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Barriers and drivers of voluntary blood donation in Katavi and Kilimanjaro regions: a comparative cross-sectional study of two regions with high and moderate blood collection rates in Tanzania

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**BARRIERS AND DRIVERS OF VOLUNTARY BLOOD DONATION
IN KATAVI AND KILIMANJARO REGIONS: A COMPARATIVE
CROSS-SECTIONAL STUDY OF TWO REGIONS WITH HIGH AND
MODERATE BLOOD COLLECTION RATES IN TANZANIA**

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**A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of
Master of Science in Public Health Research at Nelson Mandela African Institution of
Science and Technology**

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ABSTRACT

In Tanzania, blood donation does not meet the national requirement. This was an explanatory sequential mixed-method study design. The quantitative component involved a questionnaire survey to explore respondents' KAPS on voluntary blood donation and a review of blood donation data from (NTBS). The qualitative component involved four FGDs with registered voluntary blood and healthcare providers from the NTBS. Out of two hundred and fifty-three (253) surveyed participants, 47% (n=120) never donated due to various reasons. Thirty-nine (39) respondents from Kilimanjaro (33%) and 33 from Katavi (27%) respectively did not donate because they were not sensitized and consulted to donate. One of the reasons was a lack of knowledge of the whereabouts of donation centers. Twenty-three (23) respondents from Kilimanjaro (19%) and twelve (12) from Katavi (10%) respectively cited the same reason. Four respondents (4% n=4) and two (1.6%) in Kilimanjaro and Katavi respectively did not donate because the donation center was very far from their residence. Other reasons were religious and cultural reasons and fear of losing sex libido. Fifty-three 53% of all respondents, (n=133) from both regions have ever donated in their lives. In Kilimanjaro, eighteen percent (18% n=24) of respondents donated because a close family member needed it while in Katavi eight percent (8% n=11) donated because of that reason. In Kilimanjaro, eleven percent (11% n=14) donated because their best friend needed it to survive; in Katavi, eleven percent (11% n=15) donated because of that reason. In Kilimanjaro, ten percent (10% n=13) donate because they were sensitized likewise in Katavi ten percent (10% n=13) donated because of that reason. In Kilimanjaro, only, eight percent (8% n=10) just volunteered while in Katavi 25% (n=33) just volunteered. The qualitative part of the study has shown that NBTS officials from Katavi had more creative strategies to improve voluntary blood donation. The prevalence of blood donation was less than satisfactory in the study areas because of misconceptions, poor knowledge, and unfavorable attitude toward blood donation. Utilizing media such as radios and televisions may improve the reach of educational programs, advocacy, and sensitization and encourage more people to donate blood. Blood Transfusion, blood donation, Knowledge, Attitude, Practice, voluntary blood donation, Kilimanjaro, Katavi, Tanzania.

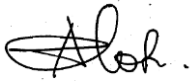
DECLARATION

I, Florian Francis Finda, do hereby declare to the Senate of the Nelson Mandela African Institution of Science and Technology that this dissertation is my original work and that it has never been submitted nor been concomitantly submitted for the degree for degree award in any other institution.

Florian Francis Finda

Date

The above declaration is confirmed by:



Dr. Ally Olotu

Date



Dr. Sally Mtenga

Date

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CERTIFICATION

The undersigned certify that they have read the dissertation titled “*Barriers and drivers of voluntary blood donation in Katavi and Kilimanjaro regions: a comparative cross-sectional study of two regions with high and moderate blood collection rates in Tanzania*” and recommend for examination in Partial fulfillment for the requirements for the award of Master of Science in Public Health Research of the Nelson Mandela African Institution of Science and Technology.



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Date



Dr. Sally Mtenga

Date

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LIST OF ABBREVIATIONS AND SYMBOLS

KAPS	Knowledge, attitude and Practice
NBTS	National Blood Transfusion Service
FGDs	Focused Group Discussions
LMIC	Low- and Middle-Income Countries
MOH	Ministry of Health
TPDF	Tanzania People's Defense Forces
WHO	World Health Organization
NGOs	Non-Government Organizations
UN	United Nations
RALG	Regional Administration and Local Government
SOD	Sudden onset disasters
TZS	Tanzanian Shillings
USDs	United States Dollars

CHAPTER ONE

INTRODUCTION

1.1 Background of the Problem

Blood transfusion is an indispensable component of health care because it contributes to saving millions of lives each year in both routine care and emergencies. It permits increasingly complex medical and surgical interventions and dramatically improves the life expectancy and quality of life of patients with a variety of acute and chronic conditions.

Since blood is a highly perishable product, the blood flow from the donation point, processing unit (blood banks), storage and to the end consumer (patients in the hospitals and health centers) should be fast and cost-effective. This can be seen in the illustration (Fig. 1).

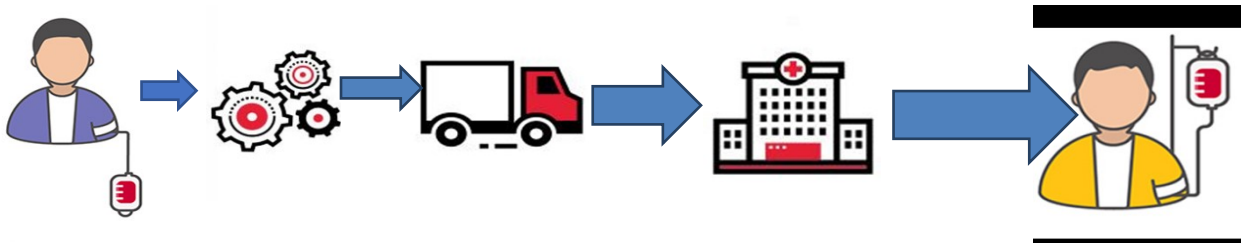


Figure 1: Blood flow

This study focused on donor aspects of the process and look at both the drivers and barriers that could contribute towards improved blood collection from voluntary donors.

This can be seen from the conception framework (Fig. 2).

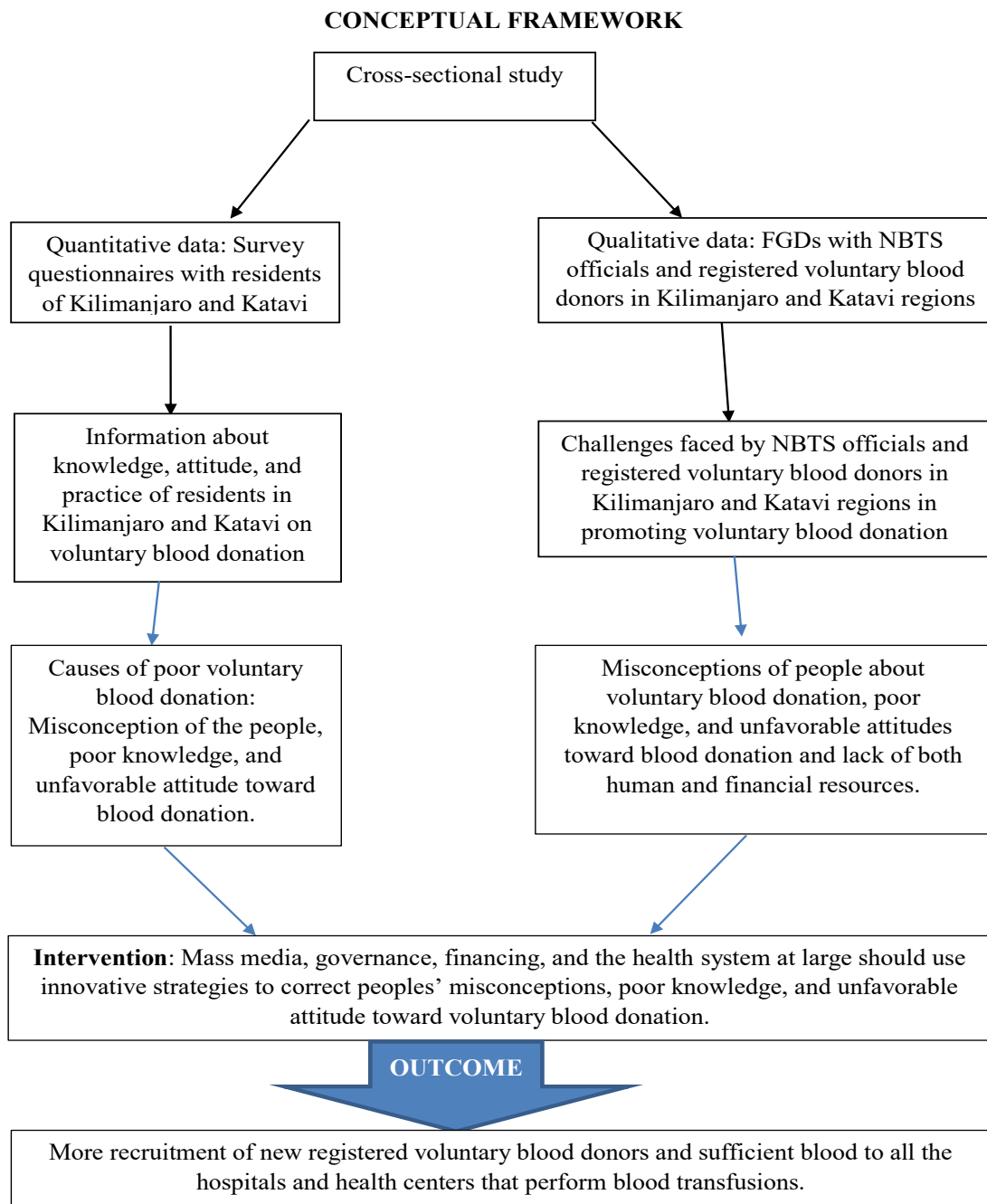


Figure 2: Conception framework

Supplying blood is one of the most challenging issues in the healthcare system since blood is an extremely perishable and vital product and donation of blood is a voluntary work (Ghasemi & Bashiri, 2017). Every second, someone in the world needs blood due to surgery, trauma, severe anemia or pregnancy complications (Every *et al.*, 1990). There is a shortage of blood for transfusion worldwide, with the heaviest burden faced by sub-Saharan Africa (Kralievits *et al.*, 2015). In countries like Tanzania, the major source of blood is blood donation, making its supply one of the most challenging in the health care system. This study assessed the magnitude of the deficit of blood in blood banks and explored the views of key stakeholders on the need, availability and opportunities for improving blood donations in northern and Western Tanzania.

According to WHO (2016), hemorrhage, which invariably requires blood transfusion, accounts for nearly one-third of all maternal deaths. Other needs for blood include accidents, surgeries, diseases causing anemia and other complications. Health-related Sustainable Development Goals to reduce child mortality improve maternal health and prevent HIV infection cannot be achieved without equitable and universal access to safe blood (World Health Organization Regional Office for Europe, 2017)

The world needs 305 million units of blood each year but only about 272 million units were available in 2017. Among 195 countries studied, 119 countries with inadequate blood supplies had a collective shortage of about 102 million units. The need for blood varied greatly from country to country. Higher-income countries with more transfusions for injuries or chronic diseases had greater demands for blood than lower-income countries where infectious diseases, respiratory illness, or nutritional deficiencies were the more common reasons for transfusions. Even so, most high-income countries had sufficient supplies while many lower-income countries fell short. Currently, about 80% of the world's population has access to only 20% of the world's blood supply. Low- and middle-income countries (LMIC) often are challenged to meet transfusion needs (Kuehn, 2019).

The region has maternal deaths due to maternal complications such as postpartum hemorrhage (PPH) and complicated childbirth surgeries which needs an immediate blood transfusion to replace the lost blood. Additionally, other needs of blood in Africa include anemia because of sickle-cell disease, malnutrition and road traffic accidents, and other forms and causes of injury (Tapko *et al.*, 2009). Moreover, the region is troubled with manmade catastrophes such as civil wars and environmental degradation as well as natural disasters such as floods and drought, which lead to accidents, injuries and malnutrition which in turn lead to the shortage of blood supply.

In India, there is a need for about 8 million units of blood per year and only one-third of this is obtained from voluntary donors. Assessment of awareness and attitude regarding blood donation will help in designing effective health education strategies to improve blood donation (Shidam *et al.*, 2015). Kenya's population is 47 million, so even if just 1% donated blood, the country would have at least 470 000 units. However, in 2018/2019, only 164 000 units of blood were collected.

Poor access to safe blood on time leads to the deaths of 830 women every day worldwide due to complications of pregnancy and childbirth and 99% of these deaths occur in developing countries, and more than 85% occur in sub-Saharan Africa (UN Population Fund, 2017).

The WHO recommends that 10 units of blood are needed per every 1000 population annually but in Tanzania with a population of 54 million people, 540 000 units of blood are needed. In 2016 for example, there were 196 735 blood units collected, so we had a shortage of 343 265 units of blood. However, 15% of the collected units were not approved due to various reasons (NBS&OCGS, 2013; Use & Blood, 2017) Sudden onset disasters (SOD) occur with little or no warning and often cause excessive injuries far surpassing the national response capacities which trigger demand for blood. These challenges can arise in both developing and developed countries (Norton *et al.*, 2013).

The current blood transfusion system in Tanzania is hospital-based and is often faced with frequent shortages of blood and unstandardized testing for Transfusion Transmissible Infections. The Government of Tanzania has recognized blood safety as one of the interventions for the prevention of HIV infections and to reduce maternal deaths. After extensive consultation with stakeholders, the Government embarked on establishing a centrally organized blood transfusion system.

Currently, Blood Transfusion Services in Tanzania are highly decentralized and lack many vital resources such as workforce, infrastructure, and financial capability. The main problems that hinder a standard blood transfusion system in the country include uncoordinated management, standards of services vary from hospital to hospital, the dependence on family replacement blood donations, hospital-based blood donations, extremely limited availability and utilization of blood components and shortage of trained professionals in the field of blood transfusion medicine.

For the quality, safety and efficacy of blood and blood products and effective clinical use of blood, it is necessary to have well-equipped blood centers with adequate infrastructure and trained personnel. Therefore, the need for modification and change in blood transfusion service has necessitated the formulation of a nationally coordinated Blood Transfusion Service that shall have the responsibility of ensuring adequate safe blood for all people in need (MOH-NBTS, 2005).

This study explored the magnitude of the deficit of blood in blood banks, the views of healthcare workers regarding the lack of blood in health facilities, and the perceptions of community members regarding voluntary blood donations. The overarching goal was to identify areas needing improvements so that there is enough blood supply in the hospitals that performs blood transfusion. To this effect, the study aimed to assess and compare the drivers and barriers to blood donations between Katavi and Kilimanjaro regions representing regions with high and moderate blood collection rates, respectively.

