UNIVERSITY OF ILORIN

THE TWO HUNDRED AND SEVENTY-NINETH (279TH) INAUGURAL LECTURE

"HEROES WITHOUT CAPES: THE LIFE-SAVING POWER OF BLOOD SACRIFICE"

By

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My Lords Spiritual and Temporal,
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Gentlemen of the Print and Electronic Media,
Distinguished Ladies and Gentlemen.

Preamble

In the name of God, the Father, God the Son, and God the Holy Spirit, I stand before you today to deliver the 279th Inaugural Lecture of this great University, the first in the Faculty of Basic Clinical Sciences and the first in the Department of Haematology. Vice-Chancellor, Sir, I thank you for this incredible privilege.

Haematology is a branch of medicine focused on the study of blood and blood-forming organs, including the diagnosis, treatment, and prevention of diseases affecting the blood, bone marrow, and the immunological, haemostatic, and vascular systems. A haematologist is a pathologist, who serves as both a laboratory physician and a clinician. Haematology is

divided into general haematology, haemostasis or coagulation, haematological malignancies or haemato-oncology, and blood transfusion and immunohaematology. My research encompasses all these areas, but primarily focuses on blood transfusion. Therefore, as indicated by the title of this lecture, I will focus on an important aspect of blood transfusion, specifically blood donors and donations.

My Journey into Haematology

When I was in primary school, my late father, who was a Mechanical Engineer and very good at Mathematics, would wake me up at 5 am every morning for Maths lessons, he also taught me Maths on visiting days when I was in boarding school at Federal Government College, Ilorin. Mathematics became my favourite subject, and I became a Maths teacher to my classmates and graduated as the top student in Mathematics in my set. At that time, I thought he wanted me to be a Mathematician, but surprisingly, when I did my first JAMB in 1984, he chose Medicine for me. However, I was not given admission to study Medicine, so I enrolled for “A” Levels at FGC, Ilorin in 1984, with a subject combination of Physics, Chemistry, and Biology, which was for Medicine. However, I missed Maths so much that I independently changed it to Physics, Chemistry, and Mathematics, intending to pursue Electrical Engineering instead of Medicine.

When my father found out about the change, he came to school and asked me, “What course do you want to study with Physics, Chemistry, and Mathematics?" I replied, “I want to study Electrical Engineering." He then asked, “Do you want to be climbing NEPA poles?" I responded, "No, Sir," and he said, “You have to change your subject combination back to Physics, Chemistry, Biology, and study Medicine.” So, he asked the Vice-Principal to change it back to Physics, Chemistry, Biology. In 1985, one year into my “A” Levels, I eventually got admission to study Medicine through my second attempt at JAMB, and that was how my journey to becoming a medical doctor began.

In medical school, I developed a passion for Haematology, one of the four branches of Pathology. My lecturer, Prof. J. O. Adewuyi, was an excellent teacher; his effective teaching helped me understand Haematology so well that it became my favourite subject. I am honoured to have Prof. Adewuyi here today. Thank you, sir, for your impact on my life. I loved that Haematology encompasses both laboratory and clinical aspects and deals with blood, which is central to all medical disciplines. Anytime there is an industrial action and all the laboratories shut down, the blood bank remains operational because it is the heart of the hospital. Thus, I started my residency programme in Haematology in December1993, focusing on blood transfusion as a specialist.

Mr. Vice-Chancellor, and distinguished audience, I am grateful to God for sparing my life and enabling me by His Spirit to deliver the 279th Inaugural Lecture of *Better by Far* University, my alma mater, titled "Heroes Without Capes: The Life-Saving Power of Blood Sacrifice." I will start by discussing each key phrase in the title of this lecture, dwell a bit on the history of blood donation and transfusion, and then share my various contributions to knowledge on today's subject matter.

Heroes without Capes

The English dictionary defines "heroes" as individuals who demonstrate exceptional bravery, courage, and selflessness. They go above and beyond to help others and make a positive impact on society. They are willing to take risks and make sacrifices for the benefit of others. When we think of a hero, we often picture a caped crusader, like Superman, soaring through the sky to rescue people from danger. However, today, I want to discuss heroes who do not wear capes, whose acts of kindness and sacrifice have far-reaching effects. I am referring to our voluntary blood donors, who regularly donate blood anonymously and without recognition, yet whose contributions save lives.

Life-Saving Power

Every two seconds, someone around the world needs blood and depends on the kindness of strangers for survival (New York Presbyterian Health Matters, 2025). This staggering statistic is one of the most overlooked aspects of modern healthcare. Blood is essential for medical treatments, but is often in short supply, especially for certain blood types like O-negative. Many patients depend on blood transfusions to survive: women experiencing bleeding after childbirth, patients battling leukemia, those with sickle cell anaemia, and patients undergoing cancer treatment, organ transplants, or major surgeries all depend on blood donations. The transfusion of blood and blood products helps save millions of lives each year, enhancing life expectancy and improving the quality of life for patients facing life-threatening conditions while supporting complex medical and surgical procedures.

One pint of blood can save up to three lives because it can be separated into three components; red blood cells, plasma, and platelets; each of which can assist different patients with various medical conditions. This illustrates the significant impact a single unit of donor blood can have. Early in my medical career, while working as a House Officer, I was on call in the Emergency Paediatric Ward one night, when a 10-year-old boy was brought in by his mother, appearing lifeless. He was a known patient receiving treatment for acute leukemia, and he looked extremely pale, nearly paper white; his PCV was 8%. His only chance of survival that night depended on a blood transfusion. However, we were able to save his life by administering a pint of blood. The blood that saved this child's life was donated by an anonymous individual whose generosity made the crucial difference between life and death. This highlights the importance of blood donation in sustaining life. It is no wonder the Bible states in Leviticus 17:11, "For the life of the flesh is in the blood."

Blood Sacrifice

Blood sacrifice is a rite involving the shedding of blood, believed to release the vital force that sustains life (Mckenna, 2025).This practice transcends culture, religion, and geography. In African Traditional Religion, animal sacrifice through bloodletting aims to appease the gods, with blood offered in exchange for a sick person. In Islam, animal sacrifice is an important ritual performed starting on the 10th day of the month of Dhul Hijjah. This sacrifice symbolises commitment to Allah and provides an opportunity to assist those in need. In Judaism, animal sacrifice is conducted to appease God for the forgiveness of sins. For Christians, blood sacrifice forms the foundation of Levitical worship, as every sin required atonement through sacrificial blood, poured out as atonement (Leviticus 17:11).According to the Law of Moses, nearly everything was purified with blood, for without the shedding of blood, there is no forgiveness (Hebrews 9:22). The blood sacrifice of the Passover lamb also protected the firstborns of the Israelites from the angel of death. (Exodus 12:13) However, the New Testament contains many references to the cleansing and reconciling power found in the blood of Jesus. The death of Jesus on the cross represents a one-time blood sacrifice for the remission of sins and salvation (Romans 3:23-26).

However, in this lecture, when I refer to blood sacrifice, I mean voluntary blood donation. This act of sacrifice arises from compassion and empathy and involves willingly giving about one-tenth of one's blood to someone in need. This sacrifice is invaluable and can make the difference between life and death. It is truly a gift of life.

Blood Donation and Transfusion Services in Nigeria

Blood transfusions were first performed in Nigeria in the 1940s, particularly for patients suffering from severe trauma or surgical complications. At that time, however, there were no organised blood banks or formal donation systems; blood was provided as needed by family members or friends of the patients (Schneider, 2013). After Nigeria's independence in 1960, the

country began to modernise its healthcare infrastructure. As hospitals and clinics expanded, blood banks gradually emerged in urban hospitals to create a more systematic approach to collecting, storing, and distributing blood(Schneider, 2013).However, Nigeria faced numerous significant challenges regarding blood donation during this period, including a lack of awareness about the necessity for regular, voluntary blood donations, fears of potential health risks, misconceptions, religious prohibitions against blood exchange, and concerns about blood safety, particularly with the rise of HIV/AIDS in the 1980s (Okpara, 1992).

