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ORGANIZING COVID-19 SURVIVORS AS CONVALESCENT PLASMA DONORS

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ABSTRACT

Introduction: Convalescent plasma transfusion therapy remains as one of the therapies recommended by the Ministry of Health for Covid-19 patients in Indonesia. However, in its practice, this therapy is greatly constrained by the availability of plasma donors at the Indonesian Red Cross (PMI) and the few survivors who are willing to donate their blood plasma. The aims of the community service activity were to educate, organize, and facilitate the survivors to do screening and donate their plasma.

Methods: The activities were conducted in June until December 2021, at Indrapura Field Hospital (RSLI) Surabaya. A total 925 participants (641 male and 309 female) were all Covid-19 patients from RSLI Surabaya. The demographic data were collected and organized as a database. The survivor's online communication group (16 WhatsApp groups) were created, to provide information and education about Covid-19 and the importance of plasma donation to the patients and survivors.

Results: The three largest groups by age were 26-35 (30.84%), 46-55 (21.26%), and 36-45 (19.47%) years old. The 3 largest groups by city of origin were Surabaya (62.42%), Sidoarjo (16.53%), and Gresik (8.63%). About 77.89% of participants have their understanding in the convalescent plasma for Covid-19. About 43.79% of them were willing to become donors after 14-day-recovery, and have been registered in the web application of donors. The 102 survivors were also involved in free plasma screening with PMI Surabaya. Total 88 survivors who have passed the screening have given their plasma as convalescent donors.

Conclusion: Organizing and educating Covid-19 survivors were exceptionally required to encourage them to become a plasma donor. The collected survivor data must be stored and managed properly to facilitate everything related to the blood plasma. The survivors are suggested to be screened 14 days after being declared healthy, to maintain the availability of blood plasma at PMI for Covid-19 patients who necessitate the convalescent plasma therapy.

KEYWORDS

citizen participation; convalescent plasma therapy; covid-19; human and health; survivor organizing.

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1. INTRODUCTION

The Coronavirus Disease 2019 (Covid-19) pandemic that hits Indonesia currently has reached its second half of curve's rise. With a high rate of transmission and a lack of community discipline in implementing the health protocols, the positive number and mortality rate for Covid-19 continues to increase. This high mortality is possibly caused by various factors, one of which is improper handling of the patients due to limited medical facilities and technology. One method used to treat Covid-19 is the Convalescent Plasma Therapy (TPK). The high titers of neutralizing antibodies in recovered individuals from Covid-19 become the basis in applying convalescent plasma therapy which is proved to be effective against the preceding SARS and MERS (Mo et al., 2006). Neutralizing antibodies shall neutralize the infection of viruses by interfering its attachment to the cell surface, inhibiting their fusion through endosome membranes, and causing particle aggregation of the viruses (Duan et al., 2020). Convalescent plasma donation is performed by donating the blood plasma containing Covid-19 antibodies from recovered patients to the patients with a less body immunity against Covid-19 infection (Gharbharan et al., 2020).

Although the effect is promising, TPK has some obstacles. The main obstacle is the lack of qualified donors which is disproportionate against the number of patients in need (Baskoro, 2021). The demand is high while the supplies are low, thus oftentimes causing a shortage that makes the families of the patient in need have to find any potential donors themselves. In order to become a convalescent plasma donor or recipient, there are several obligatory requirements. Donors must go through an administrative and screening process to be able to donate. This affects the time gap between the confirmation of willingness to donate and the blood donation to the patients, not to mention the time needed to find the potential donors. In fact, oftentimes patients in need of convalescent plasma donors are in

a severe condition that requires them to be treated as soon as possible.

Until now, the PMI/ hospital blood transfusion unit still merely relies on the awareness and the willingness of donors to come and donate their plasma by themselves. This act surely will not be sufficient to meet the high demand of TPK. Meanwhile, the number of Covid-19 survivors continues to grow in Indonesia with its amount exceeding one million people already (Satuan Tugas Penanganan Covid-19, 2021). This number indicates a huge potential to be managed. At Indrapura Field Hospital (RSLI) Surabaya itself, more than 6,000 patients have been cured and their existence as Covid-19 survivors is potential to be organized and directed to become the convalescent plasma donors.

