Salt Solution (HBSS), gentamicin sulfate, amphotericin B. The process for making VTM involves inactivating FBS in the antibiotic preparation water bath by mixing the two antibiotics above, and mixing the prepared ingredients into the HBSS buffer. The storage of VTM preparations is at a temperature of 2-8°C.

The program for preparing VTM by UGM is focused to meet the needs of VTM in testing laboratories. Therefore, in this VTM procurement activity, the Faculty of Pharmacy of UGM involves lecturers and educational staff who have the competence and expertise for it [33].

Besides, VTM, UGM also has developed a swab booth equipped with a High Efficiency Particulate Air (HEPA) filter to facilitate and protect health workers in detecting coronavirus infections (Covid-19) in patients [34].

With this swab booth/room, health workers or paramedics do not need personal protective equipment when conducting swab tests on patients. By using this swab booth the health workers do not need to use Personal protective Equipment (PPE) because they are in a cubicle. The process of taking mucus samples from the nose and throat of the patient using protruding gloves. The booth would not only help and save PPE when testing the swab. This cubicle can also provide comfort for health workers when conducting a swab test, but still pay attention to the safety of health workers and patients. Health workers do not need to use PPE just enough to wear a face mask so that it is comfortable not to be burdened with severe and heat of Hazmat suit. In addition, this cubicle can reduce medical equipment waste and get around the shortage of medical equipment. Be an alternative solution for health workers amid the limitations of PPE [34].

The cubicle is designed with a size of 90x90 cm with a height of 2 meters. The cubicle body is made of aluminum composite panel (APC) material with a thickness of about 3 mm. Equipped with a door on the back and on the front using a 6 mm thick glass with two holes mounted long medical standard gloves equipped with disposable handscoon for the hands of health workers to examine patients.

The cubicle body uses stainless steel, but is constrained by high prices. While the use of wood is not possible, it can be replaced by using Glass-Reinforced Concrete (GRC) board material. The GRC board is less suitable when cleaned with disinfectant. Although the cubicle is using quite cheap materials, but the quality of the swab booth is in accordance with medical standards [34].

The cubicle is also equipped with a HEPA filter that is commonly used to make the room clean and sterile like in a laboratory. Inside the room there are also lighting lamps and blowers. It also equipped with amplifiers with speakers as a means of communication with patients. The booth design is dynamic, can move with four wheels underneath. With a design like that allows the room to be moved easily and can be used in various places.

Using this swab booth, health workers can feel comfortable when conducting a swab test on patients. While the security of both medical personnel and patients is also maintained. Disinfection is carried out on disposable gloves and the outer surface of the chamber before being ready for use by the next patient. When a new patient arrives to be treated the condition is clean, has been sprayed and replaced with new gloves.

The design of this cubicle was inspired from a video of health workers in South Korea who were conducting a swab test in a cubicle to examine patients. For produce one unit of swab cubicle costs about IDR 8 million (US\$ 515). In the production process, UGM collaborated with two SMEs in Yogyakarta. In the meantime, production capacity is still limited to 10-15 units per week and some is already distributed to a number of Covid-19 referral hospitals in Indonesia [34].

Social and community service of Indonesian university in response to COVID-19 pandemic

The coronavirus outbreak or the COVID-19 case that struck the world today requires all of us to pay more attention to every aspect of their prevention and appearance. In Indonesia, many universities have disaster management committees that were rapidly activated during COVID-19 to prepare plans for the unexpected. This outbreak, due to the extent of unfamiliarity and uncertainty thereof, can challenge these efforts and expose limitations in such plans, including the plans of colleges/universities in Indonesia.

In light of COVID-19, this disruption has required all people in the world to act decisively. The virus has infected over 2.3 million people worldwide and it killed over 160,000 of them [35]. As measures to prevent the spread of the virus, most of colleges/universities in Indonesia have adapted a strategy and implement the strategy to prevent and control this situation, such as: adopted the practice of social and physical distancing, operating in virtual activities for academic as well as management activities and will not resume regular business operations until June 2020, cancellation of academic/management residential meetings, support mandatory self - quarantine of infected persons.