Vice-Chancellor, Sir, the operation of the National Blood Service Agency commenced in 2005 as the National Blood Transfusion Service (NBTS), through a multilateral partnership between the federal government of Nigeria and the United States government via the United States President's Emergency Plan for AIDS Relief (PEPFAR). The legal framework establishing the National Blood Transfusion Service is the National Health Act (NHAct) of 2014 (Yaguda, 2025). The National Blood Service Agency bill was signed into law on July 29, 2021 to strengthen the National Health Act (NHAct) of 2014 and to enable the service to function as a commission. This marked a significant step toward formalising blood collection, testing, and distribution in the country (Yaguda, 2025). The NBTS was tasked with establishing regional blood transfusion centers across Nigeria, promoting the practice of voluntary blood donation, and ensuring the safety and quality of donated blood through rigorous screening for diseases like HIV/AIDS, hepatitis and syphilis (Yaguda, 2025). The National Blood Service Agency (NBSA) relies on a pool of regular donations from voluntary, unpaid blood donors and collects and screens approximately 25,000 units of blood each year. The agency has successfully established 17 blood collection, testing, and distribution centers across the six geopolitical zones of Nigeria, and the process of expanding these services to more states and local government areas is ongoing (Yaguda, 2025).

According to the WHO, the minimum number of blood units required to meet demand for blood and blood products is at least 1% of a country's population. With a population of about 200 million, Nigeria needs around 2 million units of blood annually to satisfy this demand. However, only an estimated 1.2 million units are collected across various facilities each year. Less than 5% of these total blood donations come from voluntary donors, while over 90% are sourced from commercial and family replacement donors. As a result, safe blood is in short supply to meet this demand (Yaguda, 2025).

World Blood Donor Day

Every year, on June 14th, countries around the world, including Nigeria, celebrate World Blood Donor Day (WBDD). This event aims to raise awareness about the need for safe blood and blood products while also thanking and honouring voluntary, unpaid blood donors for their life-saving contributions. However, WBDD is more than just a gesture of gratitude; it also serves as a call to action. It reminds us that blood donation is a community responsibility and that by donating regularly, we can all contribute to building a healthier, more compassionate world (World Health Organization [WHO], 2025a). The Day also underscores the importance of global cooperation in achieving health goals. When countries work together to promote voluntary blood donation, share best practices, and support developing nations in strengthening their blood services, we can move closer to a world where no one dies due to a lack of safe blood. The global theme for WBDD changes each year. The theme for this year is "Honoring the Heroes of Life" (World Health Organization [WHO], 2025a). At the University of Ilorin Teaching Hospital, we join the global community in celebrating WBDD every year.

The Blood

Blood is a fluid that circulates throughout the body in blood vessels, and it is essential for life. It carries oxygen and nutrients to organs and tissues, and helps to remove waste. Blood

also plays a crucial role in fighting infections and supporting the body's healing processes. Blood travels approximately 12,000 miles within the body and pumps around 2,000 gallons everyday(NOVA, 1997). This extensive circulation ensures that blood reaches all parts of the body, supplying tissues with the substances necessary for normal functioning, growth, and cell reproduction. Aside from the heart, this pumps blood, no other tissue or organ in the human body works as tirelessly as blood does.

Blood can be broadly categorised into blood cells and plasma. Blood cells are produced in the bone marrow, and they include red blood cells, white blood cells, and platelets. Red blood cells (RBCs) primarily contain haemoglobin, which transports O2 from the lungs and CO2 back to the lungs. The lifespan of red blood cells is approximately120 days (Franco, 2012).White blood cells (WBCs) are crucial to the body's immune system, combating infections and diseases. There are various types of WBCs, including neutrophils, lymphocytes, monocytes, eosinophils, and basophils as shown in Figure 1. The lifespan of WBCs varies from hours to years, depending on the specific type (Lawrence, Ervin & Wetrich, 1945).Platelets are cells that aid in blood clotting. They cluster together to form a clot or plug when there is a cut or bruise, helping to control bleeding and prevent excessive blood loss. Platelets have a lifespan of about 7 to 10 days (Pluthero & Kahr, 2018).

Plasma, which constitutes about 55% of blood volume, is mainly composed of water but also contains proteins, fatty substances, salts, nutrients, vitamins, and hormones. The plasma proteins include albumin, globulin, and coagulation factors, all of which are involved in various physiological processes. Albumin, accounting for 60-80% of plasma proteins, is produced in the liver and is essential for maintaining colloid osmotic pressure and transporting substances in the blood. Globulins, categorised into alpha (α), beta (β), and gamma (γ), primarily serve as transport proteins, with the gamma portion also playing a role in humoral immunity. Coagulation factors, predominantly produced by the liver, assist platelets in the clotting process.

Plasma carries respiratory gases, such as CO2 in large amounts (approximately 97%) and O2 in smaller amounts (around 3%), along with various nutrients (e.g., glucose and fats), metabolites (e.g., urea and ammonia), hormones, and vitamins (Carlson, 2019).

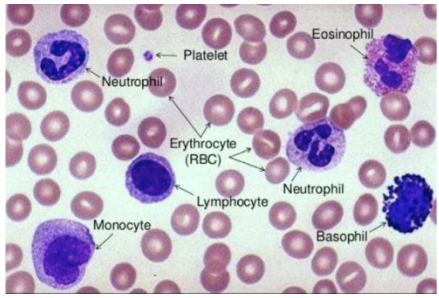

Figure 1: Peripheral blood film showing normal blood cells

Normal Rangesof Blood Counts

Haematological parameters in a complete blood count are among the most frequently requested investigations for routine medical check-ups and the preliminary assessment of many diseases across all fields of medicine. They are also commonly used to monitor the treatment of various conditions, particularly in patients undergoing cytotoxic therapy, and to determine the need for blood transfusions (Tadesse, 2024). Normal ranges of blood parameters are typically established through population studies. "Normal" is generally defined as those test values that fall within two standard deviations (SDs) of the mean, encompassing 95% of all results.

Normal haematological reference values differ among individuals of varying races, ages, and genders (Ezema, 2023). Normal reference values for haemoglobin concentration, packed cell volume, total white blood cell count, and platelet count are higher among Caucasians than among Black individuals (Bain, 1996). The values for haemoglobin concentration, packed cell volume (PCV), and red blood cell count are elevated at birth, decrease during childhood, and gradually rise at puberty until

reaching normal adult values, after which they decline again in old age, particularly in men. Additionally, these values are higher in men than in women after puberty (Mandala *et al*., 2017). Sex differences are also observed in leukocyte counts; women show higher values than men between the ages of 21 and 50 years. (Mandala *et al*., 2017).

To accurately interpret and ascertain the clinical implications of the complete blood count for any individual in a state of health or disease, it is essential to understand the normal reference range for that locality. Therefore, **Olawumi** *et al*., (2015) determined the reference values of haematological parameters for healthy adults in Ilorin to provide standards for interpreting laboratory results and assessing the need for blood transfusions in this locality and its surroundings. The red blood cell count, hemoglobin concentration, PCV, and mean corpuscular hemoglobin concentration (MCHC) were significantly higher in males than in females, while the platelet count, total white blood cell count, and absolute neutrophil count were significantly higher in females than in males. The haematological reference values obtained in this study were lower than those currently used at the hospital as shown in table 1 (**Olawumi**, 2019)

Olawumi *et al*., (2015) also compared the mean values of haematological parameters in this study with those from Jos and several other African countries, Pakistan, and the Western world as shown in Table 2. The lower values of haematological parameters in most African countries compared to the Western world may be attributed to malaria prevalence, intestinal parasite infestations, and dietary, environmental, and genetic factors (Njunda *et al*., 2015).