To overcome any obstacles, a collaboration with RSLI's Covid-19 Patient Family Assistance Volunteers is achieved to fulfill some required activities such as providing education and socialization regarding convalescent plasma donation to the patients at RSLI to build their understanding in the potential of becoming a convalescent plasma donor, creating a web-based database application to organize Covid-19 survivors from RSLI Surabaya to be then becomes a capable community to play an active role in tackling Covid-19 through convalescent plasma donations, and also facilitating covid-19 survivors to follow the convalescent plasma donor program immediately through an easy and convenient procedure by mass screening in collaboration with PMI. So, the aims of the community service activity are to educate, organize, and facilitate the survivors to do screening and donate their plasma.

2. MATERIAL AND METHODS

The activities were conducted in June until December 2021. The parties involved were including the Community Service Team from the Faculty of Medicine, Universitas Airlangga; the Management Team, Doctors and Nurses at RSLI Surabaya; RSLI's



Figure 1. Education on the Benefits of Convalescent Plasma Donation



Figure 2. Screening for the convalescent plasma donors

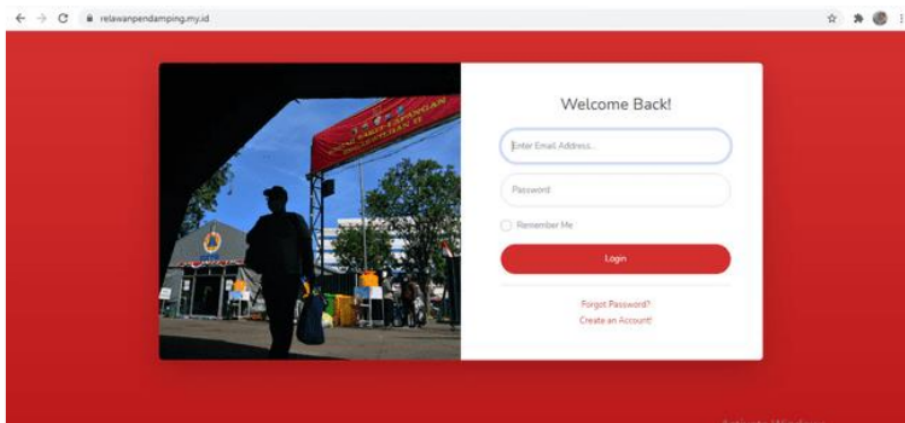


Figure 3. The display of Covid-19 survivor collecting website



Figure 4. Data Collection for Covid-19 Survivors

Patient Family Assistance Volunteers as facilitators, and Covid-19 survivors especially the alumni of RSLI Surabaya as recipients of the program benefits. The target of this activity was the patient population of Covid-19 patients and survivors from RSLI Surabaya. Samples were taken from the population through the inclusion criteria of willing to participate in the

activities voluntarily, and the exclusion criteria of not willing to participate in the activities voluntarily.

The stages of activities conducted include: (1) providing education and information to the patients about Covid-19 and TPK when they were hospitalized and being treated at RSLI Surabaya through banners and leaflets, (2) giving the recovered patients an insight into the benefits of convalescent plasma

donation and asked for their willingness, and if they want to, the patient will be registered into the survivor database application and added to the survivor's Whatsapp group of RSLI Surabaya, (3) providing education and information to the survivors in the Whatsapp group in the form of writing or infographics or flyers, (4) providing plasma donor screening every Saturday at RSLI Surabaya in collaboration with PMI Surabaya, and presenting an expert to give education about the importance of convalescent plasma to the donors (Figure 1 and 2).

