

Empowerment of mosque community with ultraviolet light sterilisator robot

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ABSTRACT

The first case of the COVID-19 disease was reported in Wuhan. Indonesia is also one of the countries affected by the COVID-19 pandemic. This case was first detected in two patients in Jakarta. The spread of the COVID-19 virus is so fast and spreads to all regions in Indonesia. Due to the rapid spread of the virus, efforts are needed to prevent it from spreading. Several local governments in Indonesia have implemented a lock down system to cut the spread of the COVID virus. Entering a new era, the government urges the public to adopt a new way of life to prevent wider transmission while preventing infection, namely wearing masks, maintaining distance, maintaining cleanliness, especially hands. The government's call to enter a new era was also followed by the mosque. However, this appeal is very difficult to implement for the new era because the mosque does not yet have a sterilizer to kill bacteria and germs. The sterilizer is used to sterilize the floor of the mosque. The service team tries to offer solutions to these problems with a touch of science and technology through community empowerment programs. The solution is offered with an ultraviolet lamp mounted on a sterilizing robot that can be remotely controlled. Ultraviolet lamp sterilizer robot is able to sterilize the floor of the mosque and the walls of the mosque.

KEYWORDS

Ultraviolet lamp;
Sterilisator robot;
Mosque community;
COVID-19;
Sterilize the floor



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1. Introduction

Indonesia is also one of the countries affected by the COVID-19 pandemic. This case was first detected on March 2, 2020 in two patients in Jakarta, which was followed by the rapid spread of the COVID-19 virus and spread to all regions in Indonesia. The Ministry of Health of the Republic of Indonesia stated that as of March 31, 2020, there were 1528 positive cases, 136 cases died, and 81 cases recovered. This COVID-19 case has spread to 31 provinces in Indonesia. In relation to this prevention, several local governments in Indonesia have implemented a lock down system. The route of spread of COVID-19 in humans is mainly from person-to-person transmission, although the original host of this corona virus is bats. Cases of human-to-human transmission are known based on cases of the first patients in Vietnam and the US who were infected while in Wuhan without having had physical contact with the Seafood Wholesale Market, which was the beginning of the spread of the SARS-CoV-2 virus.

Several previous investigators have conducted studies on COVID including discontinuing fibrinolysis in COVID-19 patients due to the reporting of two severe cases with potential diagnostic and clinical relevance studied by Bakchoul [1]. Clinical characteristics and outcomes of in-hospital cardiac arrest among patients with and without COVID-19 were studied by Yuriditsky [2]. Comparison of molecular

testing strategies for COVID-19 control: a mathematical modeling study researched by Grassly [3]. Effect of non-pharmaceutical interventions on COVID-19 cases, deaths and demand for hospital services in the UK: a modeling study researched by Davies [4]. The Outpatient Hemodialysis Management Strategy Cohort Study for COVID-19 in North West London was studied by Medjeral-Thomas [5]. Results of 3737 COVID-19 patients treated with hydroxychloroquine/azithromycin and other regimens in Marseille, France: A retrospective analysis studied by Lagier [6]. Overlapping clinical features between side effects of thoracic radiotherapy and COVID-19 pneumonia were studied by Lazzari [7]. Setting up the provision of hospice care for patients with COVID-19 at a 2400-bed academic tertiary center in São Paulo, Brazil was studied by Perondi [8]. Clinical characteristics of hospitalized patients with COVID-19 in Spain: results from the SEMI-COVID-19 Registry studied by Casas-Rojo [9]. Catheter-Directed Thrombolysis of Iliacaval Thrombosis in Patients With COVID-19 Infection was studied by Al-Otaibi [10].

Elevated EBV DNA in COVID-19 patients with impaired lymphocyte subpopulation counts was studied by Paolucci [11]. First wave of COVID-19 in hospital staff members of a tertiary care hospital in the greater Paris area: A surveillance and risk factor study investigated by Davido [12]. The incidence of thrombotic complications and overall survival in patients hospitalized with COVID-19 in the second and first batches were studied by Kaptein [13]. Preliminary Report: US Doctors Stressed During the Early Days of the COVID-19 Pandemic researched by Linzer [14]. Application of the COVID-19 Pandemic Recommendations to Urological Practice: Data from Three Major Italian Hotspots (BreBeMi) were studied by Dell'Oglio [15]. Weekly update of national living evidence-based guidelines: methods for Australian living guidelines for the care of people with COVID-19 researched by Tendal [16]. A suitable cohort study of the efficacy of tocilizumab in patients with COVID-19 was investigated by Rodríguez-Molinero [17]. Mortality trends of hospitalized COVID-19 patients: A single-center observational cohort study from Spain was studied by Garcia-Vidal [18]. The effect of international imported cases on the internal spread of COVID-19 mathematical modeling study was investigated by Russell [19]. Severe COVID-19 pneumonia in Piacenza, Italy was studied by Guglielmetti [20].