Table 1: Comparison of haematological reference values obtained from the study by Olawumi *et al.*, (2015) with those used in the hospital

	Males		Females	
Parameter	In current use	current study	In current use	Current study
RBC($x10^{12}$/l)	4.5-6.5	4.155-6.360	3.8-5.8	3.604-5.570
HB(g/dl)	13-18	11.600-16.100	11.5-16.5	9.958-14.485
PCV(%)	40-54	36.00-49.90	37-47	32.00-45.00
MCV(fl)	76-96	70.010-95.280	76-96	70.758-94.770
MCH(pg)	27-32	21.300-31.000	27-32	21.658-30.928
MCHC(g/dl)	32-36	29.600-34.390	32-36	29.558-34.200
Platelet($x10^9$/l)	100-300	60.10-306.80	100-300	75.15-340.70
WBC($x10^9$/l)	2.5-10	3.320-8.690	2.5-10	3.400-9.590
Neutrophils($x10^9$/l)	1.25-5.75	0.928-4.300	1.25-5.75	1.100-4.977
lymphocytes($x10^9$/l)	0.65-4.15	1.310-4.090	0.65-4.15	1.300-4.240

Table 2: Comparison of mean of adult male haematological reference values obtained from the study by Olawumi *et al.*, (2015) against others

Parameter	Present study	Jos[12]	Ghana[13]	Ethiopia[14]	Pakistan[15]	Western[16]
RBC ($x10^{12}$/l)	5.148	5.20	4.84	5.1	5.39	5.50
HB (g/dl)	13.805	14.20	13.64	16.1	13.04	15.5
PCV (%)	42.98	44.19	42.20	48.3	39	47
MCV(fl)	83.672	85.52	88	ND	76.3	86
MCH (pg)	26.995	27.66	29.1	ND	25.54	29.5
MCHC (g/dl)	32.203	32.18	33.1	ND	32.27	32.5
Platelet ($x10^9$/l)	174.44	216.40	316	207	255	150-400
WBC ($x10^9$/l)	5.533	4.40	5.5	6.0	8.25	7.50

Blood Products and Uses

Blood products are therapeutic substances derived from human blood. They encompass whole blood and various blood components for transfusion, as well as plasma-derived medicinal products (PDMPs), also referred to as plasma derivatives. Blood components are processed through physical methods like centrifugation, freezing, and thawing. These components consist of red cell concentrates (packed red cells), platelet concentrates**,** granulocyte concentrates, fresh frozen plasma (FFP), andcryoprecipitate. Plasma-derived medicinal products are

partially purified therapeutic preparations made in pharmaceutical companies from large volumes of human plasma. They include albumin**,** coagulation factors, and immunoglobulins. Each of these blood products has specific applications and can be life-saving. However, when used iinappropriately, they can also be fatal. (**Olawumi**, 2022).

The Vice-Chancellor, Sir, I would like to enumerate some uses of the blood components.

1. Red cell concentrate is used to save the lives of patients with cancer undergoing chemotherapy, trauma victims experiencing severe hemorrhage, women suffering from postpartum haemorrhage, patients with end-stage renal disease, and others with symptomatic anemia.
2. Platelet concentrate is used to save the lives of patients suffering from acute leukemia, disseminated intravascular coagulopathy, and others experiencing thrombocytopaenic bleeding.
3. Fresh frozen plasma contains coagulation factors and is used to save the lives of patients with thrombotic thrombocytopenic purpura, haemolytic uremic syndrome, bleeding due to warfarin overdose, disseminated intravascular coagulopathy, complications of massive transfusion, and other types of bleeding caused by coagulation factor deficiency.
4. Cryoprecipitate primarily contains fibrinogen along with other factors such as factor VIII, factor XIII, and von Willebrand's factor. Therefore, it can be used to save the lives of patients with congenital or acquired fibrinogen deficiency, Haemophilia A, von Willebrand's disease, and other related conditions.

The appropriate use of blood involves transfusing the correct blood product to the right patient at the right time and place. Safe, effective, appropriate, and quality-assured blood products play a crucial role in improving and saving millions of

lives each year by addressing issues related to child and maternal health. They also significantly enhance the life expectancy and quality of life of patients suffering from inherited disorders such as sickle cell disease, haemophilia, thalassaemia, and immune deficiencies, as well as acquired conditions like cancer and traumatic haemorrhage. Furthermore, they facilitate complex medical and surgical procedures, including transplantation (WHO, 2025b).

Blood and Blood Component Requests and Utilisation

The increasing demand for blood and blood products is often met with a limited supply. Therefore, blood ordering and transfusion practices in our various hospitals should be regularly reviewed to minimize wastage. Overordering of blood creates inventory challenges for blood banks, reduces shelf life, and leads to wastage. Implementing a blood ordering schedule, which acts as a guide for expected normal usage during elective surgical procedures, can help to mitigate overordering and facilitate more efficient management of blood inventory. **Olawumi** and Bolaji *et al*., (2006) evaluated blood utilisation in elective surgical procedures over six months, using the crossmatch-to-transfusion ratio, transfusion probability, and transfusion index as metrics to establish framework for developing a maximum surgical ordering schedule in UITH. Our findings revealed that 69.7% of crossmatched blood for various surgeries was not utilised. All three metrics indicated significant blood utilisation during wound debridement, open reduction internal fixation, and prostatectomy, while thyroidectomy and ENT surgeries showed no significant blood utilisation according to any of the three metrics.

Olatunji and **Olawumi** *et al*., (2004) also reviewed the pattern and content of blood transfusion requests for trauma patients in UITH, discovering that 9% of total requests were related to trauma cases. Patients involved in road traffic accidents and those with gunshot wounds were more likely to require blood transfusions in trauma situations (70%). The blood

bank responded by crossmatching for 81% of patients. However, only 37% of those were transfused. Regarding blood requests, **Olawumi** and Adewuyi *et al*., (2007a) found that the Obstetrics and Gynecology Unit had the highest number of requests, but was the least efficient in utilising crossmatched blood. The Paediatrics department made the fewest requests after the Medicine department, but was the most efficient in utilising crossmatched blood.

Blood Donor Selection/ Eligibility Criteria

The primary responsibility of a blood transfusion service (BTS) is to ensure a safe, sufficient, and timely supply of blood and blood products. Consequently, the BTS must collect blood only from donors, who are at low risk for infections that could be transmitted through blood and who are unlikely to jeopardise their health by donating. A comprehensive process for evaluating the suitability of prospective donors is essential to maintain both the safety and adequacy of the blood supply, while also protecting the health of recipients receiving transfusions and the donors themselves, ensuring that suitable donors are not deferred unnecessarily. Blood donation is governed by principles that safeguard the well-being of both donors and recipients (WHO, 2012). Blood donor selection aims to exclude anyone whose blood might harm the recipient, or who might be harmed by donating blood. It is intended to protect both the donor and the recipient. It is therefore subdivided into criteria for the protection of donors and criteria for the protection of the recipients (**Olawum**i, 2022).

Vice Chancellor sir, I would like to enumerate the Donor selection criteria for the protection of blood donors, they include:

1. The age range of 17 to 65 years. A lower limit of 17 was established due to the heightened risk of vasovagal reactions in younger donors, as well as the increased iron needs of adolescents and young menstruating females. The upper age limit was set because of concerns about the rising incidence of cardiovascular disease with age

and the potential risk of adverse reactions, which are more likely in first-time donors. However, donors under 18 will require parental consent, and the upper age limit for first-time donors is 60 years.

2. Donor weight of at least 50kg. This weight limit is crucial for protecting donors against adverse effects, particularly vasovagal episodes and anaemia. Low body weight and low blood volume are independent predictors of vasovagal reactions (Nishikori *et al.*, 2017).
3. Haemoglobin level for a male donor of at least 13.5 g/dL, and a female donor of at least 12.5 g/dL. A donor with a haemoglobin level lower than these thresholds is not eligible to donate.
4. Donation interval of 3 to 4 months for male donors and 4 to 6 months for female donors. Repeat and regular blood donors will need iron supplementation to replenish their iron stores and prevent iron deficiency.
5. Vital signs, including pulse rate, temperature, and blood pressure should be within normal limits.
6. Female donors are deferred during pregnancy and for at least three months after delivery (or following abortion or miscarriage) and during lactation to allow for the recovery of iron stores.
7. It is important to note that menstruation is not a reason for deferral, except for women who have regular excessive menstrual bleeding and are found to have low haemoglobin levels. However, in a study conducted by **Olawumi** *et al*., (2023) among women in Nigeria's six geopolitical zones, it was alarming to discover that 12.6% of deferrals among women were due to menstruation.This situation arises because some blood bank staff in Nigeria defer women during their menstrual periods, regardless of haemoglobin levels. The concern for jeopardizing the health of a woman who volunteers

to donate blood while menstruating is significant. Research has shown that regular menstruation does not impact a woman's ability to donate, as long as she is not experiencing heavy bleeding and her haemoglobin is above 12.5 g/dl (Myupchar, 2020).