Currently, Tanzania National Blood Transfusion Service (NBTS) operates a network of seven blood centers countrywide, namely: Lake Zone (with its headquarters in Mwanza), Northern Zone

(with its headquarters in Kilimanjaro – Moshi urban district), Southern Highland (with its headquarters in Mbeya), Western Zone (with its headquarters in Tabora), Eastern Zone (with its headquarters in Dar es Salaam), Southern Zone (headquarters Mtwara) and TPDF (Tanzania People’s Defense Forces) located at Lugalo Military Hospital in Dar es Salaam and satellite blood collection sites such as Mnazi Mmoja, Dodoma, Morogoro, Kagera, Mara, Kigoma, Iringa and Lindi as seen on the following map of Tanzania (Fig. 3).

According to NBTS records, in 2019 national blood donation rates ranges from 94% to 18%. Katavi region was able to meet its blood demand targets by more than 90% in the year 2016 to 2019, followed by Morogoro which was able to meet its blood demand targets by 82%. The regions with the lowest voluntary blood donation rates were Njombe which was able to meet its blood demand target of 18% followed by Tabora which was able to meet its blood demand target of 22%. For this reason, Katavi was selected to represent regions with higher voluntary blood donation rates. Although Kilimanjaro is not among the regions with the lowest donation rates, it was chosen due to budget constraints that could not facilitate working in Katavi and Tabora.

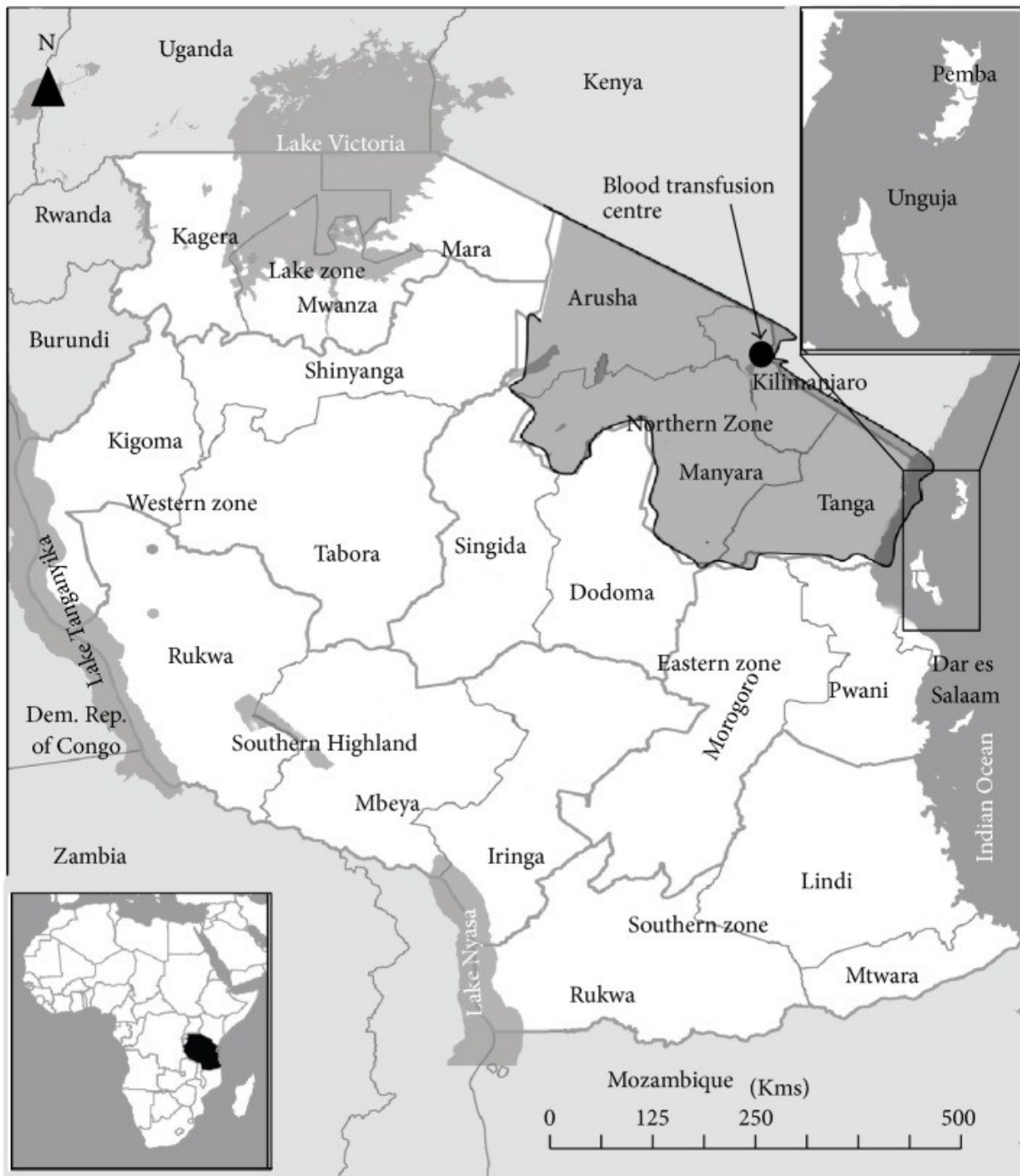


Figure 3: Map of Tanzania showing the distribution of zonal blood banks

Despite efforts made by NBTS, there is still a great demand for blood that is ready to use for an emergency in both urban and peripheral areas. However, this is due to poor voluntary blood donations, which leads to a blood shortage and an increase in deaths that could be prevented if there could be access to safe blood. Hemorrhage for example invariably requires a blood transfusion to replace the lost blood. It accounts for nearly one-third of all maternal deaths (WHO & IFRC & RCS, 2010), those deaths could be prevented if there is good voluntary blood donation which can lead to the availability of blood supply in the consumption centers (health centers and hospitals).

Other needs for blood include accidents, surgeries, diseases caused by anemia and other complications. Unfortunately, these situations are always unplanned, and they do happen in an emergency manner. Lack of access to safe blood during the situations like these may lead the health care providers to fail to save the lives of the people who need blood transfusion so as stay alive as blood has no substitute. That means voluntary blood donation is vital to meet health-related Sustainable Development Goals such as reducing child mortality, improving maternal health and preventing HIV infection (WHO, 2017).

The chief stakeholders that govern the supply of safe blood in Tanzanian include the following: (a) Government- President's Office, Regional Administration and Local Government, (b) blood donors, (c) NGOs and (d) the population at large.

Government is a very important stakeholder in blood supply, storage and distribution. It includes all the facilities in President's Office - Regional Administration and Local Government. It coordinates the smooth running of all the health centers, all the blood banks in the countries as well as the National Blood Transfusion Service (NBTS) and oversees blood transfusion guidelines and blood donation guidelines.

Blood donors are the people who donate blood which is processed in blood banks, hospitals, and health centers to get safe blood and blood products ready for transfusion. Generally, blood donors are classified into three categories: (a) voluntary non-remunerated, (b) family replacement and (c) remunerated blood donors. It's recommended to have more of voluntary non-remunerated blood donors than the later categories. In Tanzania, family replacement is the most common form of blood donation. Tanzania could learn from Asian countries such as Japan and China that have developed voluntary blood donation systems without crossing the boundaries of what can be considered as an 'incentive' rather than a 'payment' (Woodfield, 2007).

1.2 Statement of the Problem

Apart from efforts made by NBTS to ensure that there is enough blood supply in the blood banks which can be distributed to the health centers for consumption, some regions such as Katavi have succeeded to cover their blood needs by 94%, Lindi 79%, and Pwani 66% while other regions such as Songwe has managed to cover their blood needs by only 16%, Mbeya 20% and Tabora 22%.

The problem in a number of studies have been made to pinpoint factors that lead to poor blood donation rates, but we observed differences in blood donation in some regions and it is not clear what are the underlying causes. This study aims to cover that gap. Assessing the factors that push people from other regions to perform higher in voluntary blood donation can be applied to ensure

that people from the regions with lower rates of voluntary blood donation can perform better and meet the blood demand gap.

1.3 Study Rationale

Understanding the drivers and barriers to voluntary blood donation in areas with low and high blood donation rates will provide the NBTS, NGO's (Red Cross, WHO), public and private health care providers as well as the health systems at large with information that can be useful in devising measures to motivate more voluntary blood donations hence reducing the blood shortage. This will subsequently lead to a reduction in deaths due to the lack of blood for transfusion.

1.4 Objectives

1.4.1 General Objective

To assess and compare the drivers and barriers for blood donations between Katavi and Kilimanjaro regions representing regions with high and moderate blood collection rates, respectively.

1.4.2 Specific Objectives

- (i) To compare the drivers and barriers to voluntary blood donation among registered blood donors in Katavi and Kilimanjaro regions.
- (ii) To determine the drivers and barriers to voluntary blood donation in the general population residing in Katavi and Kilimanjaro regions.
- (iii) To determine the challenges and experience of NBTS officials and voluntary blood donors regarding the strategies to promote the recruitment of voluntary blood donors in the Katavi and Kilimanjaro regions.

1.5 Research Questions

- (i) What are the differences in terms of drivers and barriers to voluntary blood donation among blood donors between the Katavi and Kilimanjaro regions, which represent regions with high and lower blood collection rates?
- (ii) What are the differences in terms of drivers and barriers to voluntary blood donation among community members between the Katavi and Kilimanjaro regions, which represent regions with high and low blood collection rates?

- (iii) What are the differences in terms of knowledge, attitudes and practices of the general population towards blood transfusion in the Katavi and Kilimanjaro regions which represent regions with high and low blood collection rates?
- (iv) What are some of the lessons we can learn from the experiences and challenges of blood transfusion programs that can be used to promote voluntary blood donation?

1.6 Research Hypotheses

- (i) The levels of drivers for voluntary blood donation among blood donors and the general community will be significantly higher and barriers significantly lower in Katavi compared to the Kilimanjaro region
- (ii) The knowledge, attitude and practices towards voluntary blood donation in the general community will be significantly better in Katavi compared to Kilimanjaro regions leading to lower blood donation rates in Kilimanjaro as compared to Katavi region,
- (iii) Differences in terms of knowledge, attitude and practices of the general population and the reasons for the Katavi region to have better voluntary blood donation rates as compared to Kilimanjaro,
- (iv) Different innovative strategies used in the Katavi region to have more voluntary blood donation rates as compared to the Kilimanjaro region.

1.7 Significance of the Study

Blood shortages in health centers and hospitals has become a public health problem which needs collective efforts from both private and public sectors as well as from government and non-governmental organizations. This study provides strategies used by the Katavi region to overcome the barriers to voluntary blood donation and excel in voluntary blood collection for more than two years. Other regions can use findings from this study to improve their blood donation rates hence meet their blood collection targets. This will lead to an improvement in the availability of blood hence reducing the number of deaths due to blood shortages in the hospitals and health centers.

1.8 Delineation of the Study

Previous studies have been conducted to address the blood deficiency in the health centers but very few have investigated the reasons for and against donating blood voluntarily among volunteers

and community members, comparing regions with high versus low or moderate blood collection rates.

Few studies have also conducted a comparative assessment of the strategies that promote voluntary blood donations and the experiences and challenges that are faced with the blood transfusion program from regions with high and low blood transfusion rates in order to draw lessons that can promote blood donation in regions that are lagging behind.

Therefore, this study aims to identify the drivers and barriers that govern voluntary blood donation in urban and peripheral areas as well as draw lessons from the experiences and challenges of blood donation programs that can be used to promote voluntary blood transfusion.

The required number of respondents in Katavi was (139), but was not reached, hence only 114 respondents were interviewed. However, the study was still well powered since the refusal rate was 8.9% while in the overall sample size calculation a 10% refusal rate was included.

CHAPTER TWO

LITERATURE REVIEW

2.1 Blood Shortage

Blood shortage has become a public health importance. This is because blood transfusion support is an essential component of clinical medicine, being lifesaving in many acute situations and with many chronically ill individuals receiving regular transfusion therapy. Maintaining a safe, sufficient and accessible blood supply in the face of widespread disease is essential. This is because in almost all cases blood is demanded for emergencies, for example, physical trauma and maternal hemorrhage as well as requirements such as surgical procedures that are performed in health care centers. Due to its importance and lack of substitute products to be used instead of blood, access to a safe blood supply is vital.

The WHO estimates that blood donation by 1% of the population is generally the minimum needed to meet a nation's most basic requirements for blood: The requirements are higher in countries with more advanced healthcare systems (Al-Wardi *et al.*, 2009). In Tanzania with a population of 54 million people, 540 000 units of blood were needed in 2017 and NBTS was able to collect only 194 400 which is only 36% (Use & Blood, 2017). So Tanzania had a shortage of 345 000 units.

Data about gender and demographic profile of blood donors show that globally 33% of blood donations are given by women, although this ranges widely. In 14 of the 111 reporting countries, less than 10% of donations are given by female donors. The age profile of blood donors shows that, proportionally, more young people donate blood in low- and middle-income countries than in high-income countries. Demographic information on blood donors is important for formulating and monitoring recruitment strategies (World Health Organization, 2017).

According to WHO, an adequate and reliable supply of safe blood can be assured by a stable base of regular, voluntary, unpaid blood donors. These donors are also the safest group of donors as the prevalence of blood-borne infections is lowest among this group. World Health Assembly resolution WHA63.12 urges all Member States to develop national blood systems based on voluntary unpaid donations and to work towards the goal of self-sufficiency. The WHO shows that Data reported to WHO shows significant increases in voluntary unpaid blood donations in low- and middle-income countries (World Health Organization, 2017).

This study focused on drivers and barriers towards voluntary non-remunerated blood donation.

Blood and blood products come only from blood donors because there is not any other way to obtain the blood apart from the donation. The health of the donors is very important in blood donation so that the donor can remain safe, and the recipient can stay safe too. Awareness about blood donation, source of knowledge about blood donation, reasons for not donating blood should be stressed to improve voluntary blood donation. With the increase in educational level, the awareness level will also increase, and blood donation rates will increase. Although the prevalence of adequate knowledge of donation is estimated to be 60% in developing countries, blood the donation rate in low-income countries is far less than that in middle- and high-income countries. The prevalence of blood donation was less than satisfactory due to misconceptions, poor knowledge, and unfavorable attitude toward donation. In addition, sex, age, and educational status were found as predictors of voluntary blood donation (Urgesa *et al.*, 2017).