The person-to-person spread of the virus occurs mainly through direct contact between family members or close people such as business associates. This disease is declared very dangerous for health. This is because this disease is transmitted through droplets of COVID-19 sufferers. Large droplets can move within a distance of less than one meter. Meanwhile, small droplets can move over a distance of more than one meter. Therefore, it is necessary to maintain a minimum distance of two meters from other people. From the problem of the spread of the corona virus, referrals from previous research on medical robots are needed. Strengthening the relationship between cybersecurity and safety in the context of maintenance robots was investigated by Fosch-Villaronga [21]. 3D Printing software for printing 3D models with a 6-axis industrial robot was researched by Werner [22]. Robot-assisted pediatric laparoscopic right hepatectomy was studied by Sandlas [23]. Emotional reactions to robotic partners in a role-playing experiment were investigated by Savela [24]. A literature survey on robotic technology during the COVID-19 pandemic was studied by Wang [25]. A literature review of sensor heads for humanoid robots was investigated by Rojas-Quintero [26]. Comparison of robotic and conventional sternotomy in mitral valve reoperation was studied by Chi [27]. The analysis of the ultrasonic milling stability of the longitudinal-torque composite robot was investigated by SUN [28]. The development status of the telesurgical robotic system was investigated by Xia [29]. Robotic inguinal hernia repair in the management of inguinal hernia was studied by Kakiashvili [30].

Educational Robotics for children with neurodevelopmental disorders was investigated by Pivetti [31]. Measuring organ displacement and deformation for port placement in minimally invasive robot-assisted surgery was studied by Maddah [32]. Fully robotic coronary artery bypass grafting: How we did it was investigated by Torregrossa [33]. Robot-Assisted Gait Training Using Welwalk in Hemiparetic Stroke Patients: An Effectiveness Study with Appropriate Controls investigated by Li [34]. Agents and robots to

collaborate and support physicians in health care scenarios were investigated by Lanza [35]. The Effects of Humanoid Robots on Well-Being of Children Cared for in Pediatric Clinics was investigated by Beyer-Wunsch [36]. Peritoneal seeding and port sites of undiagnosed bladder urothelial carcinoma after robotic-assisted laparoscopic prostatectomy were studied by Li [37]. Orienting safety assurance with the results of hazard analysis and risk assessment was investigated by Chemweno [38]. The limitations of applying health technology regarding artificial intelligence, regenerative surgery, realistic robotics for the future of surgery were investigated by Jabr [39]. Fully endoscopic repair of the mitral valve without robotic assistance was investigated by Pham [40].

Spread can also be through the air when the patient speaks or through droplets that are spread from an infected person when coughing or sneezing. In addition, the spread can also occur when people touch an object or surface on which the virus is present and then touch their mouth, nose and/or eyes using contaminated hands. Patients with or without symptoms can spread the infection. To stop the spread of the COVID virus, disinfection tools are needed. Previous researchers have conducted research on COVID disinfection, including the need to combat COVID-19 with herbal disinfection techniques, formulations and preparations of hand sanitizers that are friendly to human health, studied by Alghamdi [41]. An inpatient psychiatric unit dedicated to COVID-19 patients was studied by Mahgoub [42]. Dentistry-Related Aspects of COVID-19 were investigated by Checchi [43]. Management of COVID-19 in Clinical Dental Care Part III was studied by Melo [44]. The experience of a vascular scientist diagnosed with COVID-19 surviving and thriving in thrombosis research during a global pandemic was investigated by Spier [45]. THz sensing of the disinfectant product COVID-19 using photonic crystal fibers was investigated by Khan [46]. Hygiene practice of non-critical medical equipment nurses in the era of COVID 19: A cross-sectional study at the Debre-Tabor comprehensive specialty hospital researched by Amara Birlie [47]. The role of artificial intelligence (AI) in overcoming the COVID-19 pandemic was investigated by Shamman [48]. Risk management strategies and therapeutic modalities to address COVID-19/SARS-CoV-2 were investigated by Shah [49]. Community pharmacy response to infection control during COVID-19. A cross-sectional survey was investigated by Sum [50].

Entering a new era, the government urges the public to adopt a new way of life to prevent wider transmission while preventing infection, namely wearing masks, maintaining distance, maintaining cleanliness, especially hands. One of the factors causing the transmission and spread of COVID-19 is through social interaction between individuals. Mosques can be a place for the spread of COVID-19. Information about some of the problems faced by the mosque partners, of course, must be addressed as soon as possible as a solution to prevent the transmission of the COVID virus in the mosque. The team that proposes service as part of the community who happens to be involved in the world of education, feels compelled to help provide solutions to the problems faced by the mosque partners. Through this proposed science and technology activity program and based on the needs analysis that has been carried out, the service team tries to offer solutions to these problems with a touch of science and technology, namely through the main activity of designing remote disinfection robots.

2. Method

The activity plan in order to implement the solutions offered is shown in detail in Fig. 1. The Fig. 1 shows that the method of activities includes surveys in mosques, designing robots, coordinating residents, repairing robots. The first activity is a location survey at the mosque with residents around the mosque which aims to find out the problems faced by partners, namely the mosque does not yet have room sterilization equipment. The sterilization process must be carried out thoroughly and without the use of chemical liquids. With this problem, the second activity is to design a sterilization robot. This activity aims to design a sterilization robot with ultraviolet. The third activity is a robot test activity to sterilize the floor of the mosque. The last activity is maintenance.