Vice-Chancellor, Sir, apart from these criteria designed for the protection of blood donors, there are also a set of criteria designed to protect the recipients and they include:

1. Deferral of donors with a history of blood transfusions for 12 months.
2. Allowing individuals exhibiting high-risk behaviour for HIV/AIDS to self-defer.
3. Deferral of donors with a history of jaundice or hepatitis, as well as those who have been in close contact with someone who has hepatitis, for 12 months.
4. Deferral of donors with tattoos, scarification marks, blood splashes in the eyes, accidental needle stick injuries, or assaults such as human bites or rape for 12 months.
5. Deferral of donors who have received vaccinations, including rabies and tick-borne encephalitis vaccines for 12 months.
6. Deferral of donors who have received attenuated vaccines such as BCG, yellow fever, rubella, measles, oral polio, mumps, and the live attenuated cholera vaccine for 4 weeks.
7. And donors who have received killed or inactivated vaccines, toxoids, or hepatitis A or B vaccines may be accepted if they are healthy at the time of donation.

Benefits of Blood Donation

1. A lipid profile, also known as a coronary risk panel, is a group of tests that serve as good indices for assessing cardiovascular disease. Hypercholesterolemia, elevated low-density lipoprotein cholesterol (LDL-C), and

decreased high-density lipoprotein cholesterol (HDL-C), are recognised risk factors for cardiovascular diseases. Regular blood donation typically benefits the donor by reducing harmful lipids and blood viscosity, thereby lowering the risk of cardiovascular disease (Uche *et al.*, 2013). **Olawumi** *et al*., (2016a) investigated the effect of repeated blood donations on the lipid profiles of blood donors in Ilorin, using first-time donors as controls. There was no significant difference in the mean values of total cholesterol, LDL, and HDL. However, when considering the HDL/total cholesterol ratio greater than 0.37 as a risk factor for coronary heart disease, a higher proportion of first-time donors had elevated risk compared to regular donors.

2. Excess iron is linked to heart diseases, and there is no mechanism for iron excretion other than through the loss of epithelial cells or blood loss. Thus, bloodletting can help regulate excess body iron. Each unit of blood contains approximately 250 mg of iron, and blood donation helps decrease the likelihood of iron accumulation in the body. This explains why women of childbearing age who lose blood monthly through menstruation have a lower risk of heart attacks and death from heart diseases compared to men in the same age group. Moderate iron deficiency reduces heart disease risk, while increased body iron has been associated with a heightened risk for myocardial infarction (Salonen *et al.*, 1998). **Olawumi** *et al*., (2017a) assessed the body iron stores of blood donors in Ilorin by measuring serum ferritin, and found that regular donors had significantly lower serum ferritin levels than first-time donors. This suggests that regular blood donation benefits cardiovascular health and offers protection against heart attacks.

3. Epidemiological studies have indicated a connection between excess iron and an increase in cancer incidence and risk, while experimental research has linked iron to cancer initiation, tumor growth, and metastasis. The roles of iron in proliferation, metabolism, and metastasis reinforce the relationship between iron and tumor growth and progression. Cancer cells exhibit an iron-seeking phenotype due to the dysregulation of iron metabolism proteins. These changes are influenced, at least in part, by oncogenes and tumor suppressors. The dependency of cancer cells on iron affects several cell death pathways, including ferroptosis, an iron-dependent type of cell death. This suggests that blood donation may also lower the risk of developing cancer (Torti *et al.*, 2018).
4. Regular blood donation also provides an opportunity for routine health checks and helps identify health issues that a donor may not be aware of. Before individuals are permitted to donate, their vital signs are checked to ensure fitness for the procedure. This examination may uncover a condition needing medical attention, such as high blood pressure or a low PCV. Additionally, prospective donors are screened for infectious diseases they might be unaware of. If any issues with the vital signs or other health concerns are detected, prospective donors are referred to a physician for further evaluation and management.
5. Altruism and volunteering have been associated with positive health outcomes, including a lower risk of depression and increased longevity. People, who engage in the altruistic act of blood donation, feel a stronger connection to their communities, and these positive emotions can contribute to better health and longer lives (New York Presbyterian Health Matters, 2025).

Types of Blood Donors

Blood donors are categorized into three types;

1. Voluntary unpaid donors are those who give blood without receiving payment. They are the heroes without capes.
2. Family/Replacement donors are those who give blood to replace the blood loaned to their family members or friends.
3. Paid donors are individuals who donate blood in exchange for money.

There is also a category known as autologous donors. These are individuals who donate blood for their own use; in other words, they are both the donor and the recipient. For patients with rare blood types, this may be the only readily available source of blood for transfusions.

Vice- Chancellor, Sir, most blood donations in Nigeria come from family/replacement and paid donors, with less than 5% from voluntary/unpaid donors. **Olawumi** and Adewuyi (2012) reviewed blood donation trends in Ilorin over five years. Of the more than 21,000 donors, 97.7% were family replacement donors, while only 2.2% were voluntary donors, and 0.1% were autologous. This raises questions about the absence of paid donors in this statistic, considering that most blood banks have touts trading in blood. In a study conducted to uncover the true family status of FRDs within Nigeria's blood service, approximately half of the presumed FRDs were found to be false family donors, in other words they were paid donors who disguised as FRDs (Shittu *et al*., 2019). This study highlights that many donors in Nigeria are paid donors.

Transfusion Transmissible Infections

Transfusion-transmissible infections (TTIs) are infections that can be transmitted from a donor to a recipient through blood transfusion. These infections may be caused by viruses, bacteria, parasites, or prions, with bacteria being the

most frequently transmitted. Viral agents that can be transmitted through blood transfusion include HIV, hepatitis B and C, cytomegalovirus, human T-cell lymphotropic virus (HTLV), parvovirus B19, and West Nile virus (WNV). Protozoa that can be transmitted through transfusion include *Plasmodium species*, which cause malaria; *Trypanosoma cruzi*, responsible for Chagas disease; *Babesia microti,* which leads to babesiosis; and Leishmania donovani, known for causing leishmaniasis. Prions, linked to Creutzfeldt-Jakob disease, are also transmissible through transfusion and cannot be eliminated using current methods for inactivating pathogens in the blood supply. This is why individuals who have received pituitary growth hormone or dura mater grafts or therapy, if not of synthetic origin, are permanently deferred (**Olawumi**, 2022).

The WHO recommends that all blood donations undergo screening for infections before use. Screening for HIV, hepatitis B, hepatitis C, and syphilis should be mandatory. According to the national algorithm, these are the infections that are screened for in Nigeria, except for syphilis, which is not tested for in most centers (Akinleye *et al*., 2013; Salawu *et al*., 2010). TTIs pose a significant risk associated with blood transfusions. Despite the quality-controlled screening of donor blood for these TTIs, a potential risk remains. This is because most screening tests are designed to detect antibodies, so there is an inherent window period risk of infectivity. This window period risk positively correlates with the prevalence of the specific infectious agent within a given population. By analysing the prevalence and trends of these TTIs among blood donors, we can better assess the likelihood of acquiring any of these infections through blood transfusions.

Consequently, **Olawumi** *et al*., (2017b) undertook a retrospective study examining the prevalence and trends of HBsAg, anti-HCV, and anti-HIV among blood donors in Ilorin from 2011 to 2015.Of the almost 37,000 donors screened over the five years. The seroprevalence rates for HBsAg, HIV, and HCV were 12.9%, 2.2%, and 1.9%, respectively. There was a

gradual decline in the prevalence of HBsAg from 13.5% in 2011 to 11.3% in 2015, while the HIV prevalence decreased from 3.2% in 2011 to 1.2% in 2015.In contrast, HCV prevalence showed fluctuations throughout the five years as shown in Figure 2.

The WHO aims to collect blood only from voluntary, non-remunerated donors because it is believed that maintaining a steady supply of regular voluntary, non-remunerated blood donors will ensure a sufficient, stable, and safe blood supply, significantly reducing the risk of infections such as HIV, hepatitis B, hepatitis C, and syphilis(WHO, 2025c). Research conducted in developed countries and sub-Saharan Africa has shown that voluntary non-remunerated blood donors are safer than Family Replacement Donors (FRD) concerning disease transmission. However, many studies did not differentiate between first-time and repeat donors.