Non-Government Organizations including religious organizations, Red Cross and World Health Organization are also important stakeholders in blood donation. Together, they play a very important role in making sure the blood shortage gap is minimized in both urban and peripheral areas. This has been done by improving peoples' awareness, attitude and understanding towards voluntary blood donation.

The population at large is a very important stakeholder in safe blood supply, storage and distribution. This is because all the members of the population who qualify to donate blood are potential blood donors. The health of the population is very important in ensuring that the donated blood cannot be discarded. The people need to develop habit of checking their health status as frequently as possible to make sure that the diseases can be identified and treated at early stages because key to safe blood is a healthy population. Knowledge, awareness and understanding of the people towards voluntary blood donation needs to be improved so as to make sure that the blood demand gap can be minimized as low as possible so as to avoid the blood shortage in the blood banks and health centers as well.

There is also limited published literature on barriers that keep people away from donating blood as well as the drivers that push people towards voluntary blood donation. Ensuring that there is enough supply of blood in the blood banks will help the interventions on malaria, maternal health as well as reduction of maternal deaths and the deaths due to the accidents which could have been avoided if there is enough blood supply in the health facilities.

Hemorrhage which invariably requires blood transfusion accounts for nearly one third of all maternal deaths (WHO, 2010). In 2015, an estimated 303 000 women died worldwide from

complications related to pregnancy and childbirth. Around two-thirds of these maternal deaths (66%) occurred in sub-Saharan Africa, with severe bleeding as the leading direct cause accounting for nearly 24.5% of maternal deaths in this region (Use & Blood, 2017). The need for blood varied greatly from country to country. Higher income countries with more transfusions for injuries or chronic diseases had greater demands for blood than lower income countries where infectious diseases, respiratory illness, or nutritional deficiencies were more common reasons for transfusions (Kuehn, 2019).

Many medical advances that have improved the treatment of serious illness and injuries have increased the need for blood transfusion for patients' survival, to support them through recovery or to maintain their health. Surgery, trauma and cancers, for all of which there is a high probability of the need for blood transfusion, are replacing communicable diseases as leading causes of death. About 234 million major operations are performed worldwide every year, with 63 million people undergoing surgery for traumatic injuries, 31 million more for treating cancers and another 10 million for pregnancy-related complications (WHO & IFRC & RCS, 2010).

2.2 Barriers of Voluntary Blood Donation

2.2.1 Blood Donor Behaviors

In most of the Sub-Saharan countries, the blood donor behavior in relation to voluntary blood donation is limited. Local traditions and cultures intimately shape individuals' tendency towards the donation process. In order to change the attitudes and behaviors of many potential donors in Sub-Saharan African Countries, it is important to address the barriers to blood donation, as many represent misconceptions or culture-specific beliefs that may be the ultimate driving forces dictating donor behaviors (Zanin *et al.*, 2016).

Countries such as Finland, Republic of Yugoslavia, Slovenia, Spain, and the United Kingdom have exclusively voluntary, non-remunerated blood donation and the blood gap is minimal compared to that in developing countries. In the Netherlands for example, more than 50% of whole blood donors return to give blood after an invitation to donate (Mohd-Asmawi *et al.*, 2019). This can be seen from the illustration (Fig. 3).

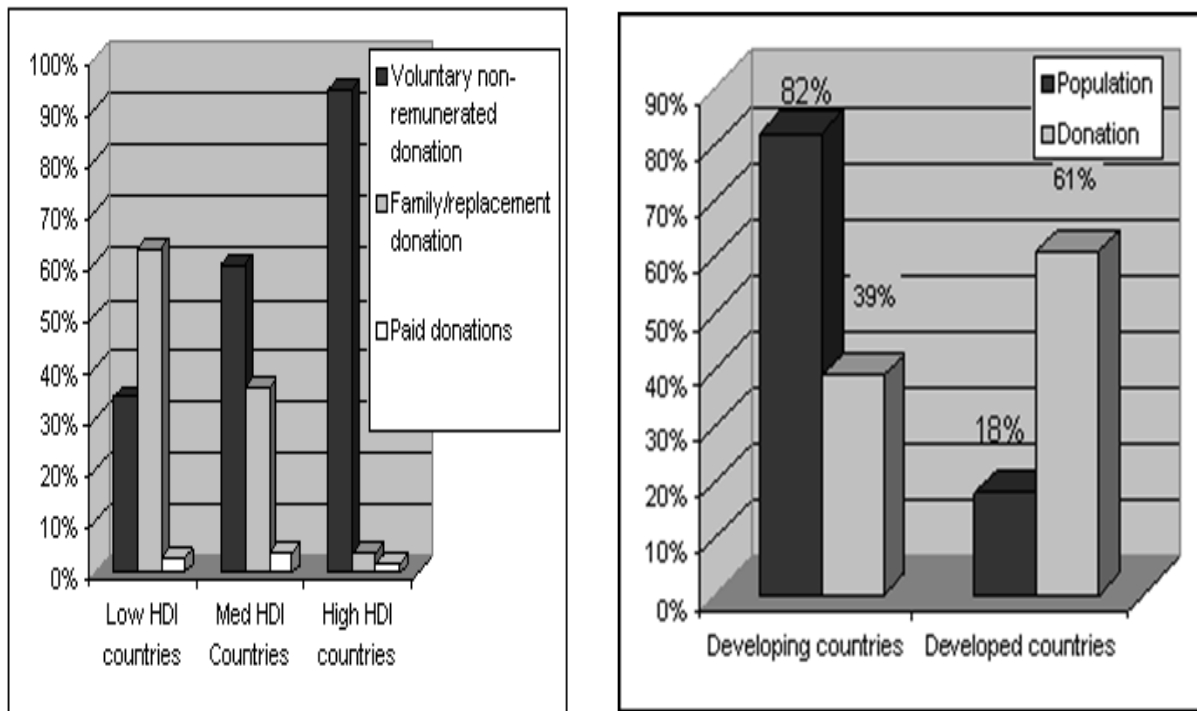


Figure 4: Blood donor behavior in developed and developing countries (Zanin *et al.*, 2016)

As it can be seen from the above illustration, people in developed countries have higher understanding and better attitude towards voluntary blood donation as compared to the developing countries.

In Africa, a large proportion of people have adequate level of knowledge about blood donation and good attitude towards blood donation. However, the level of practicing blood donation is low likely due to perceptions such as not being fit to donate blood, fear of being anemic after blood donation, fear of health risk after donation, and lack of information on where, when, and how to donate blood. Educational status is significantly associated with knowledge about blood donation (Melku *et al.*, 2016).

Blood transfusion is a basic procedure that has helped to save millions of lives each year. The transfusion of blood and its components is crucial in treating patients who are suffering from life threatening conditions such as physical trauma and anemia as well as elevating the quality of life of critically ill patients and supporting complex medical and surgical procedures. It also plays an essential, life-saving role in maternal and childcare as well as during human inflicted disasters. Therefore, there is an increasing need for adequate blood supply to be used for such clinical treatments (Mohd-Asmawi *et al.*, 2019). The blood donation is the only way of ensuring the blood supply to the health centers for consumption but there are several barriers that hinder voluntary blood donation.

(i) Knowledge

This means know-how of who is to donate blood, when to donate blood and where to donate blood. People with poor knowledge about voluntary blood donation spread wrong information about voluntary blood donation to other people and hence they avoid donating blood and this leads people avoiding donating blood which in turn leads to the shortage of blood in the hospitals hence deaths because of blood shortage since blood is always needed urgently.

(ii) Attitude

This includes the belief of the people towards voluntary blood donation. It can be socio-cultural factors such as religion beliefs, fear of being weak, taboo and thinking that the blood is for sell. Negative attitude leads to the poor voluntary blood donation rates hence shortage of blood (Nwogoh *et al.*, 2013; Arage *et al.*, 2017).

(iii) Blood Donation Practice

People who are living in the remote areas as well as those who are living in the areas where donation points are far away from where they live cannot practice voluntary blood donation due to the shortage of time as well as transport costs. However, people are willing to donate blood voluntarily if they are approached or if the donation center could be closer to their areas of residence because they consider the blood donation to be the good thing (Arage *et al.*, 2017). Other people do not donate blood due to the health factors and long-term medical complications which prevent them from donating blood.

(iv) Fear of Knowing HIV and STDs Status

Most of the women do not donate blood because they fear the behavior of their husbands thinking that they are infected with HIV/AIDS that makes them feel scared to know their HIV status, so they do not donate blood. Other people think that blood donation can damage their health and make them age faster than usual and others fear infections due to unsterilized blood donation equipment (Jacobs & Berege, 1995).

2.3 Drivers of Voluntary Blood Donation

2.3.1 Knowledge

Good awareness of the people towards voluntary blood donation will increase voluntary blood donation practice and poor awareness of the people on voluntary blood donation will reduce the

voluntary blood donation practice. It also includes advantages of blood donation to both donor and receiver and knowledge of who should not donate blood as well as qualities of a good blood donor. In most of the developing countries, the proportion of people who have an adequate level of knowledge about voluntary blood donation and attitude towards voluntary blood donation is high. Only 20% or less of blood donated in Tanzania is from voluntary, non-remunerated donors. Most blood is collected from family members or friends in the so-called replacement model. Replacement donors may not be safe since they are under pressure to donate and may not share their risky medical or social history to blood donor recruiters during health screening. Also, in emergency situations it is very difficult to find the qualified donor to donate blood. This leads to the blood shortage in the hospitals and health centers. Good knowledge leads to higher voluntary blood donation.

2.3.2 Attitude

Beliefs of the people towards voluntary blood donation leads people to donate blood more frequently without much sensitization. Positive attitude and high intention to donate in the future and making people understand the value of blood donation in saving lives by giving them correct information on overall requirements for blood donation is the good gear for developing positive attitude of the people towards voluntary blood donation (Elias *et al.*, 2016). This means that good attitude of the people on voluntary blood donation will increase the voluntary blood donation practice (Arage *et al.*, 2017; Zanin *et al.*, 2016),

2.3.3 Voluntary blood donation practice

People who have good knowledge of voluntary blood donation due to the level of education are more aware of voluntary blood donation and also view the exercise as important and meant to save lives despite the influence of some socio-cultural factors such as culture, religion among others (Grace & Nnabuike, 2021). Also, people with positive attitude and understand in voluntary blood donation do donate blood more frequently voluntarily as compared to the people with misconceptions about voluntary blood donation. Pro-social motivation, such as altruism and the desire to have a positive effect on the community, is the most frequently noted reason that drive people to donate blood (Zanin *et al.*, 2016).

However, regions with very high voluntary blood donation rates as well as those with lower voluntary blood donation rates share these barriers in Tanzania. There are many studies in Tanzania that attempt to address barriers and drivers of voluntary blood donation but lack of comparative study to compare regions with higher voluntary blood donation rates with those with

lower donation rates will make it important. It attempts to find out efforts made by regions with higher donation rates so that those efforts can be recommended to be used in regions with lower voluntary blood donation rates. This can lead to the reduction of deaths that could have been prevented if there could be enough supply of blood and blood products in the hospitals and health centers.

2.4 Strategies to improve voluntary blood donation

2.4.1 Education

The knowledge of blood donation is not up to the mark and many misconceptions are prevailing among young people. According to Mukhtiar *et al.* (2013), the most common misconception was that the blood donor has a risk for contracting infection like HIV or Hepatitis B and C, others avoid donating blood because of the fear of transmission of diseases, and others reported misconception of acquiring AIDS and hepatitis due to blood donation among the French population (Access, 2013). So educating the people to clear wrong beliefs and misconceptions in voluntary blood donation will lead to increase in voluntary blood donation rates which in turn leads to avoid deaths due to shortage of blood in the hospitals and health centers.

2.4.2 Use of Mass Media and Printed Media

These can be used to disseminate information to many people in a short period of time hence it is a very good way to facilitate health campaigns and clearing negative attitudes towards a given health campaigns. Mass media campaigns are used to inform people about certain messages and encourage positive behaviors in any society (Oriji, 2015).

2.4.3 Multi-Sector Cooperation

Since blood is a very perishable product and it don't have an alternative, voluntary blood donors are needed. However, the task of recruiting voluntary blood donors remains one of the major challenges. Thus, strengthening multi-sector collaboration, creating opportunities to donate and raising public awareness on the need for safe blood and blood products are fundamental keys to achieve a community with committed blood donors that tender voluntary non-remunerated year-round blood donation.

(i) Addressing Barriers to Voluntary Blood Donation

The 'Global consultation on 100% voluntary non-remunerated donation of blood and blood components was held on 9-11 June 2009 in Melbourne, Australia with an objective of reviewing

the current barriers to achieving a safe global blood supply based on 100% voluntary non-remunerated blood donation (VNRBD) and to identify strategies and systems that will assist in meeting the goal. The consultation also resulted in the development of a 'Melbourne Declaration' which will become a useful advocacy tool for WHO and other stakeholders to build government commitment to the principles of safe and sufficient blood supply based on 100% VNRBD (Components, 2009).

Although the blood collection and donation rates were high in some countries such as Vietnam and Sri-Lanka, some other countries lacked blood on their blood banks. For more than 30 years since the first World Health Assembly resolution (WHA28.72) addressed the issue of blood safety, many countries still lack consistent supplies of sufficient safe blood to meet the needs of their health care systems. Family replacement and paid donation continue in many countries even though there is convincing evidence that they are both less safe and that their use can inhibit progress to a safer system based on 100% VNRBD. The consultation assessed the nature of the barriers that are preventing countries from realizing this goal and reviewed the strategies and interventions that will assist progress towards this goal.

To overcome the blood shortage in Tanzania, National Blood Transfusion Service (NBTS) has developed different strategies such as financial support and strengthening through budgetary allocation by the Government through the Ministry of Health. Also, by directing efforts to make the blood transfusion service viable through non-profit recovery as well as subsidized systems, making efforts to raise funds for the blood transfusion service for making it self-sufficient. To address the problems of staff shortage, adequate staff will be recruited in order to meet specific requirements of NBTS activities (MOH-NBTS, 2005). However, sensitization programs to improve peoples' desires to donate blood are carried by different stakeholders such as NBTS and Red Cross to ensure the availability of blood in the health centers and hospitals.