Since the beginning of March 2020, all Indonesian universities have been monitoring the impact of the 2019 novel coronavirus (COVID-19) and they committed to keeping the community informed of this rapidly changing situation. Some universities have been established COVID-19 crisis center, such as; Universitas Indonesia, Universitas Gajah mada, Universitas Negeri Yogyakarta, Universitas negeri Gorontalo, Universitas

Negeri Surabaya, Universitas Airlangga, Universitas Muslim Indonesia dan Universitas Trisakti Jakarta, and several universities across Indonesia [36]; [37]; [38].

Support and quick response from Indonesian universities also have been initiated by some universities hospital in assisting with the treatment of COVID-19 pandemic. Faculty of Medicine of some Indonesian universities has intensively made efforts to prepare themselves to serve as a test center and conduct patient handling. Currently, 13 Indonesian universities hospitals (*Rumah Sakit Pendidikan/RSP*) have been assigned to handle COVID-19.

Besides the 13 RSP of state universities, the positive response also comes from several other university hospitals that have expressed their willingness to actively support the handling of COVID-19, namely: (1) RSP of University of Syiah Kuala, Aceh; (2) RSP of University of Jambi; (3) RSP of University of Mulawarman, East Kalimantan. In addition, there are three private colleges also have been prepared their hospitals for COVID-19, such as: (1) RSP of University of Pelita Harapan, Jakarta; (2) RSP of Atmaja Catholic University Jakarta, and (3) RSP of University of Trisakti, Jakarta [39]; [40].

From data base of Indonesian COVID-19 crisis center informed that 16 other PTN from various provinces in Indonesia are also ready to join in effort to assist with the handling of COVID-19. With this outbreak is it expected that more Indonesian universities hospitals can actively participate in the handling of COVID-19.

Apart from arrange the university hospitals; the university also prepares volunteer personnel both from lecturers and from students to help handle the spread of this COVID-19 pandemic [41].

In addition, some Indonesian university also has an initiative in making hand sanitizer, and disinfectant. A number of universities have made and distributed hand sanitizers and disinfectants to the community. To the hospitals and community, some colleges/Universities has also distributed Personal Protective Equipment (PPE) and face shield mask and face masks [42].

In order to quarantine the sterilization of campus and the public sphere of the potential for the spread of Corona or COVID-19 viruses, some universities in Indonesia have also spraying disinfectants. Several universities have made disinfectant. Disinfectant is a chemical used to prevent infection or disease contamination. The disinfectant substance used in spraying is IPA (isopropyl alcohol) with a rate of 98%. IPA is used diluted by mixing distilled water up to 71% by comparison of 3:1 (3 liters of IPA: 1 liter of distilled water). With an alcohol content of 70%, the disinfectant can function to eradicate the coronavirus attached to the surface of the object [43].

A number of Indonesian colleges/ universities, such as Universitas Negeri Gorontalo (UNG) is contributing through prepare their university's hotel, namely TC Damhil Hotel for use as special place to stay for medical personnel who handle COVID-19 patients for referral hospital in Gorontalo province [44].

Switching the function of TC Damhil Hotel UNG from commercial hotel become "social" hotel in accordance with the instructions of UNG's rector, this will be applied during the COVID-19 pandemic in Gorontalo province. UNG consider the need to facilitate a special residence for medical personnel as a spearhead handling COVID-19 patients, so that there was no concern from the medical personnel when returning home after performing their task.

The coronavirus outbreak or the COVID-19 case that struck the world today requires us to pay more attention to every aspect of their prevention and appearance. By threaten the patients, the medical or paramedic officers such as doctors, nurses, and other healthcare professionals, are currently person who are at the forefront of handling various cases of COVID-19. Not least among those who experience fatigue

both physically and mentally. The high workload if not accompanied by balanced nutritional intake can impact the immunity decrease of the medical personnel [45].

Realizing that need important action again this pandemic, some universities in Indonesia initiated to help and assisting medical officers, especially those who served in the COVID-19 referral Hospital, in meeting the needs of balanced nutrition and personal protective equipment. Universities have done the real action to assist the basic needs of medical officers who handle the COVID-19 case [46].