Repeat donors would have tested negative during a previous donation, allowing for further donations, which leads to a biased comparison with first-time donors, whether they are voluntary or replacement (Allain, 2011). Since FRDs are the primary source of blood in our hospital-based banks, **Olawumi** *et al*., (2016b) decided to review the relative safety of donations from FRD by comparing their prevalence rates for HBsAg, anti-HCV, and anti-HIV with those of voluntary donors, considering both first-time and repeat donors. The anti-HCV prevalence was significantly higher among FRD compared to voluntary donors. However, no significant difference in anti-HIV and HBsAg prevalence rates was found between the two donor groups.

The HBsAg prevalence rate was significantly higher among first-time donors than repeat donors. Among first-time donors, the HBsAg and anti-HCV prevalence rates were significantly higher in FRD than in voluntary donors, while no significant difference in prevalence rates existed among repeat donors. We concluded that first-time FRD have overall higher prevalence rates than first-time voluntary donors, but repeat FRD have similar prevalence rates to repeat voluntary donors. In another study, the prevalence of p24 antigen was significantly

higher among paid donors (11.1%) compared to family replacement donors (6.7%) and voluntary donors (0%) (Owoeye *et al*., 2022).

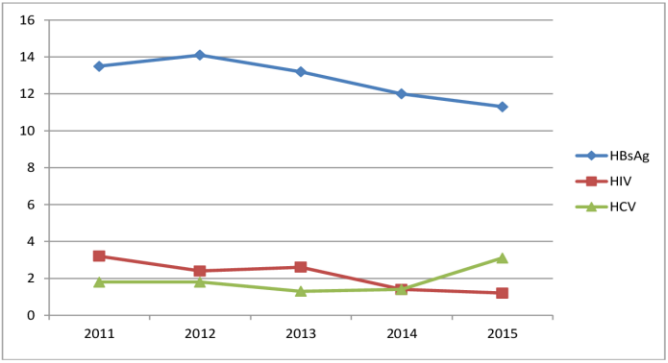

Figure 2: Trends in the Prevalence of HBsAg, anti-HIV, and anti-HCV

Malaria and Blood Safety

Vice-Chancellor, Sir, malaria parasite was among the first organisms identified as transmissible through blood transfusion, with the earliest documented case occurring in 1911. Although many other organisms have since been recognised as transmissible, malaria remains one of the most widespread infections globally (Kitchen & Chiodini, 2006).Malaria is endemic in Africa and poses one of the most complex health challenges confronting humanity in tropical and subtropical regions. Malaria contributes significantly to the number of deaths in these areas, particularly among children under five years old (Baye & Yohannes, 2007). In countries where malaria is not endemic, travel history and serological tests are utilized to screen donors who may transmit malaria parasites. However, in malaria-endemic countries, including Nigeria, serological tests are ineffective for screening donors, as most residents have developed anti-malaria antibodies. Even in countries that conduct routine screening, the risk of malaria parasite transmission persists. Consequently, pathogen reduction

techniques using riboflavin and UV light methods that inactivate infectious pathogens, including Plasmodium, in blood for transfusion represent a vital initiative in transfusion medicine to ensure blood safety (Reddy *et al*., 2008; Sullivan, 2008).

The absence of routine screening in malaria-endemic areas, such as Nigeria, presents a specific threat to vulnerable blood recipients, including visitors to the region, children who have not developed partial immunity, pregnant women not receiving standard malaria prophylaxis, individuals living with HIV/AIDS, and others with compromised immune systems (Chandramohan & Greenwood, 1998). Most studies in Africa estimate the prevalence of malaria parasitemia among blood donors to range from 6.0% to 40.0%, with P. falciparum being the predominant causative agent (Baye *et al*., 2007; Nmor & Egwunyenga, 2004). However, there is no documented information regarding the prevalence of malaria parasitemia among blood donors in Ilorin.

Therefore, **Olawumi** *et al*., (2014a) determined the prevalence of malaria parasites in this population. We found a prevalence of 27.3%, with P. falciparum accounting for 85.7% and P. malariae for 14.3%. This suggests that the prevalence of malaria parasites among blood donors in Ilorin is significantly high, and the lack of routine screening puts recipients, especially immunocompromised individuals, expatriates, and tourists from non-endemic countriesat considerable risk. While screening for malaria would enhance donor blood safety, it might also decrease the number of eligible donors. Prophylactic antimalarial treatment may be administered to recipients, particularly those who are immunocompromised.

Syphilis and Blood Safety

Syphilis is primarily a sexually transmitted infection caused by the spirochete Treponema pallidum. It can also be transmitted vertically from mother to child and through blood transfusions (Singh & Romanowski, 1999). Treponema pallidum does not survive well at 4°C (the temperature at which whole

blood is stored), and blood is likely non-infective after four days of refrigeration. However, storage does not impact positive serology, and passive transmission of antibodies to a recipient could lead to diagnostic confusion (Contreras & Hewitt, 1999). The organism is more readily transmitted in platelet concentrate due to room-temperature storage and short shelf life, as well as in situations where patients receive fresh whole blood transfusions.

Therefore, the risk of transfusion-acquired syphilis in patients receiving fresh blood is high if blood is not routinely screened for syphilis. One of the key values of a serological test for syphilis is its role as a surrogate marker for lifestyles associated with a higher risk of HIV and HCV infections, which include multiple sexual partners, homosexuality, and intravenous drug use (Gardella *et al*., 2002). **Olawumi** *et al*. (2014b) conducted a study to determine the prevalence of syphilis among blood donors in Ilorin and to examine the relationship between seropositivity and lifestyles associated with a high risk for HIV and hepatitis infections. The seroprevalence of syphilis among blood donors was found to be 1.1%. None of the seropositive donors had a lifestyle associated with high risk for HIV and hepatitis infection. Due to the low prevalence of syphilis among our blood donors, we could not determine the relationship between syphilis seropositivity and high-risk lifestyles.

Blood Group Systems

The red blood cell membrane contains numerous antigens that can stimulate antibody production. More than 300 red blood cell antigens have been identified. Most of these antigens are categorized into blood group systems, including ABO, Rh (formerly known as Rhesus), MNS, P, Lutheran, Kell, Lewis, Duffy, Kidd, and Diego, among others. The ABO blood group was the first to be identified and remains the most significant blood group system. The Rh system was the fourth to be recognised but is the second most important. The clinical significance of a blood group system lies in the frequency of its

antibodies and the potential for those antibodies to destroy incompatible red blood cells in vivo. Within the ABO system, there are four blood types: A, B, AB, and O, with blood group O being the most common (**Olawumi**, 2022). The Rh system is more intricate than the ABO system, featuring over 50 different Rh antigens. However, five primary ones account for the majority of clinically relevant antibodies: D, C, c, E, and e. The D antigen is the most significant, as it is the only one routinely tested for in blood grouping due to its likelihood of triggering an immune response. An individual with the D antigen will test positive for anti-D, indicating that the person is RhD positive. Conversely, a person lacking the D antigen will test negative for anti-D and is considered RhD negative (Mitra *et al*., 2014).

Universal Donors

Mr. Vice-Chancellor, a universal donor is someone who can give blood to recipients of all blood types. In the ABO system, group "O" donors are known as universal donors because group "O" blood has the lowest risk of causing serious reactions when transfused to an individual with a different ABO group. This universal donor phenomenon is considered outdated in major blood banks, especially in developed countries, as it has long been recognized that some so-called universal donors possess potent ABO antibodies in their plasma, known as anti-A and anti-B haemolysins. These haemolysins can destroy the recipients' red blood cells, leading to a haemolytic transfusion reaction. Individuals with blood group "O" who carry these haemolysins are referred to as "dangerous universal donors". The risk of a haemolytic transfusion reaction from transfusing group "O" donor blood to non-O recipients depends on the titre of the haemolysin and the amount of plasma in the components being transfused. Allogeneic anti-A and anti-B haemolysins are produced after allogeneic stimulation by red cell antigens from ABO-incompatible blood transfusions, pregnancies involving an ABO-incompatible foetus, and organ transplants from non-ABO-matched donors (Bushs *et al*., 1991). Heterogenic antigens, in

the form of A and B substances, found in tetanus toxoid, anti-tetanus serum (horse serum), and typhoid A and B vaccines, can also stimulate the production of haemolysins (Turgeon, 1989).

