



Opportunities and Challenges of Blood Donation and Blood Therapy in Ethiopia

Dejen Nureye^{1*} and Eyob Tekalign²

¹ Department of Pharmacy, College of Medicine and Health Sciences, Mizan-Tepi University, Mizan-Aman, Ethiopia

² Department of Medical Laboratory, College of Medicine and Health Sciences, Mizan-Tepi University, Mizan-Aman, Ethiopia

*Corresponding e-mail: dejenureye@gmail.com

ABSTRACT

Blood is our body fluid that delivers essential substances (nutrients and oxygen) to the cells and exports metabolic waste products away from cells. Blood donation is a procedure in which a voluntary and healthy individual has his blood drawn for transfusion to the one who needs it. Securing safe blood components, based on voluntary, unpaid blood donation, are an important nationwide aim to prevent scarcity of blood. The donated blood has a huge role in surgery, injury, delivery of a baby and other bleeding cases. However, in a lot of low and middle-income countries like Ethiopia, blood provision is significantly inadequate. There is more reliance on family replacement and paid donors which are expected to have transfusion transmissible infections. This is because of many factors including lack of awareness and motivation, lack of knowledge, poor attitude, misconception, and so on. Without humane gifts of noble donors, that also from the heart, many lives might have lost for want of blood. Blood donation is the most generous and may be considered as the leading ever contribution to mankind. Hence, the young generation should be motivated to carry out this charitable activity. All the myths and misconceptions should be removed in order that adequate extent of blood is made available at national and regional blood banks of Ethiopia for saving the life of patients. Thus, increasing knowledge, hastening the development of good attitude towards blood donation and establishing more donor clubs in the society particularly among students within high schools/preparatory schools and Universities of Ethiopia should be the target.

Keywords: Blood, Blood donation, Donors club, Blood transfusion, Ethiopia

INTRODUCTION

Blood and its products are crucial inputs for most medical procedures and services such as surgery, trauma care, and therapeutic interventions. Blood is a body fluid in humans that delivers food and O₂ to the cells and exports metabolic by-products away from those same cells. Of course, human blood is part of human life [1,2]. Blood donation (BD) is a procedure in which a voluntary person who is healthy has his blood drawn for transfusion to the one who needs it. This is an action that can keep the lives of thousands since there is no substitute for it. Blood transfusion became the first step in the resuscitation of road accident victims and war injuries [3-5]. A “donor” is a person who voluntarily donates blood after he/she has been declared fit after a medical examination, for donating blood, on fulfilling the given criteria [6,7]. A non-remunerated voluntary blood donor is an individual who provides blood and blood components by his/her own free will and without receiving payment for it either in cash or in-kind which could be taken as a substitute for money [8].

According to the World Health Organization (WHO) indicators of blood availability in a given nation, the median whole BD rate was considerably lower in low and middle-income countries (LMIC) than in high-income countries [9]. Transfusion of blood is undertaken to save lives and to improve our health, but an insignificant number of patients requiring this medical intervention does not have access on time. The demand for blood transfusion may come up at any point in time in both urban and rural vicinity. The absence of blood has led to fatality and ill-health. Sufficient and consistent supply of safe blood can be maintained by a constant base of regular, voluntary, unpaid blood donors.

WHO advise countries to build national blood systems based on voluntary-unpaid BDs to attain self-sufficiency goal in blood and its products [10,11]. There are great variations between countries in terms of the age distribution of transfused patients. About 65% of blood transfusions made in low-income countries are given to children less than 5 years of age and it is used more often for recovery from pregnancy-related complications, childhood malaria complicated by severe anemia, and trauma-related injuries [9,10].

In Ethiopia, National Blood Transfusion Services (NBTS) was established in 1969 by Ethiopian Red Cross Society (ERCS) since 2004 it has been referred to Federal Ministry of Health (FMoH) with the duty of organizing and managing blood donors, blood collection, blood testing and transfusion of blood and its products in Ethiopia. Its main center is located in Addis Ababa and it also has the responsibility to help regional blood banks in the country, in addition, to supervise and monitor their activities. Administratively, the regional blood banks (serving 8-12 hospitals each in a radius of about 100 km), are under their respective regional health bureaus' [12,13]. In Ethiopia, the range of age to donate blood is from 18-65 years with >45 kg of body weight. The required quantity of blood to be donated in a single donation is from 350 ml to 450 ml. Greater than 12 gm/dl of hemoglobin level for female while 13 gm/dl for male is another eligibility criterion to donate blood. The last but not the least criteria are having 110-160 mmHg systolic and 70-95 mmHg diastolic blood pressures. About 5-7 minutes are enough for drawing blood from your vein [14].