The application established in the activities is used to store the database of survivors, their cured date, and provide a reminder for them as they enter the period of being allowed to be screened for donors. For the prospective recipients of plasma donation may look for the availability of convalescent blood plasma on the application page. It is expected that the process of preparing convalescent plasma for the recipients will be faster and more efficient thus can save more patients. The appearance of the survivor collecting website is shown in Figure 3. The survivor data filled into the website is the data obtained voluntarily in the time patients declared as healthy and discharged from RSLI, as well as during the plasma donor screening (Figure 4).

3. RESULTS

The total number of patients treated at RSLI Surabaya in June until December 2021 is 950 patients, divided into 641 (67%) male patients and 309 (33%) female patients. Based on the outcome, 481 (50.63%) patients were healed (with negative result of Covid-19 PCR swab test), 459 (48.32%) patients were discharge from hospital (by rule of 14 days isolation although the result of Covid-19 PCR swab test still positive), 8 (0.84%) patients were referred to other hospital, and 2 (0.21%) patients were discharge from hospital by their own request.

Based on the age distribution, 24 (2.53%) patients were under 15 years old, 157 (16.53%) patients were 16-25 years old, 293 (30.84%) patients were 26-35

years old, 185 (19.47%) patients were 36-45 years old, 202 (21.26%) patients were 46-55 years old, 76 (8%) patients were 56-65 years old, and 13 (1.37%) patients were over 65 years old. Based on the city of origin, 593 (62.42%) patients came from Surabaya, 157 (16.53%) patients came from Sidoarjo, 82 (8.63%) patients came from Gresik, 80 (8.42%) patients came from Ponorogo, and the rest of 38 (4%) patients came from all over the city in Indonesia (7 from Madura, 2 from Pasuruan, 2 from Mojokerto, 2 from Malang, 4 from Lamongan, 3 from Kediri, 3 from Jombang, 1 from Ngawi, 2 from Nganjuk, 1 from Madiun, 1 from Tulungagung, 1 from Magetan, 1 from Jember, 2 from Situbondo, 1 from Wonogiri, 1 from Jakarta, 1 from Ciamis, 1 from Bandung, 1 from Balikpapan, and 1 from Bima).

A total of 740 peoples (77.89%) were understand about convalescent plasma therapy. A total of 416 people (43.79%) were registered in the web-based survivor database application. This web-based application is called as 'Volunteer Cares for Plasma', developed by the IT Team of the Patient Family Assistance Volunteers at RSLI Surabaya, accessible via its URL at <http://relawanpendamping.my.id/> and can be used by the Steering Committee of the Event 'Organizing Survivors as Convalescent Plasma Donors'. The application features include being able to store the identity of the survivors such as their blood types, therefore the number of potential donors based on the blood type, rhesus, and their personal identity can be known.

Sixteen Whatsapp groups have been formed containing a total of 2.764 Covid-19 survivors from RSLI Surabaya alumni (Figure 5). This group functionates to keep the contacts of the survivors, provide the latest information on the details of Covid-19 and TPK, as well as disseminate information about the patients in need of convalescent plasma donors. The existence of this group makes it easy for patients to meet the needed donors. In addition, through the activities, screening and free blood donations have

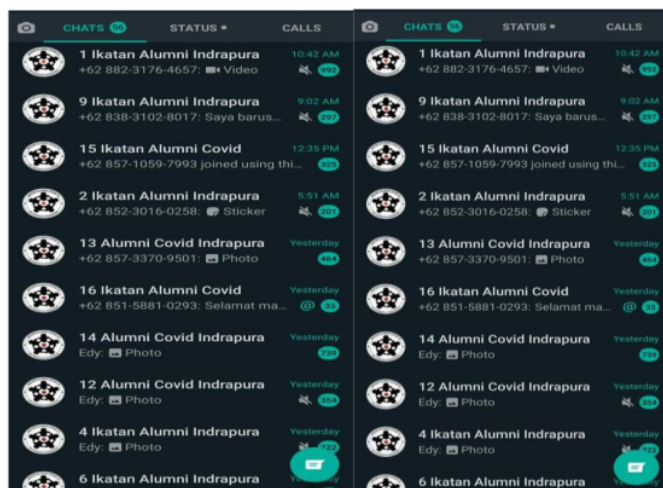


Table 5. Whatsapp groups of Indrapura Alumni Association

Table 1. List of positive news links in electronic mass media and event documentation videos