The second clinical significance of anti-A and anti-B haemolysins lies in their potential to cause haemolytic disease of the foetus and newborn (HDFN) due to ABO incompatible pregnancies. The incidence and severity of HDFN are significantly higher in Africans than in Caucasians. It has been suggested that the increased incidence of HDFN is attributed to the extremely high haemolytic activity of anti-A in black group "O" individuals. The higher prevalence of anti-A and anti-B haemolysins among Africans is believed to be linked to blood-sucking insects (Worlledge *et al*., 1974).Haemolysin titers typically range from 2 to 32.However, a visual titre of 8 has been demonstrated to be potent enough to cause in-vivo haemolysis. The haemolysin screening test is routinely conducted in some blood banks to identify" dangerous" group "O" blood containing potent haemolysins within the donor pool. Nevertheless, most hospital blood banks in Nigeria do not perform this screening despite the reported high prevalence of haemolysins among group "O" donors.

Olawumi and Olatunji *et al*., (2001) conducted a study involving 250 group O blood donors at UITH, revealing a prevalence of alpha and beta haemolysins at 23.2%. Anti-B haemolysin was found to be twice as common as anti-A haemolysin, although anti-A haemolysin exhibited a higher titre than haemolytic anti-B. A significant visual titre of 8 and above was observed in 18.5% of lytic anti-A and 13.2% of lytic anti-B samples. However, the proportion of the entire study population with a significant visual titre of 8 and above was low (2.0% for anti-A and 2.8% for anti-B). This led us to conclude that routine screening of group "O" donor blood for haemolysins may not be necessary unless intended for use in non-O recipients.

Demographics of Blood Donors

The demographic information of blood donors is essential for developing and managing recruitment strategies. Data on the gender profile of blood donors shows that, globally, 33% of blood donations come from women, though this varies significantly. In most developing countries, fewer than 10% of donations are made by female donors. The age profile of blood donors indicates that, proportionally, more young people donate blood in low- and middle-income countries compared to high-income countries (WHO, 2025c). In Nigeria, only about 1% of donors are women, more than half are single, and nearly half of the voluntary donors are young adults aged18 to 30 years. Therefore, youths and students in this age group represent the most suitable targets for focused advocacy on voluntary blood donation (**Olawumi** *et al*., 2012; Allain, 2011).

Motivation Barriers and Myths of Blood Donation

Mr. Vice- Chancellor, understanding the general knowledge, attitudes, and perceptions about blood donation in any population is critical for increasing and diversifying the blood supply. In a study conducted by **Olawumi** and Adewuyi (2007b) among graduates from universities and polytechnics across Nigeria, fewer than 10% of respondents had ever donated blood, typically as a one-time experience, and primarily for family members. Reasons provided for not donating included fear of negative health effects and lack of personal advocacy. Suggested motivational factors for blood donation included family needs, altruism, and self-testing.

In another study among male blood donors in the North-central region of Nigeria by Shittu *et al.,* (2018), the majority were motivated to donate due to the benefits of routine medical examinations and the desire to save their relatives' lives. The major inhibitory factors included fear of HIV test results and concerns about being infected during donation. Some myths held by these men about blood donation included the fear of becoming sexually impotent after donation and the belief that donated blood units might be used for rituals. An appropriate educational programme and an intensive blood donation

campaign could help eliminate these barriers, debunk the myths surrounding blood donation, and increase the pool of blood donors.

Women and Blood Donation in Nigeria

Women constitute over half of the population and need more blood transfusions than men due to obstetric and gynaecological complications that make them prone to haemorrhage. However, they are significantly underrepresented among blood donors in Nigeria. (Statistica Nigeria, n.d.) With the rising demand for blood and blood products, women in Nigeria must engage in blood donation just as their male counterparts to close the gap between the demand and supply of blood in Nigeria. Most studies on the motivations and barriers to blood donation primarily focus on male donors. Consequently, **Olawumi** *et al*., (2023) conducted an internet-based cross-sectional study among women aged 18 to 65 in the six geopolitical zones of Nigeria to identify potential barriers, motivators, and appealing incentives for women donating blood.

The most common motivators for women included 'when a family member or friend needs blood,' 'health benefits,' and 'reminders to donate.' The primary barriers for women who do not donate blood were 'poor attitude of hospital staff' and 'fear of contracting infections.' Younger women and those from the Hausa tribe were more debarred by 'lack of privacy during the blood donation process' compared to older women and individuals from other tribes. The most attractive incentives for blood donation included medical consultations and a blood donation certificate. We also identified factors associated with women's intentions to donate. Past blood donation experience and awareness that women can be potential eligible donors like men significantly predict women's intentions to donate blood in Nigeria. The main reason for deferral from blood donation was a low hemoglobin level. However, some women were incorrectly deferred due to menstruation and their gender. Further studies are needed to explore the perspectives and concerns of women, blood bank staff, and donor organizers regarding the eligibility of women as blood donors.

Community Service

University of Ilorin Teaching Hospital

I was appointed as a consultant haematologist in June 2000. I have served on various hospital committees and boards, including the Ethical Review Board, Servicom Committee, Blood Transfusion Committee, HIV Committee, and the Task Force on Open Heart Surgery. Additionally, I have been privileged to head the Department of Hematology and Blood Transfusion multiple times for a decade.

University of Ilorin

I also served on several committees at the University, including the College COBES Committee, for which I was chairman in 2018. I held the position of head of the Department of Hematology at various times over 11 years. Additionally, I served as the Director of the Stem Cell Research Center from November 2020 to July 2023.

Associations and Societies

I am the current Secretary of the Nigerian chapter of the African Society of Blood Transfusion and the Treasurer of the Medical and Dental Consultant Association of Nigeria, Ilorin Chapter, from 2003 to 2005.

General Community

I served the nation as an NYSC doctor at General Hospital, Ogbomoso from November 1992 to October 1993. I was one of the WHO consultants for the second HIV/AIDS Programme Development Project Midterm Review and the Joint Annual Review of the Kwara State Strategic Plan in 2013.In 2009, I served as the Lead Consultant during the development of the 2010-2015 Kwara State Strategic Plan for the prevention and management of HIV/AIDS. I represented the Christian Association of Nigeria (CAN)on the Board of the Kwara State Agency for Control of AIDS from 2004 to 2014. I have been an Examiner for the West African College of Physicians since 2012 and also a member of the Marriage and Family Life Board in my church community.

Conclusion

Voluntary blood donors, who are the safest source of blood and blood products, are the backbone of transfusion medicine. The need for blood is constant and urgent; the lives of many are perpetually at risk because the supply of blood in Nigeria cannot meet the demand. We cannot afford to wait for a crisis to remind us of the importance of voluntary blood donation.

The Vice-Chancellor, Sir, ladies and gentlemen, this inaugural lecture is a call for all of us to become heroes and offer what we have to help someone in need. If you have never donated before, consider this your invitation. One donation can save up to three lives. It is a gift that costs you little, yet is worth more than gold to those who receive it. For those of you who may already be donors, I encourage you to continue donating and inspire others to do the same. You are already a hero, and by continuing to donate, you multiply your impact. So, as we leave this auditorium today, let us all commit to donating blood regularly. Together, we can build a world where no one has to die because they cannot get the blood they need to survive. Remember, each donation you give is more than just a gift of blood; it is a gift of life.

Recommendations

Mr. Vice-Chancellor, Distinguished Ladies and Gentlemen, I am optimistic that the following recommendations will help to increase the supply of donated blood in Nigeria.