There are many studies that address the barriers to the voluntary blood donation, but there are very few studies that compared areas with higher voluntary blood donation rates against those with lower collection rates. This study aims to cover that gap so as to draw lessons from the areas with higher voluntary blood donation rates that could be deployed in areas with low or moderate blood donation rates hence overcoming or minimizing the blood demand gap in these areas. It also aims to identify the drivers and barriers that govern voluntary blood donation in the regions with higher and lower voluntary blood donation rates hence draw lessons from the experiences and challenges of blood donation and transfusion programs that can be used to promote voluntary blood transfusion.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This Chapter describes the methodology used in the study. Specifically, it describes the study area, research design, and target population, sampling procedures, methods and tools of data collection, data analysis and presentation and ethical consideration.

3.2 Study Area

The study was conducted in Katavi and Kilimanjaro regions. In Katavi, the survey was conducted in Ilembo and Ikola wards of Mpanda district while in Kilimanjaro, it was in Longuo and Pasua wards of Moshi. All wards were randomly selected from list of wards in the respective districts.

3.2.1 Katavi Region

Katavi represents areas with high voluntary blood donation rates because according to NBTS records, from 2015 to 2019 the region has been able to meet its blood demand target for more than 90%. Katavi is served by Western zone blood bank with its headquarters in Tabora region near Kitete hospital. The region is located between Latitudes $5^{\circ} 15''$ to $7^{\circ} 03''$ South of Equator and Longitude 30° to 33° of East of Greenwich.

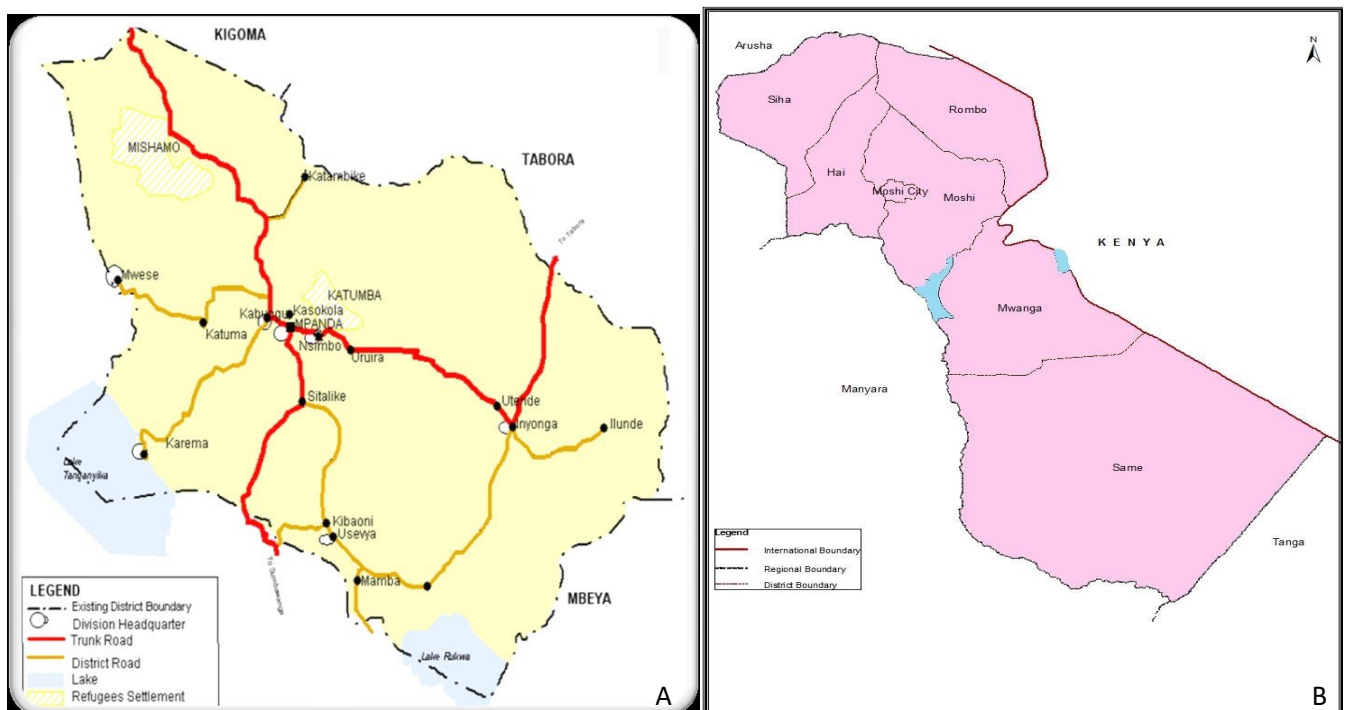


Figure 5: Map showing Katavi (A), and Kilimanjaro (B)

The main economic activities in this region are agriculture, livestock keeping, honey production, and fishing as well as tourism (Census, 2012). According to the 2012 census the region has a population of 564 604 people upon which males are 279 682 and females are 284 922. In this region 407 532 people (72.8%) live in rural areas where by 157 072 (27.8%) live in the urban areas.

3.2.2 Kilimanjaro Region

Although, the regions with lowest voluntary blood donation rate were Njombe (18%) and Tabora (22%). Kilimanjaro which has moderate blood donation rates was selected to reduce the research costs and time that would accompany working between Katavi and Njombe or Tabora. The lead researcher was based in Kilimanjaro region.

Kilimanjaro region is served by Northern zone blood bank with its headquarters found in Kilimanjaro region located opposite Kilimanjaro Christian Medical Center (KCMC). The region is located south of the equator (20 25' and 4015' S; 360 25' 30'' and 380 10' 45'' E) (URT, 2017). The region has seven districts namely Moshi urban, Moshi rural, Rombo, Mwanga, Same, Hai, and Siha (Fig. 4).

Major economic activities in Kilimanjaro include tourism, trade and commerce, crop production, animal husbandry (particularly zero grazing) and transportation. According to the population and settlement census of 2012, the region has the total population of 1 640 087 where males are 793 140 and females are 846 947.

3.3 Research Design

This was a cross-sectional study with mixed-methods design. Quantitative component involved a questionnaire survey that targeted resident community members who have/have not donated blood in two districts to explore their awareness and perceptions of voluntary blood donation. Desk review was also conducted to gather data on the amount of blood donated and usage at the blood banks was in Katavi and Kilimanjaro regions obtained from Kilimanjaro and Katavi NBT database respectively. Qualitative component of the study involved two focus group discussions with staff of blood banks as well as with voluntary blood donors to get more insights into the reasons that influence people decisions to donate or not donate blood, and challenges that the blood banks face.

This cross-sectional study utilized pre-tested questionnaires and focus group discussions to collect data. Primary data was specifically collected from the voluntary blood donors, general population and officials from NBTS in Katavi and Kilimanjaro regions. The voluntary donors were identified

from the registries of voluntary blood donors at the donation centers in Kilimanjaro and Katavi. Secondary data on the amount of blood units collected from the year 2019 to 2020 was found from regional medical offices in Katavi and Kilimanjaro. This data was used to supplement primary data collected from questionnaires and focus group discussions.

3.4 Data Collection Methods

3.4.1 Questionnaire

Two hundred and fifty-three residents (253) from Mpanda and Moshi Municipal in Kilimanjaro and Katavi regions respectively participated in the survey. The survey aimed to assess: (a) awareness of voluntary blood donation services, (b) whether the respondents have ever donated blood and reasons associated, (c) perceptions associated with voluntary blood donation, and (d) opinions of the survey respondents on how voluntary blood donation can be improved. The survey was administered in Kiswahili, a Tanzanian national language. KoBo Toolbox, electronic forms on a free-access software program were used to generate and administer the survey. Data triangulation was conducted by integrating and comparing findings from the survey, hospital records, and the FGDs to improve understating of the factors associated with voluntary blood donation. A weaving approach was used, in which both quantitative and qualitative data were presented together.

3.4.2 Focus Group Discussions

Two FGD sessions were conducted in each region. Each FGD involved six registered voluntary donors from selected randomly from the blood bank registry where their contacts were found. Another session was held with six National Blood Transfusion Service officials in each region. This means in each region there were two FGDs, making total of four FGDs with 24 respondents in both regions.

The discussion sessions ran between 30 and 50 minutes and were audio-recorded upon consent from the participants. A semi-structured discussion guide was used, with open-ended questions guiding the discussions.

3.4.3 Blood Donation and Usage Records

Blood bank records for 2019 and 2020 were reviewed from Katavi and Kilimanjaro regions. The records were obtained from regional medical officer's office and included information on the amount of blood collected, distributed and discarded as well as the reason for discarding it and the

major donors. This information was used to supplement findings from the survey and FGDs. Data for the first three research objectives was collected by face-to-face interviews using a structured and semi-structured pre-tested questionnaire.

The questionnaire collected: (a) socio-demographic data, (b) awareness and knowledge of blood donation, (c) practice of blood donation, (d) attitudes towards blood donation and e) source of information regarding blood donation. Additionally, open-ended questions were be used to understand the perceptions and feelings, barriers and drivers of voluntary blood donation.

The practice towards blood donation was assessed by asking about history of previous donation and the frequency of donation. The practice was scored from the largest (the number of times a donor donated previously) to smallest (zero) (never donated before).

To determine the experience and challenges of donors and NBTS official with regard to strategies used to recruit voluntary blood donors, focus group discussions were used. Focus group discussion involved 24 respondents (12 from each region). Respondents consisted of registered voluntary blood donors and NBTS officials, where by six respondents were NBTS officials and six were registered voluntary blood donors selected randomly from blood bank registry. This can be seen in Table 1.

For the fourth specific objective, two focus group discussions were conducted (one focus group discussion in each region). Focused group discussion includes six registered voluntary donors and six NBTS officials.

Participants were asked to choose the convenient time that works for them before focus group discussions. The data collection proceeded only after the participants signed the informed consent form. Two interviewers conducted questionnaires while one interviewer conducted focus group discussions in each region.

During focused group discussions, participants were asked open-ended questions to motivate them to narrate experiences and challenges that they encounter during the recruitment process for blood donors. Participants were asked to provide views on the perceived strengths, weaknesses, opportunities, and threats facing the donor recruitment process in their region. Focus group discussions were held in a comfortable place in both regions at a convenient time for the participants.

3.5 The study Population

The study included the blood voluntary donors, general population in Katavi and Kilimanjaro region as well as NBTS officials.

3.6 Inclusion Criteria

For donors and community interviews:

- (i) Written informed consent
- (ii) All adults (donors or community members) aged between 18 and 75 years who have resided in the study area at least for the last 6 months and which were available during data collection period were included.

3.7 Exclusion Criteria

Critically ill or those with mental illness by history as well as those aged below 18 years were excluded from the study.

3.8 Sample Size Estimation

Sample size was calculated by using likelihood ratio test for comparison of two independent proportions for cross-sectional studies. 30% proportion of blood donation was used to calculate the minimum required sample size for the first three specific objectives of the study (Elias *et al.*, 2016). Assuming a significance level of 5%, power of 90%, ability to detect a 20% difference in proportion between the two populations, and consent refusal rate of 10%, 278 community participants were required, 139 from each region.

3.9 Sampling Technique

Assuming the availability of two participants per household, 139 households were selected (approximately 70 from each region). Each ward, therefore, contributed 35 households. The interval value was calculated by dividing the total households in each selected ward by the corresponding proportional sample size calculated for each ward. The initial households were randomly selected by the lottery method. Whenever more than two eligible adults were found in the same selected household, only two of them were selected using the lottery method for interview. In the case of failure to find an eligible participant in a selected household or if the

selected household did not have residents in-house at the time of visit, the sampling process proceeds to the next household in the clockwise direction until eligible participants were found.

In the first stage of the sampling, Mpanda and Moshi urban districts were selected using purposive sampling from Katavi and Kilimanjaro regions respectively. In the second stage of sampling, two wards were selected randomly from each of the two districts from the list of available wards in each district. Then, systematic sampling technique was employed to select households from each of the ward. The numbers of households sampled from the selected wards was determined using proportionate-to-population size.

Assuming a significance level of 5%, power of 90%, ability to detect a 20% difference in proportion between the two populations, and consent refusal rate of 10% 278 participants were required, 139 from each region. Although only 253 community members participated in the study, the study was still well powered since the refusal rate was 8.9% while in the overall sample size calculation a 10% refusal rate was included.

An equal number of voluntary blood donors and employees of NBTS were collected in the two regions for a total sample size of 278 participants. Assuming availability of two participants per household, 139 households were selected (Approximately 70 from each region). Each ward therefore was expected to contribute 35 households. The interval value was calculated by dividing the total households in each selected ward to the corresponding proportional sample size calculated for each ward.

The initial households were randomly selected by lottery method. Whenever more than two eligible adults were found in the same selected household, only two of them were selected using the lottery method for interview. In the case of failure to find an eligible participant in a selected household or the selected household did not have inhabitants at the time of the visit, the sampling process proceed to the next household in the clockwise direction until eligible participants were found.

Eligibility for focus group discussions was determined based on involvement of participants in the process of strategy development and/or recruitment of donors to promote voluntary blood donation. The voluntary blood donors were selected randomly from the pool of registered donors who have recently (within the last 12 months) donated blood.

3.10 Study Variables for the Quantitative Part

The independent variables were age, sex, household income, location, and awareness on where to donate blood, beliefs on blood donation, attitude on blood donation, and knowledge on voluntary blood donation as well as blood donation practice. Dependent variables were the outcomes of independent variables which include voluntary blood donation status if someone has ever donated blood or not as well as number of voluntary blood donations as reviewed from NBTS in both regions respectively.

3.11 Data Management and Statistical Analysis

3.11.1 Quantitative Data Analysis

(i) Study Variables

Survey data were organized and checked every day at the field for errors. This was done to ensure their completeness. Data were entered in Microsoft excel and analyzed using R statistical software version 4.0.0 (74). The first step was cleaning data by running frequency of each variable, whereby unclear information was rechecked to improve clarity. Response from open-ended questions were categorized into themes and coded into categorical responses.

Descriptive analysis was used in data summarization. For continuous variables, “means” with their respective measures of dispersion were used while proportions were used for “categorical” data.

For inferential statistics, Chi square test was applied to find the association between voluntary blood donation status and independent variables i.e., knowledge, attitude, practice, gender, income level educational level and practice towards voluntary blood donations. The strength of association between individual independent variables and dependent variable was determined by use of crude odds ratio (COR) through binary logistic regression analysis.

Adjusted odds ratio (AOR) was estimated by multivariate logistic regression analysis that included all dependent variables with statistically significant COR (p value ≤ 0.5). Code 0 and 1 were used to differentiate respondents who have never donated against those who donated blood at least once respectively.