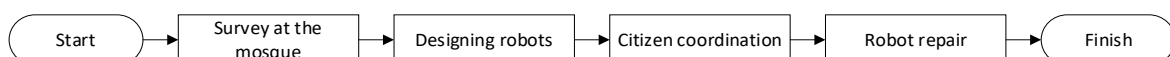


Fig. 1. Method of a series of activities

3. Results and Discussion

This community service activity program is implemented in mosque partners in Sleman Regency, precisely in the Condongcatut sub-district, Depok sub-district, Sleman Regency, Yogyakarta Special Region. There are 4 steps for the implementation of the mosque community empowerment program in the Sleman district. The first step in this program is a survey with residents around the mosque which was carried out on January 20, 2021, which is shown in Fig. 2. The picture shows the survey was carried out simultaneously with a meeting of residents around the mosque. The survey aims to find out the problems faced by residents around the mosque. Residents around the mosque have made tools to make sterilization tools using disinfectant liquid. The disinfectant liquid is very dangerous for mosque worshippers. Even though the liquid is dry, the particles contained in the liquid are dangerous if inhaled by the congregation of the mosque.



Fig. 2. Survey with residents around the mosque

With the problems found during a survey with residents around the mosque, the team then the team took the second step, namely a disinfectant robot designed using ultraviolet lights which was carried out on January 21, 2021 to May 20, 2021, as shown in Fig. 3. The image shows the design of a disinfectant robot using ultraviolet. There are two locations for installing ultraviolet lights, the first is above which is used to sterilize the walls of the mosque and the second is below which is used to sterilize the floor of the mosque.

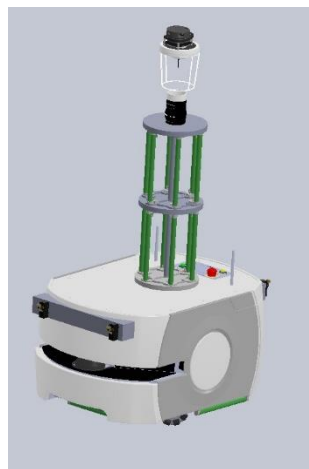


Fig. 3. Ultraviolet disinfection robot design

The third step, namely the preparation of the room and floor of the mosque, with a coordination meeting with residents around the mosque on May 25, 2021, is shown in Fig. 4. The picture shows that

the coordination meeting was held in the mosque in a sitting position with a distance of approximately 1 meter. This is done to prevent the spread of the COVID virus.



Fig. 4. Coordination of residents for preparation of room sterilization with UV robot

The last step, which is the fourth step, is carried out with the disinfectant robot as shown in Fig. 5. From the Fig. 5 it can be seen that the robot is being repaired because the robot's motor driver caught fire. This happens because a short circuit occurs when the robot is run on the mat. By using the robot, residents are happy and excited again to carry out worship in the mosque because the robot has sterilized the room and did not leave harmful particles on the floor of the mosque.

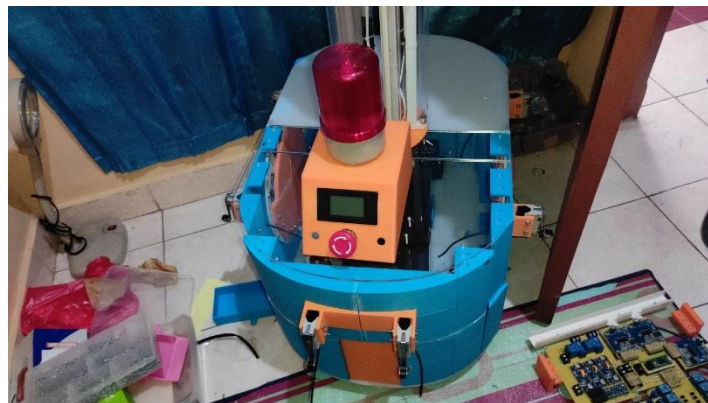


Fig. 5. Ultraviolet sterilization robot maintenance

4. Conclusion

The conclusions that can be drawn from the mosque community empowerment activities with disinfectant robots in Sleman Regency, Yogyakarta Special Region are as follows: First, a survey was conducted at the mosque on January 20, 2021, which was attended by residents around the mosque. The second step is designing a robot which will start on January 21, 2021 until May 20, 2021. The next activity is coordination with residents to sterilize the floors and rooms of the mosque which will be carried out on May 25, 2021. The last step is repairing the robot. Residents are happy and excited again to carry out worship in the mosque because the robot has sterilized the room and has not left harmful particles on the mosque floor.

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Author Contribution

All authors make equal contributions in the context of carrying out activities that include surveys in mosques, robot design, citizen coordination, robot repair.

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Conflict of Interest

The authors declare no conflict of interest.

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