1. National health authorities must facilitate the establishment of well-coordinated blood programmes backed by appropriate legislation to increase the voluntary blood donor base. Adequate funds should also be provided for more intensive advocacy for voluntary blood donation.
2. More intense advocacy aimed at youths, promotion of peer education and motivation, and the broadening of the educational curriculum to instill a sense of civic responsibility at a young age, should be implemented to increase voluntary blood donation among youths in Nigeria.
3. Specific and focused capacity-building initiatives should be introduced to foster a paradigm shift in the attitude of hospital staff, particularly those in the blood bank, toward their work.
4. Female-targeted donor education and awareness programmes should also be implemented in Nigeria to enhance women's participation in blood donation.
5. The National Orientation Agency, an organ of the Nigerian government with the capacity for public enlightenment and sensitisation, should engage in donor education and advocacy to alleviate fears and dispel myths about blood donation among Nigerian men and women of all ages.
6. The donor selection criteria should be reviewed periodically to ensure there is no discrimination of any kind, including gender, race, nationality, or religion, and to prevent the unnecessary deferral of suitable donors.
7. Efforts should focus on encouraging repeat FRDs to become regular voluntary donors, thereby improving and sustaining the blood supply in our blood banks.

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First of all, I want to express my deep appreciation and gratitude to the Lord God Almighty for making this day possible. All glory, honor, majesty, and power belong to God. Hallelujah! I am grateful to my parents, the late Engr. Michael Olabode Onifade (of blessed memory) and Mrs. Victoria Olufunmilayo Onifade, for their exceptional and selfless love, support, and care that enabled me to reach this significant milestone. My father always wanted me to become a professor, and I wish he could be here to witness today's event. I express my gratitude to my spiritual father, Rev. George Adegboye, the Senior Minister in Charge of Rhema Chapel International Churches, and his wife, Rev. (Mrs.) Oloruntoyin Adegboye, for their prayers, support, and significant impact on my life, family and career.

I appreciate my siblings and their families for their love and support. I am deeply grateful to my in-laws, the late Mr. Michael Olawumi (of blessed memory) and Mrs. Esther Olawumi, my mother-in-love, for treating me like their own daughter. I also want to thank all my brothers and sisters-in-law and their families for their unwavering love and support. I appreciate all my uncles, aunts, cousins, nephews, and nieces, especially Dr. Babatunde Onifade, who graciously passed down his medical books, stethoscope, and anatomical bones to me when I enrolled in medical school. I am truly thankful, Sir. I extend my gratitude to the in-laws of our children, Pastor and Min (Mrs.) Ajala and Pastor and Mrs. Balogun. I appreciate your love and support. I especially thank Pastor Adeogun Ajala, a retired Director of NTA, for sponsoring a documentary in honour of my inaugural lecture on the News Line of NTA.

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References

Akinleye, O. M., Olaniyan. J. A. T., Akintola, J. O., Okoye, C. A., & Eke, C .F. (2013). Blood safety and prevalence of transfusion transmissible viral infections among blood donors in Lagos, Nigeria. *International Journal of Tropical Medicine,8*, 113-118.

Allain, J. P. (2011). Moving on from voluntary non-remunerated donors: who is the best blood donor? *British Journal of Haematology*, *154*(6), 763-769.

Bain, B. J. (1996). Ethnic and sex differences in the total and differential white cell count and platelet count. *Journal of Clinical Pathology, 49*, 664-666.

Baye, G., &Yohannes, M. (2007). The prevalence of HBV, HCV and malaria parasites among blood donors in Amhala and Tigray regional states. *Ethiopian Journal of Health Development*, *22*(1), 3-7.

Bushs, J. P., Maillard, H., & Nydeggar, U. (1991). Anti-A/B-igm/G immune response to accidental A-O transfusion and toxocara canis infestation. *Schweiz med Whochenschr, 12*, 347-350.

Carlson, B. M. (2019). The circulatory system. In *The human body* (pp. 216-217). Amsterdam: Elsevier.

Chandramohan, D., & Greenwood, B. . (1998). Is there an interaction between human immunodeficiency virus and Plasmodium falciparum? *International Journal of Epidemiology, 27*(2), 296 -301.

Contreras, M., & Hewitt, P. A. (1999). Clinical blood transfusion. In Hoffbrand A.V., Lewis S. M., Tuddenham E. G. (Ed) the Postgraduate Haematology. 4th Edition. New York Oxford University Press. (pp 215-234)

Ezema, C., Halilu, T. B., Mba, A. I.,Amon, R., Anoh, N. V., Chineke, A. J., & Ezigbo, E. D. (2023). "Population based haematological reference ranges for adults in

Nigeria: an update", *International Journal of Research and Reports in Hematology, 6* (2):136-43.

Franco, R. S. (2012). Measurement of red cell lifespan and Aging. *Transfusion Medicine and Hemotherapy, 39*, 302-307.

Gardella, G., Martin, A. A., Kahn, R. H., Swint, E., & Markowitz, E. (2002). Persons with early syphilis identified through blood or plasma donation screening in the United States. *Journal of Infectious Disisease, 185*, 545-549.

Kitchen, A. D., & Chiodini, P.L. (2006). Malaria and blood transfusion. *Vox Sanguinis*, *90*,77-84.

Lawrence , J. S., Ervin, D. M., & Wetrich, R. M. (1945). Life cycle of red blood cells. *American Journal of Physiology*, *144*(2), 284-296.

Mandala, W. L., Gondwe, E. N., MacLennan, J. M., Molyneux, M. E. &MacLennan, C. A. (2017). Age- and sex-related changes in hematological parameters in healthy Malawians. Journal of Blood Medicine, *28*; 8:123-130.

Mckenna, A. (2025, April 5). *African religions*. Britannica. Retrieved April6, 2025, from https://www.britannica. com/topic/African-religions#ref810957

Mitra, R., Mishra, N., & Rath, G.P. (2014). Blood groups systems. *Indian Journal of Anaesthesia*, *58*(5), 524-528.

Myupchar. (2020). World Blood Donor Day 2020: Donating while menstruating and 11 other questions you may have about giving blood. Retrieved March 2025, from Firstpost: https://www.firstpost.com/health/world-blood-donor-day-2020-donating-while-menstruating-and-11-other-questions-you-may-have-about-giving-blood-8476471.html

NewYork-Presbyterian Health Matters.(2025, January 21). *The surprising benefits of donating blood.* New York-Presbyterian Health Matters. Retrieved February 3, 2025, from https://healthmatters.nyp.org/the-surprising-benefits -of-donating-blood/

Nishimori, H., Fujii, N., Fujii, K., Ikeda, T., Asano, N., Ogo, H., Yamakawa, M., Takagi, N., Otsuka, F., &Ikeda, K. (2017). Predictors of vasovagal reactions during preoperative autologous blood donation: a single-institution analysis. *International Journal of Haematology*, *105*(6), 812-818.

Njunda, A. L., Fon, S. G., Assob, J. C., Nsagha, D. S., Kwenti, T. D. & Kwenti, T. E. (2015). Coinfection with malaria and intestinal parasites, and its association with anaemia in children in Cameroon. *Infectious Disease of Poverty*, *4*,43, 1-7.

Nmor, J. C., & Egwunyenga, A. O. (2004). A survey of blood parasites among blood donors at Eku, Delta state, Nigeria. *Nigerian Journal of Parasitology*, *25*, 87-92.

NOVA (1997). *Amazing heart facts*. NOVA online.Retrieved March 7, 2025, from https://www.pbs.org/wgbh/nova/heart/heartfacts.html#:~:text=Your%20body%20has%20about%205.6,US%20from%20coast%20to%20coast.

Okpara R. (1992). Transmission of HIV through blood transfusion. *African Health, 14*(5):15-7.

Olatunji, P. O., & **Olawumi, H. O**. (2004). Transfusion requests and responses in trauma patients at a university hospital in Nigeria. *African Journal of Trauma, 2* (1), 15-19.

Olawumi, H. O. (2019). *Companion of Practical Haematology*. University of Ilorin, Haematology, Ilorin.

Olawumi, H. O. (2022). Blood Transfusion. In C. O. Alebiosu, & O. E. Ayodele, *Essential Textbook of Medicine* (pp. 1297-1300). Osogbo, Osun, Nigeria: Uniosun Publishing Limited.

Olawumi, H. O. & Adewuyi, J. O. **(**2007a). Blood bank audit in a medium-sized tertiary hospital in central Nigeria. *Centrepoint Science Edition, 14*(1&2), 178- 183.

Olawumi, H. O., & Adewuyi, J. O. (2007b): The impact of higher education on the knowledge, attitude and practice, about voluntary blood donation among fresh graduates

of Nigerian tertiary education institutions. *Africa Sanguine, 10*(2), 28-31.