| No | Name of The Newsletter/ Mass Media | The link |
|----|---------------------------------------|---|
| 1 | JawaPos.com | https://www.jawapos.com/surabaya/21/06/2021/skrining-donor-plasma-konvalesen-di-surabaya-diaktifkan-lagi/ |
| 2 | Detik.com | https://news.detik.com/berita-jawa-timur/d-5630917/kebutuhan-plasma-konvalesen-meningkat-alumni-rsli-berbondong-bondong-donor |
| 3 | AnalisaPost.com | https://www.analisapost.com/post/rsli-kerahkan-aluminya-untuk-donor-plasma-konvalesen |
| 4 | jatim.tribunnews.com | https://jatim.tribunnews.com/2021/07/04/rsli-surabaya-kerahkan-penyintas-covid-19-untuk-donor-plasma-konvalesen |
| 5 | Times Indonesia | https://www.timesindonesia.co.id/read/news/356536/jawa-timur-krisis-plasma-konvalesen-rs-lapangan-indrapura-kerahkan-alumni |
| 6 | Antaranews.com | https://www.antaranews.com/berita/2234162/pasien-covid-19-mandiri-mendominasi-perawatan-di-rsli-surabaya |
| 7 | Idrtimes.com | https://idrtimes.com/kebutuhan-plasma-konvalesen-meningkat-alumni-rsli-berbondong-bondong-donor/ |
| 8 | Memontum.com | https://memontum.com/147122-respon-tingginya-permintaan-plasma-convalesen-rsli-kembali-buka-donor-plasma |
| 9 | Kompas.com | https://regional.kompas.com/read/2021/07/04/190146378/permintaan-plasma-konvalesen-capai-300-per-hari-rsli-surabaya-kerahkan |
| 10 | Nusadaily.com | https://nusadaily.com/news/jatim/pmi-banjir-permintaan-plasma-konvalesen-rsli-galang-pendonor.html |
| 11 | Nusadaily.com | https://nusadaily.com/news/jatim/jatim-krisis-plasma-konvalesen-rsli-bantu-pendonor-dari-aluminya.html |
| 12 | Jpnn.com | https://www.jpnn.com/news/krisis-plasma-konvalesen-rsli-kerahkan-aluminya-jadi-pendonor |
| 13 | ImperiumDaily.com | https://imperiumdaily.com/2021/07/permintaan-plasma-konvalesen-meninggi-tni-dan-relawan-pendamping-rsli-kerahkan-alumni-penyintas-covid-19/ |
| 14 | Beritabangsa.com | https://www.beritabangsa.com/2021/07/pmi-banjir-permintaan-plasma-konvalesen-rsli-galang-pendonor/ |
| 15 | Superradio.id | https://www.superradio.id/alumni-rsli-siap-donor-plasma-konvalesen/#.YOFh3aPze3U.whatsapp |
| 16 | Nusadaily.com | https://nusadaily.com/news/jatim/permintaan-plasma-konvalesen-meninggi-tni-dan-relawan-pendamping-rsli-kerahkan-alumni-penyintas-covid-19.html |
| 17 | Youtube.com | https://www.youtube.com/watch?v=0MeKUjia3k&t=9s&ab_channel=HARIANSURYA |
| 18 | Youtube.com | https://www.youtube.com/watch?v=G8Rlu4DHoPI&ab_channel=HARIANSURYA |
| 19 | Youtube.com | https://www.youtube.com/watch?v=NtBFIC-vLcw&ab_channel=TribunJatimOfficial |
| 20 | Documentation video | https://intip.in/pengmasplasma |

been conducted two times every Saturday, on June 19th and 26th, 2021, with a total of 102 survivors,

which 88 of them passed the screening and able to donate their blood plasma.