(ii) Blood Donation and Usage Records

Blood bank records for 2019 and 2020 were reviewed from Katavi and Kilimanjaro regions. The records were obtained from regional medical officer’s office and included information on the

amount of blood collected, distributed and discarded as well as the reason for discarding it and the major donors. This information was used to supplement findings from the survey and FGDs.

3.11.2 Qualitative Data Analysis

Questions were asked till the point of saturation was reached. All questions were asked in Kiswahili language and recorded using the tape recorders. Recorded conversation was translated from Kiswahili language to English and the recorded transcripts were transcribed verbatim and analyzed for key themes through constant comparison approach by the investigators. Key themes that were discussed until a consensus was reached. Transcripts were incorporated into qualitative analysis software (Nvivo ver. 10) for more structured coding. While analyzing the dataset, two authors used two techniques to ensure their reliability. First, findings were presented in context and compared them with other published sources. Second, we triangulated the findings by comparing what was discussed in each focused group discussion until saturation was reached.

3.11.3 Data Quality Assurance

All interviewers were trained before they were approved to collect data. Questionnaires and FGD questions were widely reviewed by IHI scientists before being administered in the field. During the data collection period, the questionnaires reviewed periodically to improve completeness, consistency, and accuracy. Corrective measures were taken immediately by discussing the issues with the interviewers or supervisors.

3.12 Ethical Consideration

Prior to field work, the research proposal was presented to the School of Life Sciences and Bioengineering – Ifakara Health Institute and Nelson Mandela African Institution of Science and Technology for approval. Ethical approval was sought from the Institutional Review Board (IRB) at IHI, and finally an introductory letter to proceed to the data collection sites in Kilimanjaro and Katavi regions was provided by IHI. Regional Medical Officers from Kilimanjaro and Katavi regions provided the introductory letters to the District Medical officers to allow us collect data on their districts. All participants provided written informed consent prior participation into the study.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Results

4.1.1 Sociodemographic Factors

This study interviewed 253 participants from 139 households (approximately 70 from each region). In addition, out of 24 participants that participated in FGD from both regions, 12 were voluntary blood donors selected randomly from the blood bank registry (6 males and 6 females) with a mean age of 32.5 years (Range: 23 to 42 years). There were 12 NTBTS staff that participated in the FGDs including 6 females and 6 males. Their mean age was 38 years (Range: 32 to 44 years). Out of the 253 community members that responded to the survey, there was an almost equal distribution of males and females between the two regions (Table 1). The mean age for the survey respondents was 42.2 years (Range: 18 to 75 years, and a standard deviation of 13.5). The average monthly household income was 387 181 Tanzanian shillings (TZS), equivalent to about 176 USD. About one-third of the respondents (31.2%, n=79) had primary education, another one-third (31.2%, n=79) had a college education and about one-fifth (22.1%, n=56) had secondary school education. Only a few participants had no formal education, and a few had a university education (Table 1). This is summarized in Table 1.

Table 1: Study groups

Participant	Gender	Kilimanjaro	Katavi	Total (%)
Community members (residents)	Males	75	59	134 (53%)
	Females	64	55	119(47%)
	Total	139	114	253(100%)
NTBS Officials	Males	6	6	12(50%)
	Female	6	6	12(50%)
	Total	12	12	24(100%)
Registered voluntary blood donors	Males	6	6	12(50%)
	Females	6	6	12(50%)
	Total	12	12	24(100%)

4.1.2 Barriers and Drivers of Voluntary Blood Donation

Among 253 community members who participated in the study, univariate analysis was done first and then select statistically significant variable for multivariate analysis. The multivariate logistic

regression showed that living in Katavi increase the odds for donating blood compared to Kilimanjaro.

The odds for ever donated blood were lowest among individuals aged >50 years 0.76 (0.36, 1.64) compared to individuals below 30 years of age. The higher income and higher education are directly associated with the increase in voluntary blood donation. The odds ratios for donation were higher in individuals with college and higher compared to those with no formal education: 34.07 (4.29, 270.73) <0.005.

This means education level was significantly associated with voluntary blood donation. Regarding income, the odds ratio for blood donation was higher in people with income of >500 000Tsh per month compared to those with income of below 100 000Tsh per months; 11.62 (6.30, 41.62) <0.005.

This means income level is significantly associated with voluntary blood donation. The odds ratio for donating blood was higher in people who did not know their blood group; 0.05 (0.026, 0.094), <0.005 (Table 2).

Table 2: Factors associated with voluntary blood donation

Variable	Odds ratio (95% CI)	p-value
Location		
Kilimanjaro	Ref	-
Katavi	5.36 (3.12, 9.20)	<0.005
Sex		
Male	Ref	-
Female	1.42 (0.86, 2.33)	0.17
Age category (in years)		
17 – 30	Ref	-
31 – 40	1.13 (0.54, 2.33)	0.75
41 – 50	0.76 (0.36, 1.64)	0.49
51 – 60	0.24 (0.09, 0.66)	0.005
Above 60	0.35 (0.12, 0.97)	0.04
Educational level		
No formal education	Ref	-
Primary	3.28 (0.40, 26.94)	0.27
Secondary	15.04 (1.84, 122.23)	0.01
College and above	34.07 (4.29, 270.73)	<0.005
Average monthly income (In Tanzanian shillings)		
Below 100 000	Ref	-
101 000 – 250 000	2.47 (0.80, 7.60)	0.11
251 000 – 500 000	3.23 (1.13, 9.19)	0.028
Above 500 000	11.62 (6.30, 41.62)	<0.005
Knowledge of blood group		
Know	Ref	-
Do not know	0.05 (0.026, 0.094)	<0.005

The respondents had an average age of 42.2 ranging from 18 to 75 years and the standard deviation of 13.52, and average monthly household income of 387 181 Tanzanian shillings (TZS), equivalent to about 176 USD. In Katavi, males were 59 and females were 55 whereby in Kilimanjaro males were 75 males and 64 females. The survey study had total of 134 (53%) males and 119 (47%) females who were the community members from both regions. About one third of the respondents (31.2%, n=79) had primary education, about one fifth (22.1%, n=56) had secondary school education and another one third (31.2%, n=79) had college education. Only a few participants had no formal education, and a few had university education.

Out of 253 surveyed participants, 47% (n=120) never donated blood in their lives due to various reasons. Thirty-nine respondents from Kilimanjaro (33%) and 33 from Katavi (27%), respectively did not donate blood because they were not sensitized as well as being consulted to donate. One of the reasons was lack of knowledge of the whereabouts of donation centers. Twenty-three respondents from Kilimanjaro (19%) and 12 from Katavi (10%), respectively cited the same reason. Four (3%) and 2 (1.6%) respondents in Kilimanjaro and Katavi, respectively did not donate blood because the donation center was very far from their residence. In Katavi 1 (0.8%) did not donate the blood because of religious and cultural reasons whereby in Kilimanjaro only 1 respondent (0.8%) sited such reason. In Kilimanjaro 4 respondents (3%) did not donate blood because they feared to lose sex libido where as in Katavi only 1 respondent (0.8%) sited that reason.

Total of 53% of all respondents, (n=133) from both regions have ever donated blood in their lives. In Kilimanjaro 18% (n=24) respondents donated blood because the close family member needed it while in Katavi 8% (n=11) donated blood because of that reason. In Kilimanjaro, 11% of respondents (n=14) donated blood because to serve their best friend: in Katavi, 11% of respondents (n=15) donated because of that reason. In Kilimanjaro 10% of respondent (n=13) donated blood because they were sensitized to do so likewise in Katavi 10% (n=13) donated because of that reason. In Kilimanjaro only 8% (n=10) just volunteered while in Katavi 25% (n=33) just volunteered. Qualitative study revealed that more education and more sensitization is needed to improve voluntary blood donation. In addition, during the discussion with NBTS officials from Katavi they had shown to have more creative strategies to improve voluntary blood donation.

Table 3: Socio demographic characteristics of the community members in Katavi and Kilimanjaro

Variables	Katavi	Kilimanjaro	P-value	Total
Sex				
Male	59 (2%)	75 (54 %)	0.726	134
Female	55 “48%”	64 (46%)	0.168	119
Education level				
Uneducated	5 (2%)	10 (4%)	0.975	15
Primary	26 (10%)	53 (21%)	0.170	79
Secondary	30 (12%)	26 (10%)	0.120	56
College	44 (17%)	35 (14%)	0.792	79
University	9 (4%)	15 (6%)	0.206	24
Economic activities*				
Business	30 (20%)	51 (29%)	0.079	81
Farmers	51 (33%)	64 (37%)	0.836	115
Employed	8 (5%)	2 (1%)	0.040	10
Animal husbandry	14 (9%)	15 (9%)	0.712	29
Fishing	47 (31%)	32 (18%)	0.002	79
Unemployed	3 (2%)	11 (6%)	0.082	14

* A number of respondents had more than one economic activity hence the numbers are more than participant in respective areas

4.1.3 Drivers and Barriers of Voluntary Blood Donation among Registered Voluntary Blood Donors in Kilimanjaro and Katavi Regions

Only about a 133 (53%) of the survey community members had ever donated blood in their lifetime. A majority of those that had ever donated blood 101 (76%) were from Katavi region and 32 (24%) were from Kilimanjaro region. Nearly all that had reported donating blood had donated between 1 and 4 times over the past year, only one person had donated more than 4 times and was from Katavi region. Multivariate and univariate analyses have shown that there is significant association between socio-demographic factors to the likelihood of donating blood. During the FGD with the registered voluntary blood donors who are also community members, some of the most popular reasons given for not donating blood included fear of knowing health status, fear of being stigmatized if found positive of HIV/AIDS and the need for motivation for donating blood. Below are comments from two of the FGD participants:

Lack of interest in donating blood and poor education about the voluntary blood donation was mentioned as a main reason for not donating blood. Most of the people think that the blood is for sell so they don't donate [Female blood donor from Kilimanjaro].

I once had unprotected sex, so I thought that I was infected with HIV/AIDS. From that day, I never had peace of mind so I never donated because I am afraid that people might stigmatize me once they know my health issue. But one day I decided to take courage and went to the hospital and took HIV test, and I was clean, since then I have been donating regularly [Male blood donor from Kilimanjaro].

With regards to awareness of voluntary blood donation services, nearly a half (47.0%, n=118) of all respondents were aware of voluntary blood donation. Some of the most popular sources of information included outreach visits by the health care providers, radio programs and internet as well as reading the posters and the printed materials. Respondents from Katavi were more than five times more likely to be aware of voluntary blood donation than those from Kilimanjaro (Table 2). The difference between the two regions also came up during the FGD sessions with the NBTS staff from Katavi, who stated that they raise community awareness regarding voluntary blood donations through several programs including through radio stations, community and conducting regular visits to the communities as these participants said:

Yes, we have different programs. These programs include a radio program (Mpanda FM radio) which cover the whole Katavi region and some parts of Rukwa region, through this radio program we can reach a lot of people within a very short period and make them understand the importance of voluntary blood donation as well as clearing the wrong beliefs about the blood donatio [Female NBTS staff from Katavi].

Another program we use is ensuring that all the donors get their results on time. We visit one site after three months so when we go for the next visit, we make sure that we have the results with us. This motivates the donors and makes them keep on donating blood as well as getting the new recruits [Female NBTS staff from Katavi].

4.1.4 Perceptions Regarding Voluntary Blood Donation

Community members' perceptions towards blood donation are summarized in Table 3. A majority of the survey respondents in both regions indicated that whether or not one donates blood is dependent on several factors including health status (75%), age 22%) and religion or culture (2%).

Nearly a half of all respondents believed that there were no health risks associated with blood donation. Of the 18% that believe there to be risks, some of the most popular risks listed included fear of becoming anemic (66%), fear of being exposed to diseases (26%). A majority (76%) of the

respondents recommended that the most important way to improve voluntary blood donation would be to educate and sensitize the community about this issue (Table 3).

Level of importance of several strategies for improving voluntary blood donation was assessed. These included (a) community sensitization, (b) community education, and (c) bringing blood donation stations near people. More than 90% of all respondents in both regions said that these factors were very important in improving voluntary blood donation services (Table 4). Participants of the FGDs also discussed other means that could be implemented to improve blood donation. These included improvement in the national blood donation campaigns, recognition and appreciation of blood donors, and collaboration between different institutions in encouraging and facilitating blood donation services. The participants also advised that similar campaign approaches as those used on cervical and breast cancer should be used in improving voluntary blood donation. Here is a comment from one of the participants:

Voluntary blood donation campaigns should be taken more seriously. They can be led by senior government officials like a president or prime minister. They should not be done on just a single day of the year, but throughout the year, the way campaigns against cervical cancer and breast cancer are done. In so doing there will be no blood shortage in the health centers [Male blood bank staff from Kilimanjaro].

Table 4: Community member knowledge, attitude practice and perception on voluntary blood donation

		Katavi	Kilimanjaro	Total	P value
Blood donation practice and experience					
(i)	Do you know your blood group?				
	Yes	72 (28%)	44 (17%)	116 (46%)	0.000
	No	26 (10%)	76 (30%)	102 (40%)	0.000
	I don't remember	19 (54%)	16 (6%)	35 (13%)	0.010
Times donated blood					
(ii)	1 to 3 times a year or more	46 (18%)	16 (6%)	62 (25%)	0.007
Community members knowledge in voluntary blood donation					
(i)	Can anyone donate blood?				
	- Yes	16 (6%)	13 (5%)	29 (12%)	0.248
	- No	98 (39%)	126 (49%)	224 (88)	0.578
(ii)	Why can't everyone donate blood?				
	- Sex of the person	1 (0.4%)	0 (0 %)	1 (0.4%)	
	- Age of the person	26 (10%)	24 (9%)	50 (20%)	0.257
	- Other health reasons (pregnancy, being in menstrual cycle, being sick and after donating shortly)	99 (39%)	74 (29%)	173 (68%)	0.215
Community members attitude toward voluntary blood donation					
(i)	Is voluntary blood donation important?				
	- Not important	3 (1%)	4 (1.6%)	7 (3%)	0.560
	- Slightly important	2 (0.8%)	3 (1%)	5 (2%)	0.918
	- Very important	108 (43%)	133 (52%)	253 (100%)	0.706
(ii)	Community members opinions in improving voluntary blood donation				
	- Education and sensitization	115 (45)	78 (30%)	193 (76%)	0.146
	- Bring donation centers	9	12	21 (8%)	0.515
	- Increase number of health care providers	6	6	12 (5%)	0.073

	Katavi	Kilimanjaro	Total	P value
- Motivation and recognition of voluntary blood donors	2	6	8 (3%)	0.022
- Interventions are not important	5	12	12 (5)	0.008

4.1.5 Challenges and Experience of NBTS Officials and Voluntary Blood Donors regarding Recruitment of Voluntary Blood Donors in Kilimanjaro and Katavi Region

Challenges of NBTS officials in Kilimanjaro include failure of the people to keep on donating blood. As most of the people come to the voluntary blood donation centers just to know their blood group. Once they know it and donate blood for the first time, they don't keep on donating blood. However, in Katavi people keep on donating blood because once someone donates blood, he gets voluntary blood donation card and NBTS badge. This practice is not present in Kilimanjaro. Voluntary blood donation card lasts only for five months, when donors have voluntary blood donation card, they get higher priority in any of the district hospitals in Katavi region when they come to seek health services. This makes people donate blood more frequently. Below is the comment from one NBTS official from Kilimanjaro and one NBTS official from Katavi region.