Olawumi, H. O., & Adewuyi, J.O. (2012). Blood donation trend in a tertiary hospital in Nigeria. *Savannah Journal of Medical Research and Practice,1*(1), 25-28.

Olawumi, H. O., Biliaminu, S. A., Abdulazeez, I. M., Shittu, A. O., Durotoye, I. A., Ogunfemi, M. K., & Adepoju, A.M. (2017a). Evaluation of iron stores of blood donors in a teaching hospital in North Central Nigeria. *Sudan Medical Journal, 53*(3), 140-146.

Olawumi, H.O., & Bolaji, B. O. (2006). Blood utilization in elective surgical procedures in Ilorin. *The Tropical Journal of Health Sciences, 13* (1), 15-17.

Olawumi, H. O., Durotoye, I. A., Afolabi, J. K., Fadeyi, A., Desalu, O. O., Aderibigbe, S. A., Babatunde, A.S., Ernest, S. K., Fawibe, A. E., Salami, A. K., Saadu, R., Adeboye, M.A.N. & Aboyeji, A.P. (2015). Reference values of hematological parameters of healthy adults in the north-central zone of Nigeria. *East African Medical Journal,92*(8); 420-425.

Olawumi, H. O., Fadeyi, A., Babatunde, S. K., Akanbi II, A. A., Babatunde, A. S., Sani, M. A. & Aderibigbe, S. A. (2014a). Malaria parasitaemia among blood donors in Ilorin, Nigeria. *African Journal of Infectious Diseases, 9*(1), 10-13.

Olawumi, H. O., Fasola, F. A., Otu, T. I., Ugwu, N. I., Durotoye, I. A., Omokanye, K. O., Ogunfemi, M. K., Ijei-Enesi, I. P., Abba, A. M., Mariere, U. I., & Oyekunle, J. O. (2023). Blood donation among women in Nigeria: Motivators, barriers and appealing incentives. *Vox Sanguinis, 118*(6), 447-454.

Olawumi, H. O., Issa, B. A., Fadeyi A., Durotoye, I. A., Shittu, A. O., Yusuf, A. D., Ajiboye, P. O., Adegunloye, O. A., Salami, A. K., Nwabuisi, C. & Sulyman, D. (2014b). Seroprevalence of syphilis among blood donors in Ilorin. *Research Journal of Health Sciences, 2*(3), 133-139.

Olawumi, H. O., & Olatunji, P. O. (2001): Prevalence, and titre of alpha and beta haemolysins in blood group 'O' donors in Ilorin. *African Journal of Medicine and Medical Sciences, 30*, 319-321.

Olawumi, H. O., Shittu, A. O., Durotoye, I. A., Biliaminu, S. A., Abdulazeez, I. M., Ogunmodede, J.O., Ogunfemi, M. K. & Adepoju, A. M. (2016a). A study of the effect of repeated blood donation on lipid profile in Ilorin, Nigeria. *Annals of Medical Research, 5*, 43-46.

Olawumi, H. O., Shittu, A. O., & Ogunfemi, M. K. (2016b). Prevalence of some transfusion-transmissible infections among first-time and repeat voluntary and family replacement donors in North Central Nigeria. *Sudan Medical Journal*, *52*(3), 131-136.

Olawumi, H. O., Shittu, A. O. & Durotoye, I. A. (2017b). Prevalence and trend of HBsAg, Anti-HCV and Anti-HIV among blood donors in a tertiary hospital in North-central Nigeria. *SMU Medical Journal*, *4*(1), 33-42.

Owoeye, O. A., Obe, O. A., **Olawumi, H. O.**, & Babatunde A. S. (2022). HIV seroprevalence among blood donors in Ilorin, Nigeria. *Journal of Hematology and Transfusion*, *9*(1), 1105.

Pluthero, F. G., & Kahr, W. H. (2018). The birth and death of platelets in health and disease. *Physiology*, *33*, 225-234.

Reddy, H. L., Dayan, A. D., Cavagnaro, J., Gad, S., Li, J., & Goodrich, R. P. (2008). Toxicity testing of a novel riboflavin-based technology for pathogen reduction and white blood cell inactivation. *Transfusion Medicine Review*, *22* (2), 133-153.

Salawu, L., Bolarinwa, R. A., Adegunloye, A. B., & Muraina, H. A. (2010). HBsAg, anti-HCV, anti-HIV and VDRL in blood donors: Prevalence and trends in the last three and a half years in a tertiary health care facility in Ile-Ife, Nigeria. *International Journal of Medicine and Medical Sciences,2*, 335-341.

Salonen, J. T., Tuomainen, T. P., Salonen, R., Lakka, T. A., & Nyyssönen, K. (1998). Donation of blood is associated with reduced risk of myocardial infarction. The Kuopio Ischaemic heart disease risk factor study. *American Journal of Epidemiology*,*148*(5), 445-451.

Schneider, W. H. (2013). History of blood transfusion in sub-Saharan Africa. *Transfusion Medicine Reviews*, *27*(1), 21-28.

Shittu, A. O., **Olawumi, H. O.**, Omokanye, K. O., & Ogunfemi, M. K. (2018). Blood donation in North-central region of Nigeria: motivational and inhibitory factors. *Archives of Clinical Research*, *6*, 45-48.

Shittu, A. O., **Olawumi, H. O.,** Omokanye, K. O., & Ogunfemi, M. K. (2019).The true status of family replacement blood donors in a tertiary hospital blood service in Central Nigeria. *Africa Sanguine, 21*(2), 11-14.

Singh, A. E., & Romanowski, B. (1999). Syphilis: review with emphasis on clinical, epidemiologic, and some biologic features. *Clinical Microbiology Review*, *12*, 187- 209.

Solberg, E. H. (2006). Establishment and use of reference. In Solberg, H. E, & 4th (Ed.), *13. Elsevier Saunders; Solberg HE editor Establishment and use of reference. 4th ed. Philadelphia: 2006.* Philadelphia: Elsevier Saunders.

Statista Nigeria. (2024). *Total population from 2011 to 2021, by gender.* Statista. Retrieved February 15, 2024,from https://www.statista.com/ statistics/967908

Sullivan, J. (2008). Pathogen inactivation of plasmodium falciparum in plasma and platelet concentrations with riboflavin and UV light. *Vox Sanguinis*.*95* (Suppl. 1), 278 - 279.

Tadesse, S. Complete blood count (CBC). (2024). A comprehensive guide to its clinical significance. *Hematolology Blood Disorder*, *7*(3):190

Torti, S. V., Manz, D. H., Paul, B. T., Blanchette-Farra, N., & Torti, F. M. (2018). Iron and Cancer. *Annual Review of Nutrition, 38,* 97-125.

Turgeon, M. L. (1989). Fundamentals of immunohaematology theory and technique. USA: Lea and Febinger. 110-121

Uche, E., Adediran, A., Damulak, O., Adeyemo, T., Akinbami, A., & Akanmu, A. (2013). Lipid profile of regular blood donors. *Journal of Blood Medicine,10*(4),39-42.

World Health Organization. (2012, January 1). *Blood donor selection: Guidelines on assessing donor suitability for blood donation.* World Health Organization. Retrieved February 17, 2025, from https://www.who.int/publicati on s/i/item/9789241548519

World Health Organization. (2025a). *World Blood Donor Day*. World Health Organization. Retrieved March 10, 2025, fromhttps://www.who.int/campaigns/world-blood-donor-day

World Health Organization. (2025b). *Blood products.* Retrieved February 17, 2025, from https://www.who.int/health-topics/blood-products#tab=tab_1

World Health Organization. (2025c) *Blood safety and availability*. World Health Organization. Retrieved February 18, 2025, from https://www.who.int/news-room/fact-sheets/detail/blood-safety-and-availability

Worlledge, S., Ogiemudia, S. E., Thomas, C. O., Ikoku, B.N., & Luzzato, L. (1974). Blood group antigens and antibodies in Nigeria. *Annals of Tropical Medicine and Parasitology,* 68, 249-264.

Yaguda, S. (2025). *Message from Director General.*National Blood Service Agency. Retrieved March 10, 2025, from https://nbsc.gov.ng/