To increase the awareness and the interest of Covid-19 survivors outside RSLI Surabaya, the activities have been reported both in printed and electronic mass media, with 19 online media press releases as well as one documentation video related to the flow of organizing survivors as convalescent plasma donors. List of links and figures of positive press releases on electronic mass media and event documentation videos are available in Table 1.

4. DISCUSSION

Convalescent Plasma Therapy (TPK) is one of the treatment methods widely used nowadays to treat COVID-19 patients with severe symptoms. Chances of recovery will be greater if you get this therapy (Duan et al., 2020; Kong et al., 2020; Korley et al., 2021). This TPK also reduces the mortality rate of Covid-19 patients (Salazar et al., 2020, 2021; Tworek et al., 2021).

TPK is implemented by donating the blood plasma taken from Covid-19 recovered patients (survivors) to Covid-19 suffered patients with severe symptoms (Malani et al., 2020). Blood plasma is used for the therapy since it contains antibodies appeared as the body's response against the infection of a virus or bacteria, including the Coronavirus. The antibodies taken are a high amount of antibodies and sufficient enough to eradicate viruses or bacteria that causing the disease.

The use of convalescent plasma as a therapy method for a disease has been carried out for a long time. Up to this day, many studies have proven that TPK can be used as a treatment, especially in patients who experience severe symptoms. Some of the benefits of TPK for Covid-19 patients include accelerating healing and recovery from illness, relieving symptoms appeared in patients, such as shortness of breath, chest pain, or fever. Furthermore, the benefits of this TPK are preventing disease complications, reducing the severity of the disease, and reducing the risk of death. Therefore, TPK is supposed to provide a good effectiveness toward

Covid-19 patients with severe symptoms (Balcells et al., 2020; Korley et al., 2021; Ray et al., 2020; Salazar et al., 2020).

Not all Covid-19 patients need to be given TPK. TPK recipients are specialized to Covid-19 patients aged min. 18 years with severe symptoms or in critical condition and currently undergoing treatment in a hospital. It also can be given to Covid-19 patients with moderate symptoms of comorbidities, such as diabetes, asthma, or weak immune system. TPK is not intended for Covid-19 patients with mild symptoms who carry out self-isolation at home. TPK also cannot be applied on healthy people aiming to replace the function of Covid-19 vaccine. Interval in giving TPK is 90 days from the previous therapy (Casadevall et al., 2020; Mo et al., 2006; Ray et al., 2020).

Convalescent plasma donors must comply special criteria to be qualified. Covid-19 survivors eligible to donate their plasma must have high antibody titers thus sufficient to fight the virus in the body (Li et al., 2020). Additional criteria applied in Indonesia are someone with a positive history of Covid-19 in the last 3 months, preferably a man, or a woman who has never been pregnant with a minimum age of 18 to 60 years. The next requirement is to have a minimum weight of 55 kg, have no history of blood transfusions in the last 6 months, the donor must be in a good health and has been declared healthy (PCR test result shown negative from Covid-19 for at least 14 days). The general requirements are not having a blood-borne infectious disease, such as hepatitis or HIV AIDS and having a blood type that matches the plasma recipient (Epstein & Burnouf, 2020; Palang Merah Indonesia, 2021). In the activities conducted at RSLI, before carrying out screening and plasma donation, the survivors are given an education about the details of plasma donation in Covid-19 cases assisted by an internal medicine specialist and infectious tropical disease consultants, as shown in Figures 4 and 5.

Convalescent Plasma Therapy Procedures

Before having the convalescent plasma donation, Covid-19 survivors qualifying the above criteria need to undergo a screening process, in the form of blood test and rapid antigen or PCR test, as well as other examinations, such as measurement of height, weight, blood pressure, and hemoglobin. After being declared eligible, the donors will be asked for their consent to donate their blood. Then, the doctor or health worker will perform the procedure to take the convalescent plasma from the donors by using an apheresis machine. This procedure usually takes approximately 45-60 minutes.