Some universities channeled aid in the form of healthy food balanced nutrition with milk and vitamin supplementation to the medical officers who served in the COVID-19 referral hospital, especially in Java Island, where the large are numbers of infected of COVID-19. The paramedics need adequate and optimal nutritional adequacy. To fulfill these efforts, we want to provide nutritious food, milk, and vitamins to the healthcare personnel at the forefront with a total of about 1200 people [47].

Furthermore, some university has practiced of humanitarian activities that focus on providing assistance in the form of personal protective equipment (PPE) such as masks, coverall, gown, hand-sanitizer, gloves, and other equipment for health workers who are currently handling the case of COVID-19 in Indonesia [48]; [49].

They are moved because of the lack of personal protective equipment available for health workers. In fact, in conducting the treatment of positive patients COVID-19, health workers certainly need adequate APD to prevent the risk of transmission, The universities are moving by linking sponsors, fundraiser and people who want to help with healthcare professionals in need.

Discussion

In Indonesia, the final pandemic predicted is estimated if at 70 percent of infected populations spread. They will be protectors of the 30 percent remaining population [50]. In such cases, the virus will have difficulty finding a host because of the group's immunity, "in anticipation and facing of the moment that it calls the second wave, the university needs to prepare some important things, such as an increased diagnosis capacity, primarily a self-sufficient screening method to quickly know the status of people under surveillance COVID-19 (ODP) and patients under supervision for COVID-19 (PDP) [51]; [9]. The health worker can pick up the patient if needed. For that matter, the preparedness of the health care system needs to be improved also, from surveillance function to the availability of health facilities [52].

So far the COVID-19 pandemic has led to some social issues, such as food security, disinformation, as well as public fears. To minimize the social and economic impacts of these issues a number of strategies have been carried out by various universities in Indonesia to address these matters. It includes improving the prevention efforts of the dissemination; improve resource availability; increased preparedness for the victims; Create a more conducive atmosphere; anticipates various impacts; and enhances the integration of information, communication, coordination, and evaluation [53].

In the transmission of the second wave virus, the university predicts that the forefront of its resistance is no longer a health worker, but rather a community in these areas. Therefore, the universities in Indonesia coordinate to run the strategies that have been set so that they can run as planned and the Indonesian universities need to conduct thorough and intensive education of the community before taking the intervention step [54].

The community with university support plays an important role in the strategy. When the surge occurs, health personnel can no longer handle the entire case. Communities and universities can be deployed in these conditions. For that, they need to be educated in order to play an active role such as self screening, monitoring, and

quarantine of the region. Primarily for now, universities need to encourage communities to create a conducive environment, no longer rejecting health workers, bodies, and former COVID-19 positive patients [55]. While the government can exercise its oversight and it is distribution functions to these areas.

Therefore, as a first step of the strategy, universities in Indonesia make some recommendations that can be executed immediately. First, related to education about COVID-19, including the creation of educational literacy content COVID-19, can be run after the college. Secondly, Governments, both central and regional, can provide incentives and accommodation to healthcare professionals who handle the COVID-19. Thirdly, need to explore the local community. Fourth, the creation of information network maps to the public. In addition, the University has formulated strategies to reduce the spread of COVID-19, which is the first, containment, i.e. limiting or controlling the rate of COVID-19 deployments and following with mass screening. The last strategy is implementing flatten the curve with social restrictions [18]; [56].

Table 2 summarizes the response of Indonesian universities to the coronavirus disease (COVID-19) pandemic through various.

Conclusion

The outbreak brings a distinct impact to the education sector in Indonesia. The academic activities of Indonesian universities are not limited to internal affairs, but also contribute to a real endeavor of addressing the problem. This contribution can be done by providing communication, information and education to the community. Campus activities should not be limited to providing internal campus flexibility alone. Internally, the campus must continue to maintain the quality of online academic activities as well as successful social distancing. Externally, the online learning process is expected to be package by also solving the problem of prevent the spread of Corona viruses in the community.

