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Editorial

Blood Donations and Blood Banks: A Case on Supply and Demand for Blood in COVID-19 Pandemic

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With the outbreak of unknown pneumonia in Wuhan, Hubei Province, China, in December 2019, a new strain coronavirus (CoV), which was temporarily named 2019 novel coronavirus (2019-nCoV) by the World Health Organization (WHO) on January 7, 2020, provoked the attention of the entire world. The virus was subsequently renamed as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) and the disease it causes was named as Coronavirus Disease 2019 (COVID-19). It is an RNA virus and called as Crown in Latin from the structure of the virus under electron microscope. On January 31, 2020, the WHO announced the outbreak of COVID-19 in China as a Public Health Emergency of global Concern [1,2].

SARS-CoV-2 first affects the respiratory system. The infected individuals complain symptoms of naso-pharyngeal origin to full blown pneumonia. We develop the symptoms, such as fever, cough and difficulty in breathing, within 14 days after exposure to the virus directly or to somebody who has infection secondary to COVID-19. It is difficult to recognize whether a person is actually infected by this virus or not if the symptoms occur concomitantly with common cold or flu. Infections by COVID-19 can cause more severe clinical features in guys who have weak immune system, old age, and those with chronic conditions like cancer, diabetes mellitus, and chronic lung disease. About 80% of infected people are experiencing mild illness and recover, but it can be more serious for others. Even if an overexuberant inflammatory response with multi-organ failure may be prevalent in some cases, most of the deaths are associated with respiratory complications which need intensive care and respiratory support [3]. Severe Acute Respiratory Syndrome (SARS) due to a coronavirus was reported to the WHO in 2002. In September 2012, Middle East Respiratory Syndrome Coronavirus (MERS-CoV) were reported to the WHO. All of these emerging infectious diseases including COVID-19 are caused by β-coronaviruses [1]. On March 11, 2020, the WHO declared a pandemic status for the COVID-19, and the consequences of this situation include a grave interference in allogeneic blood supply [4].

As the lockdowns due to continues spread of SARS-CoV-2 across the world are putting blood donors movement in trouble, a lot of countries are facing shortage of blood reserves at their blood banks for meeting urgent needs. The amount of unpaid and charitable blood donations is reducing everywhere including in Europe and Central Asia regardless of no fall in requirements for blood. In Turkey, the amount of blood donors has dropped from nearly 9,000 per day to below 2,000 due to this pandemic [5]. Blood collection hubs in china had reported sharp drops in donations. To give evidence, only about 10 people a day has donated blood at the city of Nanjing in China despite donations from 300 people are needed daily to meet the demand as noted in website on February 6, 2020. As a result, Chinese Medical Professionals were trying to take up the dropping by donating their own blood [6]. According to the American Red Cross estimation, 4,600 blood drives have been canceled across the country related to COVID-19 concerns, leading to the collection of 143,600 fewer units. Concurrently, blood centers and hospital transfusion services in USA are experiencing a similar drop at nationwide level [4,7]. More

than half of the Indian women are anemic, and majority of the maternal mortalities in India are due to bleeding, which makes blood a decisive component. Nonetheless, the number of donated blood has fallen from 38,189 units in February, 2020 to 26,741 units in March 2020. Around 3,037 units have been collected in the first ten days of April 2020. Indian blood donation camps have also been decreased from 473 in February 2020 to 46 in April 2020. Moreover, the voluntary donations have gone down by almost 100% and in-house replacement donations have also been declined approximately by 50%. While numerous countries permit Unbanked Directed Blood Transfusion, where members of the family can directly donate blood to their patients, it is still an illegal practice in India [8].

The same is true in African continent. For example, blood supplies in Morocco are running dangerously low as the COVID-19 crisis outbursts on in the North African countries. At the time of writing this editorial, news released from Morocco had mention that almost 200 Moroccans donated blood per day while hospitals in the country require nearly 800 donations per day for on progress and new therapies [9]. Similarly, the occurrence of a serious shortage of blood in blood banks has been reported by the Ethiopian National Blood Bank Service after a month of the first coronavirus case recorded (Megabit 3) in the country. Although blood transfusion saves millions of lives, the demand and the supply of blood are not balanced in Ethiopia. The national necessity of blood in the country is about 100,000 units per year in average, but around 43 percent is collected. As per the WHO report, the number of voluntary blood donors is only 22% in Ethiopia, which ascribed to low blood collection in the country [10]. At the time of writing this paper, the national blood bank of Ethiopia are under supporting the regional blood banks by delivering blood units as the stocks become empty there. The blood has a short shelf life (5 - 7 days for platelets, up to 35 days for whole blood and 42 days for erythrocytes), thus in absence of a continuous supply, the reserves are bound to dip [8].