The stages of giving convalescent plasma to Covid-19 patients consist of three steps including before, during, and after the procedure. Prior to convalescent plasma therapy, the nurse will prepare the necessary equipment, such as a needle, infusion tube, and a convalescent plasma bag that matches the patient's blood type. During the procedure, the doctor or nurse will clean and sterilize the skin area of the arm, where the needle will be inserted, with alcohol. Thereafter, the needle is inserted into the vein, then glued with a plaster. The convalescent plasma therapy procedures will last approximately 1-2 hours. The procedures are generally similar to the blood transfusion. The final step of giving the convalescent plasma is that Covid-19 patients will be continuingly supervised by the nurses. It aims to monitor the condition of the patients after receiving the convalescent plasma therapy. During the therapy, the doctor may also give other medicines according to the patient's needs, for example Covid-19 antivirus such as remdesivir or favipiravir.

The management of convalescent plasma donation, like the management of blood donation in Indonesia, is carried out by the Indonesian Red Cross Blood Donation Center Unit (UDDP PMI). Covid-19 survivors eligible to the objected criteria and willful to donate their plasma must go to the PMI Center for initial screening. It aims to see the antibody titers and the blood quality. The blood sampling will take about 30 cc (6 blood sample tubes). In the next three days, PMI Center will contact the survivors

if their blood passes the screening. The process of taking plasma from a donor takes about 60 minutes. When a Covid-19 patient needs a donor, the family may contact the PMI to ask about the available blood stock (Indonesian Red Cross, 2021).

The need of convalescent plasma for Covid-19 patients with severe symptoms is increasing, yet the supply of convalescent plasma is limited. This is due to the strict requirements on the donors, thus only few of them could meet the criteria (Baskoro, 2021). Covid-19 survivors that possibly become the donors are those who suffer mild or moderate symptoms when they were sick. Patients with mild to moderate conditions in Surabaya are mostly treated at Indrapura Field Hospital (RSLI) Surabaya. A total of approximately 7.000 patients have finished their treatment at RSLI Surabaya and have a great potential to become the convalescent plasma donors. Taking this opportunity, it is initiated to organize those Covid-19 survivors through various media.

The organizing of Covid-19 survivors is realized through several familiar and easy-to-access media for many people, such as Whatsapp Group and Website. The database collection is achieved through a website via URL at <http://relawanpendamping.my.id/> since it is much simpler as long as the members have an internet quota to access the online page. Collecting the survivor data through this website is supposed to be more effective as it can reach a wider range of location including the RSLI's Covid-19 survivors outside Surabaya. The use of website will be effective if it is managed properly, especially by applying an interactive website. An interactive website makes it easy for two-way communication. It has been implemented to trace Covid-19 cases (Shrotri et al., 2021).

In addition to the website, the collection of Covid-19 survivors is achieved by creating a Whatsapp Group (WAG). This way is considerably easy as it facilitates a direct interaction between the group members. WhatsApp application itself is widely used already,

with around two billion users in one month (Damar, 2021). The benefit from creating the WAGs is the easiness in providing education and information about the development of Covid-19, including the need for convalescent plasma. The database collected from the website will be distributed into the WAGs, thus any information regarding the need of convalescent plasma will be discovered by the members. Members who meet the requirements with full awareness will go to the PMI for blood screening purposes. Whatsapp application is considered as having a high effectiveness in providing health education (Elba et al., 2021; Utami et al., 2020).

5. CONCLUSION

Convalescent Plasma Therapy remains as one of the healing methods used for severe Covid-19 patients. Plasma donation is performed by people who have been exposed to the disease and meet the required criteria to donate their plasma. The number of plasma donors is highly limited and disproportionate against the demand of the plasma. Providing education and information to the survivors, starting from them being treated at RSLI until becoming the alumni, might open up their insight and awareness as well as their willingness to become a plasma donor. The free cost in screening and plasma donation shall increase the interest of the survivors to donate their blood plasma. The activities of organizing Covid-19 survivors as potential donors create the easiest way for patients to get TPK quickly.

Some suggestions to improve any similar activities in the future are the up-to-date management of the website and WAGs that must provide more benefits. This effort needs to be fulfilled since the database collected is considerably useful as Covid-19 pandemic has not ended yet.

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