Currently, at least 706 campuses in Indonesia have been conducting lectures with an online system to anticipate the spread of Corona viruses. In the research activities, a number of lecturers conducted research by utilizing application form survey in data collection, with focus on study related to COVID-19 which is aligned with the expertise of each lecturer. Routine campus activities in the form of meetings, monitoring, and job evaluation remain as appropriate in the situation of the COVID-19 led by the campus's structural officials. The academic staff still does other supporting activities such as conducting discussions along with the theme and the focus of research that has been agreed with the Forum group discussion (FGD) by utilizing the applications available. The pandemic of COVID-19 presents challenges for different sectors of society, including colleges/universities. University campuses with their congregate settings are considered particularly at risk to contamination. As the Government of Indonesia continues to fight the epidemic, Indonesian universities across the country have followed public health guidance to shut campuses. In order to maintain academic activities is still lively and in response to such outbreak, colleges/universities in Indonesia are already moved to online instruction, so that students can keep up their studies.

The outbreak of the coronavirus has become a major disruption to colleges and universities across the country, but in positive perspective the Coronavirus (COVID-19) pandemic is our best change to change universities for good through contribution in academic, research and service activities.

The higher education in Indonesia faced significant challenges to respond the Covid-19 pandemic. The period of the Covid-19 pandemic is still not over. Universities are also required to adapt to this pandemic. Universities in Indonesia have made various

efforts to adapt and at the same time make a real contribution to society in facing this pandemic. The innovations and adaptations carried out by universities in Indonesia in the face of this outbreak have had a significant impact on the reduction of the spread of Covid-19.

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Table 1. Indonesian universities/colleges offering online lectures during COVID-19 pandemic

Type of university	Total number
State university	65
Private university	637
Total	702

Table 2. The activity/product made by Indonesian universities in responds to the COVID-19 pandemic.

Activity/Product	Colleges/universities involved
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Production of Ventilators (Vent-I) and Portable ventilator	Bandung Institute of Technology (ITB); University of Indonesia (UI), University of Gadjah Mada (UGM), University of Airlangga (Unair), Surabaya Institute of Technology (ITS); Padjajaran University (Unpad); University of Bung Hatta; State Polytechnic of Surabaya; University of Technology Sumbawa; State Islamic University of Bandung
Robot-Ventilator (Robo-Vent)	Gunadarma University; ITB
Support with university hospitals	UI; Unair; Diponegoro University, UGM; Hasanuddin University (Unhas), Unpad; University of North Sumatra (USU) Andalas University (Unand); Universitas Brawijaya (UB); University of Mataram, University of Surakarta; University of Tanjungpura; Udayana University; University of Syiah Kuala (Unsyiah); University of Jambi; University of Mulawarman; University of Pelita Harapan; Atmaja Catholic University dan University of Trisakti.
Face shield mask	ITS; UGM; Unsyiah, Universitas Muslim Indonesia (UMI); University of Muria Kudus; Universitas Kristen Maranatha;
Personal Protective Equipment (PPE)	Unand; ITS; UI; UGM; Universitas Negeri Surabaya (Unesa); Universitas Bali Dwipa; Diponegoro University (Undip); Unair
VTM (viral transport medium or viral carrier media) and swab test booth	Universitas Gadjah Mada (UGM)
Family Resilience Counseling	State Islamic University of Bandung, Universitas Negeri Gorontalo (UNG); Univesity of Tarumanegara
COVID-19 Crisis Centre	UI; UGM; Unesa; Unair; Universitas Negeri Yogyakarta; UNG; University of Trisakti; UMI; IPB Bogor.
University hotel for paramedics' accommodation	UNG; UI
Hand-sanitizer, disinfectants, face masks, coverall, gown, and gloves	University of Indonesia; Universitas Gadjah Mada; University of Airlangga; State Islamic University of Surabaya; Muhamadiyah University of Malang; Muhamadiyah University of Yogyakarta; Universitas Nahdlatul Ulama Surabaya; Djuanda University; Pertamina University; Universitas Baiturrahmah; Universitas Surabaya; University of Palangkaraya; Universitas Negeri malang; Universitas Serang Raya; Universitas Slamet Riyadi; Brawijaya University; Universitas Negeri Padang; Udayana University; Universitas Mathla'ul Anwar (FSFK UNMA) Banten; Sampoerna Univesity