The WHO Country Office for Ethiopia, with support from the United States Centres for Disease Control and Prevention (CDC), has been supporting the extension of the blood safety program in Ethiopia to establish an efficient and sustainable NBTS. A national blood policy and plan, as well as standards, operating procedures and guidelines for appropriate blood usage, have been developed and are being implemented in the country with the support of WHO [15]. The National Blood Bank (NBB) together with regional banks holds annual BD campaigns at about 200 different sites in Ethiopia. Total 30 mobile blood collection teams are working throughout the country with 5 fully functional teams in Addis Ababa alone. They mostly rely on replacement donations with about 30% coming from voluntary donations. Around 85% of the blood comes from donors in Addis Ababa even though the number of blood donors in other corners of the country has been showing progress [16]. With the help of WHO and CDC, emphasis has been given to the promotion to move towards 100% voluntary donations [15,17]. At present, 27 blood banks are available all over the country. Around 5-6 years back 40,000 individuals were required blood but this figure had increased to more than 240,000 people [18].

Difficulties of Blood Donation Service and Its Possible Solutions

In the majority, undeveloped countries including Ethiopia citizens are still dying due to insufficient supply of blood and its products. Less than half of the required amounts are donated or collected for transfusion therapy, though the country desires more than 300,000 units of blood per year. The dearth has put a massive strain on pharmaceutical care given for patients when they are in high demand for blood transfusions [13,19]. Melbourne, Australia's declaration in 2009 states that Voluntary Non-Remunerated Donation of Blood and blood components to every patient as the need should be available in each health facility [20]. However, challenges to the recruitment of voluntary, unpaid or otherwise non-remunerated whole blood donors have created obstacles to collecting adequate supplies of safe blood in developing countries [21]. In poorer countries, donors usually give blood when family or friends need a transfusion and many donors donate as an act of charity. According to ERCS, there are not enough people in Ethiopia who donate blood voluntarily, since they are not informed of the importance until something happens in their family that would require blood transfusion. Some people think that they would die or become sick if they donate blood. In some regions and rural areas in general, there are cultural issues, like it is taboo to donate blood [22].

Moreover, a study was done by Bantayehu, et al., showed that the extent of knowledge on BD among health care professionals in Ethiopia is not as much as someone would anticipate bearing in mind that they are expected to be more knowledgeable than anyone else [23]. In fact, their practice towards BD was also found to be poor. Health care workers are expected to act as a model and practice BD so as to produce a good image to the public [24,25]. Experiences from other African countries tell us youths of Ethiopian Universities are great potential to satisfy the need for blood by national and regional blood banks of Ethiopia [26,27]. However, majority of them had poor knowledge; unfavorable attitude and poor practice towards voluntary BD. Students are usually scared to donate their blood. Inadequate information, being not asked, and fear were documented as some of the justification for not donating the blood.

Therefore, it is essential to encourage students to donate blood regularly and the universities should establish blood donors club that organizes different events to build students' attitudes positively and to raise the number of blood donors in the country [26-28].

Blood transfusion is highly valuable in improving the quality of life as well as the life expectancy of patients suffering from serious or life-threatening conditions [29]. Every country should ensure that provisions of blood and its products are satisfactory, and free from infections like Human Immune Virus (HIV) and hepatitis viruses (HBV, HCV) that can be acquired by receivers of blood from donors [10]. However, the incidence of newly diagnosed HIV infections associated with blood transfusion in LMIC still remains as high as 1-3% in spite of continued advances in HIV testing of donated blood and blood products [21]. When an individual donates blood it should be safe blood (free from any viruses, parasites, drugs, alcohol, chemical substances or other extraneous factors). People who donate blood should be in good health and should not suffer or have suffered from any serious illness. The recipient should not be harmed by receiving blood; the donor should not be put at risk by giving blood. Blood donation club (BDC) which is a collection of voluntary donors, is the primary defence to prevent the transmission of blood-borne infections including HIV, hepatitis, and parasites. BDC is the safest donor since it is provoked by the wish to help others and a sense of moral duty of social responsibility. The mere prize they get is individual satisfaction, self-worth, and pride. In efficient blood donor programs, voluntary blood donors are well-educated regarding criteria for donor selection and are more likely to self-defer if they are not qualified to donate. BDC also leads to reduction in donated blood wastage with all its associated costs because in blood donated with personal initiatives fewer blood units become positive for infection and need to be discarded [14].