Challenges are there, for example someone comes to donate just to know his blood group, to get the donation card and to know his health status. Ones he gets those he doesn't need to come back for the donation again. Others come just because it is a blood donation day, so they come to donate and they don't keep on donating blood, also it depends on how they are sensitized because blood donation is personal [Female NBTS official from Kilimanjaro].

One male from Katavi said that:

We give our donors voluntary blood donation card and badge that lasts for five months. When they go to any district hospital to seek for health service, they are given higher priority to treatment as compared to the ones who does not donate blood. This helps them to get health care services earlier and go back to their businesses. This strategy motivates more people to come and donate blood as frequently as possible and this leads to enough blood supply to our blood bank. When we go to schools, we just tell the head of the school to give us time and date to talk to the students about the importance of voluntary blood donation, we sensitize them and when they are sensitized, they donate blood on the sport and get the blood donation card as well as the badge [Male NBTS official from Katavi].

Another challenge is failure of the center to provide results on time. The NBTS officials from both regions agreed that they find it very difficult to make all outreach visits due to the lack of manpower and resources such as funds and vehicles for conducting outreach visits. However, in Katavi, all the interviewed NBTS officials explained that all the results are given in the next outreach visit. This makes both donors and potential donors become more motivated in donating blood. Lack of resources was not experienced in Katavi region. Below is the comment from one NBTS official in Kilimanjaro:

Another challenge is us as a center, we lack resources. We tell the donors that when we come back we will be having their results as all the tests take about two weeks to one month but due to the lack of resources we could not be able to give their results on time when we pay the next visit so donors get demoralized and we lose our credibility to them [Male NTBS from Kilimanjaro].

Another female from NBTS official in Katavi region commented that:

Another program we use is ensuring that all the donors get their results on time. We visit one site after three months so when we go for the next visit, we make sure that we have the results with us. This motivates the donors and makes them keep on donating blood as well as getting the new recruits [Female NTBS from Katavi region].

All FGD participants in both regions explained that wrong notion about voluntary blood donation was a very big challenge. This wrong knowledge, misconception and attitude about voluntary blood donation include belief that if someone donates blood, they must keep donating to avoid periodic blood fluctuations. Another factor was the fear of becoming anemic. All NBTS participants who participated in FGDs agreed that the best way to clear those misconceptions and unfounded beliefs and attitudes is through education. However, in Kilimanjaro, they use more traditional ways of visiting people in groups for example in the churches, markets, sports, schools and other gatherings and educate and sensitize them to donate blood. Katavi use both traditional ways of educating people in social gathering and the radio programs (Mpanda FM radio) which has full coverage in Katavi region and some parts of Rukwa region. Below one comment from NBTS officials from Kilimanjaro one comment from registered voluntary blood donor from Kilimanjaro, one voluntary blood donor from Katavi region said the following:

Another challenge is wrong notion of the people about voluntary blood donation. People believe that once you donate you must keep on donating blood to avoid periodic blood volume fluctuation. This is because blood volume can go up so you must keep on donating

if you don't want to die. However, with very extensive education most of them understand us and come to donate, however, more education and sensitization is needed to improve voluntary blood donation [Male NTBS official from Kilimanjaro].

One of the NBTS official female from Katavi region also said:

I got the information about voluntary blood donation and its importance from the health care providers who came to visit us and taught us about the voluntary blood donation and its importance as well as clearing the wrong notion that if you donate ones you must keep on donating because if you don't the blood level will increase and you will get health problems [Female registered voluntary blood donor from Kilimanjaro].

The female of NBTS from Katavi region said that:

We educate both our potential voluntary blood donors and registered blood donors through Mpanda FM radio. We tell them honestly about how many people die due to the need of blood and we also tell them what can be done so as to rescue those people from those tragic deaths. In so doing we find a very long queue of the people who came to volunteer to donate blood. In so doing we always have blood supply, and we supply what we can't consume on time to other nearby regions such as Kigoma and Tabora. Through Mpanda FM radio we make sure that everyone is aware that donating blood voluntarily is his or her own responsibility to serve lives of the people who are really vulnerable. In so doing they donate, and we meet our blood demand targets and, in some months, we do exceed it that is why we are capable of supplying blood to the neighboring regions [Female NBTS from Katavi region].

The female blood donor from Katavi region responded that:

I got the information about the need for voluntary blood donation and the importance of blood donation from Mpanda FM radio which has the full coverage over the whole region. The health care providers do teach about the importance of voluntary blood donation directly to the donor as well as to the receivers and that makes me choose to donate blood voluntarily. I also got the information about the voluntary blood donation from the health care providers who came to the church and educated us on the need for voluntary blood donation [Female registered voluntary blood donor from Katavi region].

In both regions fear of people about knowing their HIV status was a major challenge to blood donation. NBTS officials from both regions explained that most of the people don't come to donate

blood because they don't want to find out their health status in particular HIV/AIDS status. Below is one comment from NBTS official and one registered voluntary blood donor:

People don't come back because we fear knowing their health status such as HIV/AIDS, so the easy way is to run away without knowing the results because they think that knowing the results does worse than good to them. With extensive education people come to donate and accept the results as we arrange for HIV/AIDS counseling for those who are found HIV positive. They accept the status and start treatment and become healthy [Female NBTS official from Kilimanjaro].

Another male registered for voluntary blood donor said that:

One day I was called to take the results and I said that I don't want to hear it and when the nurse read it to them and found out that I am not infected with HIV/AIDS I felt so happy and went to have a bottle of cold beer so as to congratulate myself. From that moment I keep on donating blood in every three months because men can do so in three months if they want [Male registered voluntary blood donor from Kilimanjaro]

All 48 participants in FGDs from both regions explained that people are not interested in voluntary blood donation because they don't see how important it is compared to their business. Below is the comment from one registered voluntary blood donor in Kilimanjaro:

Most of the people are not interested in voluntary blood donation because they don't see that it is important to them as compared to their business. It is difficult to convince someone to close his business and spend time in just donating the blood, unless he really has to serve life of someone very dear to him or her. They need something with direct benefit to them. However, people need to know that in almost all the time blood is always needed in emergency situation, so it is very difficult to get a donor to help someone whom you love who really needs blood in emergency cases like in an accident. So, it is not bad to spend few minutes in donating blood to serve someone's life that might be your son, daughter, friend, mother, father or close relative [Male registered voluntary blood donor from Kilimanjaro]

All 48 participants in FGDs from both regions explained that solution for the barriers of voluntary blood donation is for the voluntary blood donation to be taken more seriously. The campaign can be led by senior government official like prime minister or president and in the voluntary blood donation day those faithful voluntary blood donors in each region can be rewarded. The reward

can either be blood donation t-shirt or certificate which can be administered by the prime minister or president in the blood donation day. This will motivate both current and potential blood donors to keep on donating blood, in so doing there will not be blood shortage in hospitals and health centers.

As major barrier is fear of the people to know their health status particularly HIV status, there should be HIV counseling so that people can know the importance of early diagnosis and start the use of ARVs as soon as possible. Also, all the participants agreed that that negative attitude towards voluntary blood donation as well as misconceptions should be cleared. People should be educated about the importance of having blood in the blood bank ready for the use. So, education and sensitization were seen as the best option to clear wrong notions and misunderstanding of the people about voluntary blood donation. However, in Katavi region people are educated using radio programs which reaches many people at ones and give them correct facts about voluntary blood donation, status of availability of blood in the blood bank as well as in the hospitals and health centers.

4.1.6 Amount of Blood Collected in Katavi and Kilimanjaro Regions between 2019 and 2020

We obtained a record of the amount of blood donated from April 2019 to November 2020 in Kilimanjaro, and from January 2019 to November 2020 in the Katavi Region. We obtained records for eight (8) months in 2019 and 8 months in 2020 in each region. We present a summary of the amount of blood collected in units in Table 6. On average, more blood units were collected in the Katavi Region both in 2019 and 2020 compared to that collected in the Kilimanjaro region. In both regions, males donated most of the blood, donating about two-thirds of all the blood donated (Table 6). The difference in the amount of blood donated between the two regions also came up during the FGDs with NBTS from Katavi, who reported that Katavi Region was contributing the most to the national blood bank compared to all other regions in the country as this participant stated:

Although we have been the first in collection of blood in this country, but we are not satisfied with the blood we collect, we can do a lot better in order to help other regions with lower blood collection so as to serve lives of the people. More education should be given to the people, and this should be done regularly. We should not wait for the national blood donation day which happens only once in a year while the blood is needed every day [Female blood bank staff from Katavi].

People in Katavi are more motivated to donate blood as the voluntary blood donors are given their results on the next outreach visit and they are also given NBTS blood donation badge and card. People who have the blood donation card are given higher priority when they go to any district hospital in Katavi region as this participant stated:

We give priority to our voluntary blood donors when they come to the hospital to seek medical services as well as health care services. This helps them to get health care services earlier and go back to their businesses. This strategy motivates more people to come and donate blood as frequently as possible and this leads to enough blood supply to our blood bank. When we go to schools, we just tell the head of the school to give us time and date to talk to the students about the importance of voluntary blood donation, we sensitize them and when they are sensitized, they donate blood on the spot and get the blood donation card as well as the badge [Female blood bank staff from Katavi region].

In Kilimanjaro, people are less motivated in voluntary blood donation due to the reason that they don't get their blood test results on time after donating, and they don't get the voluntary blood donation card on the next visit when blood donation persons come to carry out the donation process. This makes donors less motivated as these two participants stated as follows:

As a center, we lack resources. We tell donors that when we come back for next visit, we will be having their results as all the tests take about two weeks to one month but due to the lack of resources we could not be able to give their results on time when we pay the next visit so donors get demoralized and less motivated and this leads them to decide not to donate blood. As people need to know their status so they don't feel comfortable [Male blood bank staff from Kilimanjaro].

Male from blood bank staff from Kilimanjaro said that:

On top of what has been said, voluntary blood donation needs to be the ongoing process and not an activity that has to be done and forgotten. We do not have radio program or television to educate people on voluntary blood donation that is why someone comes to donate just to know his blood group, to get the donation card and to know his health status. Once he gets those he does not need to come back for the donation. Others come just because it is a blood donation day, so they come to donate, and they do not keep on donating blood because the voluntary blood donation is personal. People needs to know that voluntary blood donation is more than knowing the blood group, more than knowing the health status and it is more than getting the voluntary blood donation card. It is about

...serving lives of the people who cannot survive without blood. If it is made as ongoing process, we could be able to retain more donors and meet our blood collection targets [Male blood bank staff from Kilimanjaro].

Table 5: Amount of blood collected in Kilimanjaro and Katavi regions between 2019 and 2020 (1 unit = 500 mL)

Variables	All blood collected	From male VBD	From female VBD	From male family replacement	From female family replacement
Kilimanjaro 2019	2923	1826 (62.5%)	787 (26.9%)	232 (7.9%)	78 (2.7%)
Katavi 2019	4010	2726 (68.0%)	614 (15.3%)	626 (15.6%)	44 (1.1%)
Kilimanjaro 2020	2811	1633 (58.1%)	730 (26.0%)	325 (11.6%)	123 (4.4%)
Katavi 2020	4072	2798 (68.7%)	796 (19.5%)	446 (11.0%)	32 (0.8%)

4.2 Discussion

The study has shown that both Kilimanjaro and Katavi regions share the same barriers to voluntary blood donation. However, the study has shown that Katavi has been doing better in addressing those barriers to voluntary blood donation. This is because Katavi has employed more innovative strategies in overcoming barriers to voluntary blood donation.

The major barrier to voluntary blood donation in both regions was misunderstanding, misconception and wrong attitude towards voluntary blood donation. These poor attitudes and misconceptions include fear of periodic fluctuation of blood volume, belief that blood is for sale in the hospitals, fear of becoming anemic and fear of becoming weak. To overcome this challenge, potential voluntary blood donors needed to be educated and recruited as voluntary blood donors. In Kilimanjaro, the same traditional ways of educating and sensitizing people to donate blood were used. But Katavi Region has more innovative strategies. They educated people using radio programs (Mpanda FM radio) which cover the whole Katavi Region and some parts of the Rukwa Region. They reached a large proportion of the population using radio programs as compared to normal outreach visits. This could be one of the key reasons they recruited more people as voluntary blood donors in Katavi as compared to Kilimanjaro.

Another barrier is not having time to donate blood. Most people don't donate blood because they are too busy with their daily activities. In Kilimanjaro, traditional ways of convincing people to spare a few minutes to donate blood are still being used. However, in Katavi, once people donate

blood, they receive voluntary blood donation cards and blood donation badges. The card helps them to be prioritized for services when they attend a district hospital. Voluntary blood donors are happy if they see their contribution is being recognized and awarded, and as a result, they keep on donating repeatedly. This attracts more potential blood donors to donate blood and become faithful voluntary blood donors.

Another barrier is a lack of knowledge. In both regions, there was limited knowledge about voluntary blood donation. In overcoming this barrier in Kilimanjaro, outreach visits are used to educate and sensitize people to donate blood. However, in Katavi, radio and print media are used to educate and sensitize people. The study shows that the people of Katavi are more knowledgeable about voluntary blood donation because radio reaches more people within a very little time as compared to travelling physically to meet potential blood donors and educate them. In Katavi, they used the voluntary blood donation card as a motivator for voluntary blood donation, and this keeps people donating blood repeatedly as compared to Kilimanjaro.

It is essential to understand the various factors that could affect the perception and awareness of voluntary blood donation among the places with higher voluntary blood donation rates and those with lower voluntary blood donation rates. Such studies may be useful for the successful implementation of voluntary blood donation programs and strategies in areas with lower voluntary blood donation rates. This will help in maintaining an adequate and safe blood supply.