At this time, the dearth of blood in most nations of our planet is not believed to be due to an extraordinary high demand for blood products. The problem is mainly deficient in supply. The intimidation to the blood supply is not SARS-CoV-2 itself, but rather the unintended consequences of stay-at-home order as well as social distancing on blood drives [4,11]. However, the virus could affect the balance between demand and supply in two ways. The first way is transfusions which generate additional demand could be required for COVID-19 patients with severe respiratory failure (those rely on machines to support the function of their heart and lung), as doctors believe, although the condition is rare [6,8]. Coming to the second probability, voluntary blood donors (potential blood suppliers), who are infected with or suspected for COVID-19 infection, may be a lot in countries with high prevalence of the virus, will be/are quarantined and restricted from donating blood [3]. On the other hand, some chronic blood donors may fall into high-risk categories for COVID-19 due to aging or co-morbid diseases that will create difficulty for them to continue donating [11]. Blood donors are also reluctant to make donations due to fear of contracting the virus [3,9].

In nations like USA, voluntary blood donors are part of their critical infrastructure companies or industries. Therefore, travel and business restrictions have an impact on the access of blood in Health Care Systems including blood banks while efforts are made that healthy individuals can still donate in areas that have issued shelter in place declarations [12]. Generally, there are 2 major places where healthy individuals give blood. These are mobile drives and fixed sites. Mobile drives usually happen at schools, universities or businesses. Fifty percent of blood collected (of which 10 to 15% collected at high schools) in the USA is obtained from mobile sites (unlikely to resume until the fall). So that mass cancellation of schools, and closing of large employment campuses in the United States [13] and in other developed as well developing world including countries in Africa, such as Uganda [14] and Ethiopia has put a big strain on the blood supply (led to reduction in blood being collected).

In North America, several hospitals have drastically changed operations to enhance preparedness for critically ill coronavirus patients. The changes made are different among one hospital to another hospital, but have included cessation of the elective surgeries and procedures; suspension of an organ or stem cell transplants, reduction of blood utilized by chronic sickle cell exchange programs, and increasing awareness on the risk caused by blood shortage. Thus, the reduction in blood donated has been reversed in part by a reduction in need. As the pandemic carries on, the supply of blood will most likely be influenced by elasticity in both supply and demand, as additional

community spread of COVID-19 or further government restrictions on free movement could worsen supply limitations and rescheduling of formerly elective surgeries as urgent cases may lead to increased demand [4]. Blood Transfusion Service of many countries in Africa will face the impact of COVID-19 probably more than any other department in their Ministry of Health (MOH) because of the way it conducts its business. In addition to the scarcity of donors, the capacity of blood banks itself to derive more blood could affect the blood supply negatively secondary to limited resources and poor infrastructures. This can typically be exemplified by a shortage of Cars as blood is collected by teams which move in groups of more than six people including the driver, phlebotomists, donor clerks and counselors. But, currently not more than three or four people should move in one vehicle due to the pandemic [14]. In another view, to hold a large number of blood donors at a single drive session by keeping social distancing, wide rooms are required by blood Banks which may not be available in a lot of African countries. In first world countries, such as USA, the blood drive was held in a large conference room, and only five donors were allowed in at any given time, ensuring plenty of space to accommodate the six foot guidelines [15]. Recent reports released from different international organizations are telling us that an imbalance between blood supply and demand for blood may be compounded through anemic patients due to under nutrition and infectious diseases including malaria outbreaks, a special concern in developing countries. The International Panel of Experts on Sustainable Food Systems has thought that the health catastrophe caused by the novel coronavirus has brought on an economic disaster and is quickly intensifying an ongoing food insecurity and nutrition crisis. In another aspect, the WHO urges sub-Saharan Africa to strengthen its malaria control and curative services in order to save lives at this phase of the outbreak [16,17].