Nationwide necessities for blood are determined by the ability of the country's health system and coverage of the population. In urbanized countries having advanced health care services, the demands for blood continue to go up to help progressively sophisticated medical and surgical cases. The availability of non-infected blood and its products in time is important in all health settings, but in many undeveloped and transitional states, there is an extensive gap between blood demand and supply [14]. Despite the annual blood collections increased by 147% (65,681 units) in Ethiopia during 2011-2014 and similarly, voluntary, non-remunerated blood donor donations largely increased from 24% in 2011 to 88% in 2014, the rate of collections remained below WHO's minimum target for adequacy of 10 units per 1,000 population per year (<1% of the population participates in BD) [18,21].

Though BD is life-saving practice, Ethiopia's current blood supply is far less compared to the demand. Ensuring adequate blood supply would be vital for the health care system [29]. Ethiopian FMOH said that "with a growing concern of traffic accidents which is causing injuries and death in Addis Ababa and other parts of the country we need to be able to respond to patients with a proper blood transfusion" [18]. As per the WHO report released in 2014, the mortality rate due to traffic accidents was 37.28 individual per 100,000 in Ethiopia. This was 2.77% of the total deaths making Ethiopia rank 12th in the world. Each year, about 25-40% of Ethiopian mothers who give birth die due to lack of enough blood from donors [19]. Hemorrhaging persists to be one of the primary causes of maternal deaths in Ethiopia while many of this mortality can be disallowed through blood transfusions. Thus, one of the key rationales for improving BTSs in Ethiopia is to decrease the number of maternal deaths [17,30]. Shortage of safe blood supplies for transfusion due to delays in acquiring blood in hospitals or blood had to be obtained from other hospitals that were several kilometers away [31], which can be exemplified by Mizan-Tepi University Teaching Hospital (MTUTH) was also another major problem for women dying when they reach hospital on time. We may say that there is an imbalance between demand and delivery of blood in some areas of Ethiopia. This can be evidenced by somehow high prevalence of anemia, malaria, and injuries including trauma in some health care settings, and expansion of general, teaching and referral hospitals as well.

Favorable Conditions for Blood Donation Service

With the intent of dropping the occurrence of HIV in the blood supply and to accurately screen transmissible infections in the blood after collection, Ethiopia had got its first NBTS in the FMOH. The center costs \$5 million for construction, is expected to assist the ministry to gather the WHO's suggested yearly blood collection (>25%) from the country. The project was sponsored or financed by the US President's Emergency Plan for AIDS Relief (PEPFAR) as part of its 2015 fund. The 5-story earthquake-resistant construction is going to be built on a 5,300 square km plot of land within the compound of FMOH. The building will offer the ministry extra power to collect donations; screen and

process blood products, and dispense life-saving products to serve around 26,000,000 people. The center will also be accountable for screening the donated blood for infection agents (HIV, HBV, HCV, and Syphilis); perform blood typing; get ready blood components (concentrated red cells, fresh frozen plasma, platelets, and cryoprecipitate) and distribute harmless blood for health institutions. There are a variety of medicines which we could provide through blood fractions and blood extract but our patients suffer and usually travel outside since we do not have the capacity and the technology. Therefore, this facility would support the government of Ethiopia to achieve its medical excellence using biotechnology [18, 30].

The emergence and widespread of HIV in the 1980s and 1990s caused blood services across the globe to look for new approaches to make the collection of safest blood possible [32]. In 1989, the NBTS of Zimbabwe devised a novel and moving strategy called “Pledge 25”. They have been targeting a formerly untouched pool of low-risk blood donor groups (young people aged between 16-25 years). The aim is to motivate and encourage BD from school and university students, youth groups, communities, Church groups and other places of learning. Then, “Club 25” was developed from the “Pledge 25” concept when the NBTS of other countries such as the South African begun to design strategic policies [33]. In the origin of the program, students vowed to give blood for a total of 25 sessions by the time they attain the age of 25; the dedication nowadays differs depending on each country [32].

Maintaining a healthy lifestyle in order to donate the safest blood is one part of the pledge. “Club 25” members are also expected to teach and inform their peers as well as other members of the community concerning safe behavior, thus adding health promotion activities. The idea behind “Club 25” is to be open and sincere with young people, giving clear guidelines about BD criteria and details regarding the best HIV/AIDS protection mechanisms or methods based on recent evidence, and then let the young person make their own choices [34]. Now, many countries including Ethiopia had adopted this strategy, which has been accepted and supported by WHO and the International Federation of Red Cross and Red Crescent Societies (IFRCRCS) [32,33]. Even though the major objective of the team was to speak up for women and girls’ rights, the Yellow Movement Initiatives in Addis Ababa University has been making blood drive event to draw a large number of blood donors. This experience has to be expanded to other sister Universities including Mizan-Tepi University (MTU) in order to save the lives of mothers particularly and human beings in general [35].