We reported almost equal participation of males and females in the Kilimanjaro and Katavi regions. On analyzing the socio-demographic data, males and females accounted for 47% (n=119) and 53% (n=134) of all participants, respectively.

Most of the respondents in both regions were knowledgeable about voluntary blood donation, but they did not practice blood donation as it should have been expected. This led to the low voluntary blood donation practice. They observed a similar finding in India where 87.3% of respondents had never donated blood, although they were having good knowledge of voluntary blood donation. This finding suggests that having knowledge regarding voluntary blood donation does not lead to the actual practice of voluntary blood donation because of the lower level of awareness and wrong perception (Shidam *et al.*, 2015).

Most of the participants never considered donating blood because of various reasons, such as fear of ill health, fear of becoming exposed to diseases, fear of becoming anemic and lack of time. This is like the study by Mathew *et al.* (2007) where donors did not see blood donation as an important voluntary activity on par with other activities like volunteering at hospitals, schools, and support

groups. Fear and inconvenience were major barriers to donating. Better education campaigns to allay fears about donating and motivating people to donate blood were important motivators (Mathew *et al.*, 2007).

In this study, young donors between the ages of 18 and 30 years largely dominated the donor population, followed by donors between the ages of 31 and 49 years. This study has almost similar findings to the study by Shidam in the year 2015 in India, where the author found that the donor population was young with the ages between 18 and 30 years (Shidam *et al.*, 2015).

In the current study majority of volunteers (90.5%) had a positive attitude regarding donating blood in the future, if they get enough education and go through advocacy programs.

Despite having a centralized blood bank network, Katavi has tried its level best to meet its blood demand gap, while Kilimanjaro has not because of various reasons such as lack of awareness, risk perception of donating blood among potential donors, lower knowledge about donating blood, and negative attitude toward voluntary blood donation.

Katavi has a better blood collection rate as compared to Kilimanjaro because of its strategy of educating people through radio programs (Mpanda FM radio). They use the radio media to educate people about the importance of voluntary blood donation to both donor and receiver, and food intake that can help the donor's body recover after the blood donation. Also, they provide blood test results on time and recognize the contribution of voluntary blood donors by giving them priority in the district hospitals in the Katavi Region when they go to seek health and medical services. This makes donors feel proud to donate blood. All these plus proper sensitizations help to make people donate blood and keep the recruited blood donors.

Some reasons given by those that had donated blood in both regions were the need for blood to rescue family members, relatives or close friends, proper advocacy and sensitization and satisfaction in helping someone who might not get a family member to donate blood for him or her in case of emergency. This finding is like the results of a study conducted in America by Alexander Smith in 2016 which found out that the reasons for donating blood include the desire to help another person's life, and the recognition by volunteers that people in a medical emergency will need blood in order to survive (Dhanakoses, 2016).

In this study people have shown positive attitude about voluntary blood donation and they indicated that they can donate in the future if they are properly educated and sensitized about donating blood especially in peripheral areas, if health care centers are moved near the people, and

if blood donors are valued, recognized and motivated as well. They responded that more education and advocacy are needed especially to the people living in peripheral areas, outreach visits from the health workers should also include them because they feel that they are marginalized. Most of the community members and FGD participants from both regions explained that education and advocacy could also be used as a way of retaining the blood donors as well as recruiting new ones.

The findings of the study indicated that people knew the emergency in which blood is needed. Respondents cited the victims of road accidents as well as people undergoing surgical procedures as people who needs immediate blood transfusion. Regarding health conditions, which disqualify one from donating blood, respondents cited people with HIV/AIDS or anemia, as well as people who are under medication should not donate blood.

Electronic and print media had a great influence on improving people's awareness of voluntary blood donation. From this study, we saw that healthcare providers in the Katavi Region made use of printed materials and radio programs to improve people's awareness, knowledge and attitude towards voluntary blood donation, hence improving blood donation practice as compared to Kilimanjaro. In addition, findings from this study showed that the use of mass media for disseminating information and emphasizing the importance of voluntary blood donation in the Katavi Region has led people to practice voluntary blood donation, and that made Katavi people more aware of donating blood as compared to Kilimanjaro.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

In conclusion, awareness, knowledge, and a positive attitude towards voluntary blood donation could cause more recruitment of new voluntary blood donors, leading to an increase in the amount of blood collected and avoidance of deaths because of a blood shortage in the hospitals. To overcome the barriers to voluntary blood donations, Katavi Region has deployed more innovative strategies compared to Kilimanjaro. In Kilimanjaro, they did education on voluntary blood donation during the outreach visits by NBTS officials. In Katavi, they also used radio to educate the population about voluntary blood donation. Because a substantial proportion of the population can afford radios, the message about voluntary blood donation can reach many people within a short time. Using radio media can make the campaigns to encourage voluntary blood donation easier, can address people's misunderstandings, attitudes and misconceptions and may have contributed to the increased recruitment of new voluntary blood donors in Katavi.

Good knowledge and awareness of voluntary blood donation will lead to a higher desire to practice voluntary blood donation. This will lead to enough supply of blood in the hospitals and health centers that perform blood transfusions and surgeries. The study has identified strategies deployed by Katavi, a region with high voluntary blood donation rates. Regions with lower and moderate blood donation rates can use these strategies to improve and reach their blood collection targets. The study underscores the importance of health education in both urban and peripheral areas. We recommend education and motivation through various mass media to eliminate misbeliefs, misinterpretations, misinformation and misconception about voluntary blood donation and reinforce positive attitudes towards voluntary blood donation. We also need periodic awareness programs for voluntary blood donation even among healthcare workers, to motivate people so that they can donate blood. This will significantly improve the chance of meeting blood donation targets all over the country and in the world at large.

5.2 Recommendations

Derived from the outcome of the study, the following are the recommendations:

- (i) Voluntary blood donation should be emphasized in ongoing national wide campaigns and should be promoted by senior government officials such as President or Prime

Minister. These campaigns should be sustained to achieve the goal and should not be for one day in a year.

- (ii) The health system at large should take voluntary blood donation more seriously in order to make sure that all the hospitals and health centers have enough blood for both emergency and routine cases.
- (iii) People should be educated on voluntary blood donation and its importance to both donors and recipients as well as the importance of having the available blood ready for transfusion in hospitals and health centers.
- (iv) The outreach programs conducted by NBTS officials should be extended to the people living in peripheral areas so that they can understand the importance of donating blood.
- (v) Mass media such as televisions and radios should be used to educate people on voluntary blood donation because these can reach many people within very short time and improve peoples' knowledge and awareness on voluntary blood donation.
- (vi) People who donate blood frequently should be acknowledged by the senior government officials and provided with incentives such as NBTS t-shirt, certificates or given priority for care when they attend health care facilities. This will motivate new donors to donate blood and encourage the current registered donors to continue donating blood.

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APPENDICES

Appendix 1: Barriers and Drivers of Voluntary Blood Donation in Northern and Western Tanzania

Survey Questionnaires in English

Section A

Demographic Profile of the Respondent

1. Name
2. Region you are coming from (tick one)
 - i. Kilimanjaro
 - ii. Katavi
3. District you are coming from
 - i. Moshi
 - ii. Mpanda
4. Ward you are coming from
5. Age of the participant
6. Gender of the participant (Tick one)
 - i. Male
 - ii. Female
7. Marital status (Tick one)
 - i. Married
 - ii. Not married
 - iii. Separated,
 - iv. Widow,
 - v. Widower.
8. Level of education (Tick one)
 - i. Not educated,
 - ii. Primary education,
 - iii. Secondary education,
 - iv. College education,
 - v. University,
 - vi. Higher education (Master/PhD)
 - vii. Other (explain)
9. Economic activity
 - i. Farmer
 - ii. Business/ Entrepreneurship
 - iii. Fishing,
 - iv. Animal husbandry
 - v. Employed
 - vi. Others (explain)
10. Average monthly income

Section B: Community Members' Knowledge Attitude and Practice On Voluntary Blood Donation

(a) Community members' knowledge on voluntary blood donation

1. Do you have any knowledge about voluntary blood donation (Tick one)
 - i. Yes
 - ii. No
 - iii. I don't remember
2. If YES, where did you get it from (tick as much as you can)
 - i. Radio/TV
 - ii. Magazine/News paper
 - iii. Social network,
 - iv. Health care providers
 - v. Local leaders,
 - vi. Church/mosque
 - vii. Others
 - viii. In others please explain

(a) Community members' practice on voluntary blood donation

1. Do you know your blood group?
 - i. Yes
 - ii. No
 - iii. I don't remember
2. If YES, what is your blood group?
 - i. A
 - ii. A+
 - iii. B
 - iv. B+
 - v. O
 - vi. O+
 - vii. AB
3. Have you ever donated blood in 12 months?
 - i. YES
 - ii. NO
 - iii. I don't remember
4. If YES how many times did you donate?
 - i. Between 1-5 times
 - ii. Between 6-10 times
 - iii. More than 10 times
 - iv. I don't remember
5. What made you donate blood?
 - i. Family member/close relative needed it
 - ii. Best friend needed it
 - iii. I was sensitized by the health care providers

- iv. I just volunteered
 - v. Other reasons (Please add other reasons)
6. Where did you donate blood?
7. If you have not donated blood, what made you not to donate?
- i. I don't know where to go to donate,
 - ii. I was never sensitized,
 - iii. I am afraid to be exposed to diseases during donation,
 - iv. Fear of fluctuation of blood levels,
 - v. Fear of losing sex libido and become impotent,
 - vi. Health reasons
 - vii. I have my personal reasons
 - viii. My religion doesn't allow me to donate blood,
 - ix. My tradition doesn't allow me to donate blood,
 - x. I don't have time because I am too busy
 - xi. Donation point is too far so I need bus fare,
 - xii. Other reasons (please add other reasons)

(a) Community members' attitude on voluntary blood donation

1. Do you think that anyone can donate blood?
- i. YES
 - ii. NO
 - iii. I don't remember
2. For someone to donate blood, it depends on what?
- i. Age
 - ii. Sex of the person
 - iii. Health status of the person (diseases, pregnancy, breastfeeding mother, or being in menstrual period)
 - iv. Region and tradition,
 - v. Other reasons (Please add other reasons)
3. Do you think that voluntary blood donation is important?
- i. Yes
 - ii. No
4. If Yes, how important is voluntary blood donation?
- i. Very important
 - ii. Somehow important,
 - iii. Not very important,
 - iv. I don't know
5. Why do you think that voluntary blood donation is important?
- i. Save lives of sick people,
 - ii. Save lives of people have experienced physical trauma (accidents) who need immediate blood transfusion to save their lives,
 - iii. Helping family member or close relative who needs blood,
 - iv. Other reasons(please add other reasons)
6. Do you think that there are health problems that someone can get after donating blood?

- i. Yes,
 - ii. No,
 - iii. I don't know
7. If Yes, what are they?
- i. Fluctuation of blood levels,
 - ii. Fear of erectile dysfunction to men (ED)
 - iii. Fear of failure to become pregnant,
 - iv. Fear of losing sex libido,
 - v. Fear of being exposed to diseases during donation,
 - vi. Other reasons (please add other reasons)
8. Do you think that the community members have enough understanding on voluntary blood donation?
- i. Yes
 - ii. No,
 - iii. I don't know
9. Do you think that educating the community members about their role in voluntary blood donation is important?
- i. Very important
 - ii. Not very important
 - iii. Not important
 - iv. I don't know
10. Do you think that sensitizing the community members about their role in voluntary blood donation is important?
- i. Very important
 - ii. Not very important
 - iii. Not important
 - iv. I don't know
11. Do you think that moving voluntary blood donation centers near the people who donate blood is important?
- i. Very important
 - ii. Not very important
 - iii. Not important
 - iv. I don't know
12. Do you think what can be done in order to improve voluntary blood donation so to ensure the availability of blood in the blood banks and in the health centers?

We thank you very much for your time and contribution which have been of great values. Ones we finish discussing with other groups and ones we finish collecting data from other people and other stake holders, we shall make sure that you see the result of this research project.

Ones again, we thank you very much.

Study team

Appendix 2: FGD with 12 Registered Voluntary Blood Donors in English

Demographic Profiles of FGD Participants

11. Name
12. Region you are coming from (tick one)
 - iii. Kilimanjaro
 - iv. Katavi
13. District you are coming from
 - iii. Moshi
 - iv. Mpanda
14. Ward you are coming from
15. Age of the participant
16. Gender of the participant (Tick one)
 - iii. Male
 - iv. Female
17. Marital status (Tick one)
 - vi. Married
 - vii. Not married
 - viii. Separated,
 - ix. Widow,
 - x. Widower.
18. Level of education (Tick one)
 - viii. Not educated,
 - ix. Primary education,
 - x. Secondary education,
 - xi. College education,
 - xii. University,
 - xiii. Higher education (Master/PhD)
 - xiv. Other (explain)
19. Economic activity
 - vii. Farmer
 - viii. Business/ Entrepreneurship
 - ix. Fishing,
 - x. Animal husbandry
 - xi. Employed
 - xii. Others (explain)
20. Average monthly income

FGD Questions with Twelve Registered Voluntary Blood Donors from Kilimanjaro and Katavi (Six from Each Region)

1. How many times did you donate blood?
2. How did you get the information about the need for voluntary blood donation?
3. What is your opinion about the need for the voluntary blood donation?

4. What made you donate blood?
5. How willing are you to donate blood? Why?

We thank you very much for your time and contribution which have been of great values. Ones we finish discussing with other groups and ones we finish collecting data from other people and other stake holders, we shall make sure that you see the result of this research project.

Ones again, we thank you very much.

Study team

Appendix 3: FGD with 12 NBTS officials in Katavi and Kilimanjaro regions (6 from each region) in English

Demographic Profiles of FGD Participants

21. Name
22. Region you are coming from (tick one)
 - v. Kilimanjaro
 - vi. Katavi
23. District you are coming from
 - v. Moshi
 - vi. Mpanda
24. Ward you are coming from
25. Age of the participant
26. Gender of the participant (Tick one)
 - v. Male
 - vi. Female
27. Marital status (Tick one)
 - xi. Married
 - xii. Not married
 - xiii. Separated,
 - xiv. Widow,
 - xv. Widower.
28. Level of education (Tick one)
 - xv. Not educated,
 - xvi. Primary education,
 - xvii. Secondary education,
 - xviii. College education,
 - xix. University,
 - xx. Higher education (Master/PhD)
 - xxi. Other (explain)
29. Economic activity
 - xiii. Farmer
 - xiv. Business/ Entrepreneurship
 - xv. Fishing,
 - xvi. Animal husbandry
 - xvii. Employed
 - xviii. Others (explain)
30. Average monthly income

FGD with Twelve Blood 12 NBTS Officials from Katavi and Kilimanjaro (Six from Each Center)

1. Are there programs to improve the voluntary blood donation?
2. How do you meet your blood demand targets?
3. What challenges do you experience when executing those programs?