Donating blood and its products (easy and safe way to save life) is an indispensable gift to maintain the health of the community, and the need for it is continous. We don't know the end date of fighting against COVID-19, so the Red Cross Societies and blood banks across the globe have needed the help of whole blood, plasma and platelet donors [18]. Although experts are trying to get substitutes like hemoglobin-based oxygen carriers, these products are not readily available. Thus, there is no replacement therapy for donated blood and platelets [7]. But, the blood supply in a lot of nations will persist to be fragile during this pandemic. In consequence, the lives of many people who need transfusion will be at risk. Emergency open-heart surgeries, and trauma care for trauma cases arising from road traffic accidents and other injuries, including victims of natural disasters, frequently requires multiple units of blood. People with cancer and blood disorders, such as leukemia and thalassemia, are often depend on donated blood. People needing organ transplant services and women who suffer postpartum hemorrhage are also among those who arrive at hospitals requiring transfusions. Getting blood may be the difference between life and death for a number of these people [11,19]. As a result, different responses are implemented in different countries to minimize the shortage. Just to show us a little, health care institutions in America and Ethiopia have issued an emergency call for blood donors and the governments have exempt blood donations from stay-at-home order [7]. In each nation, all adults who are healthy and not quarantined should strongly be encouraged to make an appointment to offer blood and its products. Donating blood by appointment, rather than as a walk-in, allow donor centers to perform social distancing practices [11]. We have to advocate that individuals can still go out and give blood since social distancing does not have to mean social disengagement. Bear in mind that the best technique to protect ourselves and prevent the spread of COVID-19 is applying preventive actions such as repeated hand washing with soap and water as well as avoiding of touching our mouth, nose or eyes with unclean hands [15,20].

After an emergency call for blood donors almost at global level, many countries, such as United States and Ethiopia, have had a good response at the fixed blood collection sites because word has gotten out from politicians and media outlets that there is a blood shortage [13]. Following the call, Ahmed Abiy (Ethiopian Prime Minister) and Tayachew Zinash (First Lady) have donated blood. Other higher officials and health professionals as well as football players in Ethiopia are also giving their blood to act as a model and to produce a good image to the public [10]. We believe that calling and recalling of healthy citizens of the world for blood donations should be an ongoing process. It is merely through our partnership and dedication to giving blood that we can keep on to give hope and healing to all those hospital patients who need transfusions as part of their pharmacotherapeutics [20]. Like Food and Drug Administration (FDA) of the United States, the world countries can modify and revise their national blood policies and eligibility criteria of donors, based on studies

and the capacity of their health care facilities, to encourage more blood donations [12]. Through optimizing patient blood management methods by reducing unnecessary transfusion, and "doing more with less," we can also satisfactorily balance availability with requirement, and continue to present life-saving medical therapeutics [4]. National Blood Transfusion Services should make an every effort to developing new mobile unit services and increasing visits of mobile units to places where donors can be served in small groups for facilitating blood donors to give blood. Blood collection centers could also expand its hours of operation to boost donations for its patients [3,7]. Countries in Africa should mobilize their resources and involve stake holders and non-governmental organizations to strengthen the capacity of their blood banks and to expand infrastructures of blood collection centers found in each region in addition to making solidarity with international agencies having a concern on access of blood for patients.

Most people do not know the importance of donating blood. Some believe that it has no advantages either for the donor or for those who receive the donated blood. The necessity of blood donation today is almost impossible to imagine because the lives saved are countless [21]. So that, we have to raise awareness on the importance of donating blood and eligibility criteria to donate blood, and simultaneously remove misconceptions related to the pandemic among societies to increase the number of voluntary blood donors. To reach the community to disseminate information and educate the public, the concerned bodies could use social media, personal mobiles through text messages, and public media, such as television and radio. In Ethiopia, large parts of the population do not have any access to mass media and education. So, most of them might face complexity in getting and understanding health related information's announced from the mass media's. To address the challenges, supplementing the following might help the country: (a) using communities' local communication systems like "Edir", "Daguu" in Afar region, Boranna elders communication channel and "Iyaa dabarsa" in some parts of oromyia; (b) using local figures like community leaders or "Aba Gedas", ethnic leaders and elders of the community; and (c) integrate blood donation issue with home to home screening programs of COVID-19.

Here are sorts of information that could be informed for those who have or have not donated before. It's imperative for everybody to do their part and donate blood, because many humans don't see how touching it can be for somebody who badly wants it. It's essential for individuals with rare blood types to donate as much as possible. A patient who does not receive the correct blood type will experience medical consequences. For instance, if a female patient has "A" positive blood type, she should only receive either "A" positive or "O" positive blood. If she receives either "A" negative or "O" negative blood, she will no longer be able to bear children. We have to eat a good breakfast and hydrate ourselves with water before coming to give blood. We should not do stressful physical exercise the day before donating blood. Before blood donations, anyone will be screened by blood collection centers as blood cannot be donated if a deferral is detected [19].