This philosophy (blood donors club among students) is working in Zimbabwe because around 70% of the blood collected throughout the country was from students and HIV infection rates among blood donors were decreased from 4.45% in 1989 to 0.35% in 2005 [34]. Universities and preparatory schools are potentially ample donor recruitment trees: offering a large, easily accessible, operationally convenient, cohesive and compliant prospect group of blood donors who can help ensure constant blood supply in the country [24]. The establishment of peer-group donor clubs is an indispensable activity to increase the number of individuals that donate blood voluntarily and regularly. The club members can mobilize the University and local communities using leaflets, posters as well as local FM Media. As a result, the local communities, as well as the country, may be relieved from blood shortage stress. A single, centrally coordinated club of university blood donors enables easy communication and coordination and accountability because of its well-defined structures, activities to be carried out under some form of regulated environment and creation of a centrally coordinated group of voluntary non-remunerated BD ambassadors in their community. Peer collected blood donors make it easy to engage in collaboration and partnership with like-minded groups and stagger blood drives to manage resources and blood unit’s expiries. Clubs also facilitate the creation of a culture of regular, voluntary non-remunerated BD [26]. BD is the one way to a person in healthy life. This is because during the BD our body will be replaced new blood cells. University students become benefited as their future carrier is concerned if the higher institution where they are learned provide them acknowledgment paper or participation certificate. Making blood donor clubs will also answer one of the questions raised by students’ which is lack of different clubs within the universities that invite students. It actually increases the number of community services provided by tertiary educational organizations of the country. Possibly the clubs will create influence on the stakeholders to strengthen the already initiated process or if not to induce the steps for opening blood banks in the local community.

CONCLUSION

Being able to support medical doctors to save the life of humans is a great feeling and honourable act hence; there are no ideal substitutes of human blood. The more blood people donate the more lives they save. Although it might vary and depends on specific data, women are the ones usually affected due to accidents and during childbirth where they

might need blood transfusions. As their blood requirements are small, many neonates and infants may be benefited from blood donated by one blood donor. At every single blood donation, we can help about 3 or 4 individual recipients. To do so, people of Ethiopia particularly students of preparatory schools and Ethiopian Universities be supposed to be educated, informed, and trained about blood donation and organized in clubs.

DECLARATIONS

Conflict of Interest

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Authors' Contributions

Dejen Nureye conceptualized and drafted the manuscript. Eyob Tekalign reviewed the draft and adds significant intellectual content. Both authors have read and approved the final version of the manuscript.

REFERENCES

- Mulcahy, Andrew W., et al. "Toward a sustainable blood supply in the United States." *Rand Corporation, Santa Monica, CA*, 2016.
- Nwabueze, S. A., et al. "Perception of blood donation among medical and pharmaceutical science students of Nnamdi Azikiwe University, Awka." *Open Journal of Preventive Medicine*, Vol. 4, No. 7, 2014, p. 515.
- Beers, Mark H., et al. *The Merck manual of medical information*. Pocket Books, 2003.
- Devi, H. Sanayaima, et al. "Knowledge, attitude and practice (KAP) of blood safety and donation." *Indian Medical Gazette*, Vol. 1, 2012, pp. 1-5.
- Al-Drees, Abdul Majeed. "Attitude, belief, and knowledge about blood donation and transfusion in Saudi population." *Pakistan Journal of Medical Sciences*, Vol. 24, No. 1, 2008, pp. 74-79.
- Tadesse, Woldemichael, et al. "Knowledge, attitude, practice and associated factors towards voluntary blood donation among regular health science students of Samara University, Ethiopia." *Health Science Journal*, Vol. 12, No. 1, 2018.
- Hada, J. A. "A research report on knowledge, attitude and practice on blood donation among 18-25 years bachelor level people." *Hope International College*, 2008, pp. 1-30.
- Asif, Naghmi, and Khalid Hassan. "Voluntary blood donation." *Journal of Islamabad Medical and Dental College*, Vol. 5, No. 1, 2015, pp. 1-2.
- WHO. Global status report on blood safety and availability 2016. WHO, Geneva, Switzerland, 2017.
- WHO. 10 facts on blood transfusion. WHO, Geneva, Switzerland, 2017.
- WHO. Giving blood in a time of crisis. Global health days, World Blood Donor Day, 2017.
- Jembi BSSP. Ethiopia national blood bank service. 2017, www.jembi.org.
- Kassahun C. Ethiopia: Blood donation, its use, and means to do, the Ethiopian Herald (Addis Ababa), 2015.
- Dejen, Ambaye. Knowledge, attitude, practice and associated factors of blood donation among health care workers in Tikur Anbessa specialized hospital, Addis Ababa, Ethiopia. Diss. Addis Ababa University, 2015.
- WHO Country Office. Ethiopia: Ethiopia | Blood safety, WHO | Regional Office for Africa. WHO. 2015.
- APA News. Hundreds of mothers are dying in Ethiopia from lack of blood during and after delivery, the head of the National Blood Bank has revealed. APA-Addis Ababa (Ethiopia), 2017.
- Embassy of the United States. The U.S. Government and the National Blood Bank Services collaborate on the blood drive. Addis Ababa, Ethiopia, 2014.
- eNews Channel Africa. Ethiopia to get its first National Blood Transfusion Service Centre. Africa Thursday, 2016.
- ENSA. About 40% of Ethiopian mothers die because of lack of enough blood donors. Cantabria, Spain, 2014.

20. Consultation. WHO Global. "100% voluntary non-remunerated donation of blood and blood components WHO." *Melbourne, Australia*, 2009, pp. 9-11.
21. M Chevalier, Michelle S. "Progress toward strengthening national blood transfusion services-14 countries, 2011-2014." *MMWR. Morbidity and Mortality Weekly Report*, Vol. 65, 2016.
22. Capital of Ethiopia. Interview by Amanuel with the Ethiopian Red Cross Society. Capital Ethiopia Newspaper, 2013.
23. Bantayehu, Destaw. "Knowledge, attitude, and practice of voluntary blood donation and associated factors among health care providers in Addis Ababa health facilities, Ethiopia." *Occupational Medicine and Health Affairs*, 2015.
24. Tadesse, Tsige, et al. "Blood donation practice and associated factors among health professionals in Tigray regional state public hospitals, northern Ethiopia." *BMC Research Notes*, Vol. 11, No. 1, 2018, p. 677.
25. Malako, Dawit, Fissehatsion Yoseph, and Mebratu Legesse Bekele. "Assessment of knowledge, attitude and practice and associated factors of blood donation among health care workers in Ethiopia: a cross-sectional study." *BMC Hematology*, Vol. 19, No.1, 2019, p. 10.
26. Edington Muchokwani. A 'how-to' guide to better engage young people to continue serving their communities through blood donation, unlocking the potential for blood adequacy in Africa. Africa Society for Blood Transfusion, 2018.
27. Nigatu, A., and D. B. Demissie. "Knowledge, attitude and practice on voluntary blood donation and associated factors among Ambo University Regular Students, Ambo Town, Ethiopia." *Journal of Community Medicine and Health Education*, Vol. 4, No. 5, 2014, p. 6.
28. Misganaw, Chalachew, et al. "The level and associated factors of knowledge, attitude and practice of blood donation among health science students of Addis Ababa University." *International Journal of Medical Science and Human Science Research*, Vol. 1, No. 10, 2014, pp. 105-18.
29. Tadesse, Tsige, et al. "Blood donation practice and associated factors among health professionals in Tigray regional state public hospitals, northern Ethiopia." *BMC Research Notes*, Vol. 11, No. 1, 2018, p. 677.
30. Hailegebriel B. Ethiopia National Blood Transfusion Service Centre construction launched, the Ethiopian Herald. All Africa Global Media, 2016.
31. Knight, Hannah E., Alice Self, and Stephen H. Kennedy. "Why are women dying when they reach the hospital on time? A systematic review of the 'third delay'." *PloS One*, Vol. 8, No. 5, 2013.
32. World Health Organization. "Towards 100% voluntary blood donation: a global framework for action." WHO, 2010.
33. Kongnyuy, Eugene J., and Nynke van den Broek. "Availability and safety of blood for transfusion in three districts in Malawi." *Tropical Medicine and Health*, 2008.
34. Club 25. Reaching young blood donors. Celebrating the Gift of Blood, World Blood Donors Day, 2006.
35. Yellow Movement Initiative. Addis Abab University external relations, partnerships, and communications, 2018.