While the impact is a little less obvious, there are quite a lot at least five health benefits for the donors that come as a consequence of providing blood. These are: (1) It improves individual's psychological health since it is an expression of love for humankind, as blood knows no caste, colour, creed, religion or race. This kind of expected, altruistic interaction has most important psychological advantages. The psychological health benefit we receive from knowing we're helping others is just as helpful as the physical health benefit; (2) It preserves our cardiovascular health: high levels of iron in the blood constrict our blood vessels and create more risk of a heart attack (acute myocardial infarction). Depleting those extra iron deposits by donating blood gives our vessels more room to operate [22,23]; (3) It helps our liver healthy: researches associate iron overload with non-alcoholic fatty liver disease (NAFLD), hepatitis C and other liver diseases and infections. Though there are many other factors involved in these problems, donating blood can help relieve some of those iron stores and avoid extra issues in our liver [23,24]; (4) It reduce our risk of developing cancer: iron has also been thought to increase free-radical damage in the body and associated to an increased risk of cancer and aging. Regular blood donation is found to be linked with minor risks of developing liver, lung, colon, and throat cancers due to the reduction in oxidative stress when iron is released from the bloodstream [23,25]; and (5) It burns our calories: we can burn up to 650 calories per donation of one pint of blood. The calories burned might help to loss our body weight [24,25].

To avoid fear of contracting the virus by the donors, we have to alert the community at large that SARS-CoV-2 does not pose any risk to donors during the donation process or from attending blood drives. All instruments utilized through the donation process are sterilized, and most are single-use only. Individuals have been refraining from giving blood when they are symptomatic, and for at least 28 days after disappearance of their symptoms after a diagnosis of SARS-CoV-2, or 28 days after the last close contact exposure to a person with SARS-CoV-2 [4,20]. Communicate the public that extra-precautions are taken in blood collection sites to prevent the spread of COVID-19 from person-to-person as per Centers for Disease Control and Prevention (CDC) recommendations. We should take the followings measures to maintain the safety of blood collector and blood donors [26]:

- The temperature of all staff and donors should be taken upon entering the blood collection centers for deferral purpose.
- Staffs with COVID-19 related symptoms should inform their boss and stay out of job until they have been cleared by Human Resources to come back.
- Staffs should wash their hands and use hand sanitizer after every donor encounter.
- Restrict guests from contacting with donors and crucial personnel.
- Ask all donors or visitors to present with a face covering or face mask or give them face mask when they come to donate.
- Include in the blood donor's questionnaire or ask all donors or visitors ahead of entering blood centers to defer themselves if they have had exposure to someone diagnosed with or suspected of having COVID-19 within the last 14 days.
- Ask all donors or visitors before entering donor's center to defer them if they have been diagnosed or suspected of having COVID-19 within the last 14 days.
- Space chairs in reception, donation, and refreshment vicinity to be 2 meter apart.
- Install clear barriers at registration areas and promote a handshake free zone
- Provide new, unused pens to each donor for the pre-screening questionnaire.
- Disinfect donor clipboards and seats (chairs) after each use.
- Regularly and repeatedly disinfect high touch surfaces (door handles, sink handles, chairs, tables, and other items in registration, interview rooms, donation and refreshment areas).
- Remind citizens to follow social distancing as much as possible while at the blood donation centers.
- Request donor's appointment book and limit visitors to the center.

Although respiratory viruses are not known to be transmitted by blood transfusion and no reported cases of transfusion-transmitted coronavirus, the potential for transmission of COVID-19 by blood components is unknown at this time. In Korea and China, recipients of blood transfusions from donors diagnosed with SARS-CoV-2 infection following donation are not developed COVID-19 related symptoms or tested positive for SARS-CoV-2. Even though no transfusion-transmission of COVID-19 has been seen, medical personnel and blood collection firms must remain vigilant and in close contact with donors and health authorities for cross-referencing SARS-CoV-2 positive donations and recipients. Additional research is desirable to verify the existence or absence of virions in blood products and whether these virions are infectious or not [20,27,28]. Even with no persuasive evidence that SARS-CoV-2 can be transfusion-transmitted; the absolute disruption we have seen on a daily basis of life is a spectacular reduction in blood donations [4]. In one or another way, the best strategy to balance supply with demand is containment of this pandemic using preventive measures, such as convalescent plasma or novel vaccines, and treating and curing the COVID-19 cases through novel therapies.

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