4. What are the reasons that prevent people from donating blood in this region?
5. What needs to be done so as to improve the voluntary blood donation in this region and country wise at large?

We thank you very much for your time and contribution which have been of great values. Once we finish discussing with other groups and once we finish collecting data from other people and other stakeholders, we shall make sure that you see the result of this research project.

Once again, we thank you very much.

Study team

Appendix 4: Informed consent for Study Participants in English



Informed Consent Form for Study Participants

Title of project: Barriers and drivers of voluntary blood donation in Katavi and Kilimanjaro regions: a comparative cross-sectional study of two regions with high and low blood collection rates in Tanzania

Name of Principal Investigator: Florian Francis Finda NM-AIST/M033/T18

This Informed Consent Form has two parts: Information Sheet (to share information about the research with you) and Certificate of Consent (for signatures if you agree to take part)

Informed Consent Form Date:

Part I: Information Sheet

Introduction

Hello, my name is Florian Francis Finda and I am a Master's student from Nelson Mandela African Institution of Science and Technology which collaborate with Ifakara Health Institute. I am conducting a study on Barriers and drivers of voluntary blood donation in Katavi and Kilimanjaro regions: a comparative cross-sectional study of two regions with high and low blood collection rates in Tanzania.

I am particularly interested in understanding the knowledge, attitude and practice of people in relation to voluntary non-remunerated blood donation to the people in the areas with higher voluntary blood donation rates (Katavi region) and those in the areas with moderate and lower blood donation rates (Kilimanjaro).

I am going to give you information about the purpose of this study we are going to conduct, and would like to request your permission to have an interview with you about this topic and to tape record the conversation. Please let me know if there are any words that you do not understand in this consent form, and I will take time to explain. If you have any questions later, please do not hesitate to ask me, I will be more than happy to explain.

Purpose of the study

Blood transfusion is a basic procedure that has helped save millions of lives each year. The transfusion of blood and its components is crucial in treating patients who are suffering from life threatening conditions such as physical trauma and anaemia as well as elevating the quality of life of critically ill patients and supporting complex medical and surgical procedures. It also plays an essential, life-saving role in maternal and child care as well as during human inflicted disasters. Therefore, there is an increasing need for adequate blood supply to be used for such clinical treatments.

The blood donation is the only way of ensuring the blood supply to the health centres for consumption but there are several barriers that hinder voluntary blood donation. These barriers include knowledge, attitude and practice of the blood donors in response to the voluntary blood donation. These barriers are available in all regions, meaning regions with lower and higher blood donation rates.

The goal of this study is to obtain the drivers that make people in higher donation areas such as Katavi to donate blood voluntarily and understanding barriers that prevent people in the areas with lower voluntary blood donation rates not to donate blood voluntarily. This information will help us to understand challenges associated with management of cases to enable effective design, selection and implementation of control intervention in order to make sure that there is enough blood supply in the blood banks and health centers found in both urban and peripheral areas.

Why you are being asked to participate

We are inviting you to participate in this study because you have been selected purposively (You have experience on blood collection, testing, processing, approval, transfusion and distribution).

Procedures.

Specifically, in this study we are going to provide you with prepared questions for you to respond to/interview you by asking you some of the prepared questions on your perspective, experience, perception, and attitude regarding voluntary blood donation. During the interview the conversation will be recorded using the tape recorder so as to capture all the information spoken out. The interview will take about 30 minutes. We are therefore, requesting you for your time to participate in this interview.

What will happen if I don't want to participate

Your participation in this study is entirely voluntary. It is your choice whether to participate or not, and you are free to leave the study at any time if you choose to.

Risks/discomfort

There are no health risks associated with this particular study. There may be a minor risk that the few minutes of discussion with you may interfere with your time of doing your normal routine activities or other activities.

Benefits

As participant you will not directly benefit from your participation. However, the outcome of this study will potentially provide information to the Policy Makers and the Ministry of Health to prioritize control interventions. Thus, impacting on social economic development, good health and well-being of, your family, your community, all Tanzanian and beyond. Also, this study together with other information collected in other parts of Tanzania will contribute on the global efforts of reducing or minimizing the blood shortage gap in the health centers found in both urban and peripheral areas.

Reimbursements

This is voluntary participation, unfortunately, you will not receive any incentive to participate in this study. But we ask you to accept a “**thank you**” for letting us have time for interview with you.

Confidentiality

While we collect identifying information in this study, we will use a unique code instead of your name, so that only the researcher will know what your name is, and that will be kept private. Your participation may attract attention from other people. We will not share any information about you to anyone outside the research team. All of the information collected during this project will be kept private.

Geographic information about your house’s location or working location may be collected. This information might make it possible for someone to identify your household or working place. However, the information will be stored very securely so that only people from the study team will be able to have access to it. It would be very difficult for someone outside of the study to access your information.

Sharing the results

Findings from this study will be shared with the relevant community through community meetings. The knowledge we get will be shared with the Ministry of Health, President Office, Regional and Local Government Authorities and development partners for further action towards actions to take to reduce the burden of blood shortage in the health centers. We’ll also publish the results in the scientific journals to promote wide access to information.

Who to contact

If you have any further questions, related to the study you may contact: Florian Francis Finda, who is the overall responsible Person for this study through 0784111221 or through email ffinda@ihi.or.tz

In case of further clarifications, you may need to contact Dr. Mwifadhi Mrisho, the secretary of Ifakara Health Institute Institutional Review Board through 0788-766676 or through email mmrisho@ihi.or.tz

Part II: Certificate of Consent

I, have been invited to participate in research titled **“Barriers and drivers of voluntary blood donation in Katavi and Kilimanjaro regions: a comparative cross-sectional study of two regions with high and low blood collection rates in Tanzania”**.

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and all the questions I have asked have been answered to my satisfaction. I understand the risks involved with this study, and I agree to dedicate some little time for an interview. I consent voluntarily to be a participant in this study.

Name of participant.....

Signature.....

Date.....

Mobile phone numbers:

Email:

Name of Principal Investigator: Florian Francis Finda

Signature.....

Date.....

Mobile phone numbers: +255784111221

Email: ffinda@ihi.or.tz

Name of IHI - IRB Representative: Dr. Mwifadhi Mrisho (PhD)

Signature.....

Date.....

Mobile phone numbers: +255788766676

Email: mmrisho@ihi.or.tz

Appendix 5: Consent form for participating in data collection in English

Consent Form for Participating in Data Collection

You have been asked to participate in the In-depth interview/ focus group discussion/ questionnaires by Nelson Mandela African Institution of Science and Technology. This means to collect data or information on the activities related to Barriers and drivers of voluntary blood donation in Katavi and Kilimanjaro regions: a comparative cross-sectional study of two regions with high and low blood collection rates in Tanzania.

The information provided will be useful to health of the people and other relevant authorities to understand the Barriers and drivers of voluntary blood donation hence employing the measures that are employed in the areas with higher voluntary blood donation rates to the areas with lower donation rates hence reducing the blood demand gap to the areas with the lower blood donation rates.

All information provided here will be treated HIGHLY CONFIDENTIAL.

“I have read, understand this information and agree to take part in this study”

Name _____ of _____
respondent.....Signature.....Date.....

“I have agreed to abide by the above condition”

Name: Interviewer.....Signature.....Date.....

Appendix 6: Consent form in Kiswahili

Utayari Kushiriki Katika Ukusanyaji wa Taarifa

Mimi ni mwanafunzi wa chuo cha Sayansi na Teknolojia (Nelson Mandela African Institute of Science and Technology)/ Ifakara Health Institute (NM-AIST/IHI) nasomea shahada ya uzamifu katika fani ya afya ya um ana utafiti (Master of science in Public Health Research). Kama sehemu ya mahitaji ya degree yangu, Nafanya utafiti wa kujua changamoto au sababu zinazosababisha watu kuchangia au kutokuchangia damu kwa hiari. Naomba uwepo wako katika hii stadi kwa kujibu maswali machache.

Taarifa zitakazo chukuliwa zitatunzwa kwa usiri mkubwa.

“Nimesoma na kuelewa taarifa hii na ninakubali kushiriki katika utafiti huu”

Jina la msailiwa..... Sahihi/ alama ya dole
gumba.....Tarehe.....

“Nimekubaliana na vigezo na masharti yote”

Name: Jina la msaili.....Sahihi.....Tarehe.....

Appendix 7: Focus group discussion interview guide with registered voluntary blood donors in Kiswahili (Majadiliano ya Pamoja Kati ya Wachangiaji 12 wa Damuwalisajiliwa Kuchangia Damu Kwa Hiari Katika Mikoa ya Kilimanjaro na Katavi)

(Wachangiaji Sita Kutoka Kila Mkoa)

Sehemu ya kwanza: Taarifa binafsi

1. Jina
2. Tarehe
3. Umri.....4. Jinsia Mwanaume/Mwanamke
5. Jina la hospitali.....
6. Kiwango cha elimu.....
7. Kazi.....

Sehemu ya pili: Uelewa na mtazamo kuhusu uchangaji wa damu kwa hiari

1. Ni mara ngapi umechangia damu?
2. Ulipataje taarifa juu ya uhitaji wa damu?
3. Ni wapi ulitoa damu?
4. Unaelewa nini kuhusu kujitolea kutoa damu? Unafikiri kujitolea kutoa damu ni muhimu/ au sio muhimu?
5. Nini maoni yako kuhusu umuhimu wa kujitolea kuchangia damu?
6. Je una utayari kiasi gani kuchangia damu bila malipo yoyote? Kwanini?
7. Kwa maoni yako unafikiri nini kifanyike ili watu waweze kuchangia damu kwa hiari?

Tunawashukuru sana kwa kutupa muda wenu na michango yenu ambayo imekuwa ya thamani kubwa sana. Pindi tutakapohitimisha majadiliano na makundi mengine pamoja na wadau wengine tutawajulisha matokeo ya utafiti huu.

Kwa mara nyingine tunawashukuru sana.

Timu ya utafiti.

Appendix 8: Survey questionnaires in Kiswahili

Maswali kwa Wanajamii

Sehemu a: Taarifa binafsi (Please tic where appropriate)

1. Jina
2. Tarehe
3. Umri.....
4. Jinsia ... Mwanaume/Mwanamke.....
5. Kiwango cha elimu.....
6. Kazi.....
7. Kipato kwa mwezi.....
8. Mkoa.....

Katika sehemu b hadi d, kwa Taarifa isiyo sahihi tafadhali andika namba **sifuri (0)** kwenye mabano na kwa Taarifa ambayo iko sahihi tafadhali andika namba **moja (1)** kwenye mabano

Sehemu b. Uelewa wa wanajamii kuhusu uchangiaji wa damu salama kwa hiari

- i. Niko tayari kuchangia damu kwa hiari ila tatizo ni kwamba sijui na wapi ntachangia damu ()
- ii. Sielewi kundi langu la damu lakini hat ana hivyo sijali maana kujua kundi la damu wala kutokulijua hakuhatarishi afya yangu kwa namna yoyote ()
- iii. Siendi kuchangia damu maana naogopa kuathirika kwa maradhi mbali mbali huko hospitali ()
- iv. Sijachangii damu maana magonjwa kama UKIMWI au homa ya ini huambukizwa kwa njia ya damu hivyo sipendi kumwambukiza mtu na mimi naogopa kujua kuwa nimeathirika. Ni bora nibaki na hali yangu bila kujua nikawa salama kuliko kumwambukiza mtu mwingine ()
- v. Kwakuwa uchangiaji wa damu hufanyika hospitali naogopa kuambukizwa maradhi mbalimbali ikiwemo homa kali ya mapafu (COVID-19 au corona) hata kama nimevaa barakoa ()
- vi. Mtu yeyote anaweza akachangia bila kujali umri, jinsia, hali ya ujauzito, hali ya hedhi, mtu anayetumia dawa, mgonjwa, mlevi, mtu anayetumia madawa ya kulevyana ahata mama anayenyonyesha ()

- vii. Damu haina mbadala hivyo uchangiaji wa damu kwa hiari ni suala lisiloepukika ()
- viii. Uchangiaji wa damu ni kitendo cha heshima na kishujaa ()

Sehemu c.Mtazamo wa wanajamii juu ya uchangiaji wa damu kwa hiari

- i. Sio lazima mtu wa kuchangia damu awe mimi, mtu yeyote anaweza akachangia damu mda wowote ()
- ii. Ntachangia damu kwa hiari pale ambapo ndugu yangu wa karibu au Rafiki yangu atakapokuwa na uhitaji wa damu ()
- iii. Kikwetu kuchangia damu ni mwiko kwa mila zetu, hivyo siwezi kutoa dam una pia siwezi kukubali niongezewe damu ()
- iv. Hakuna umuhimu wowote wa kuchangia damu maana babu zetu na wazee wetu waliishi siku nyingi kuliko sisi na hawakuwa na huduma ya kutoa au kuongezewa damu, hivyo sioni sababu ya kuchangia damu ()
- v. Mama mjamzito, mgonjwa, mtu anayetumia dawa, mwanamke aliye katika siku zake (hedhi) mlevi namtumiaji wa madawa ya kulevya, watoto wenye umri wa chini ya miaka 17 na wazee wenye umri wa Zaidi ya miaka 60 hawaruhusiwi kuchangia damu ()
- vi. Utoaji wa damu huwafanya wanaume kupungukiwa na nguvu za kiume hivyo kushindwa kufanya tendo la ndoa sambamba na kutungisha mimba ()
- vii. Sioni sababu yoyote ile ya kuchangia damu ()

Sehemu d Ushiriki wa wanajamii katika uchangiaji wa damu kwa hiari

- i. Ninaelewa kuwa uchangiaji wa damu kwa hiari ni muhimu kuokoa maisha ya watu ila huwa sichangii maana nakuwa na shughuli nyingi sana. ()
- ii. Sichangii damu maana dini yangu hainiruhus kuchangia au kuongezewa damu. ()
- iii. Sichangii damu maana sielewi natakiwa nikae kipindi gani toka nichangie damu hadi nichangie kwa mara nyingine. ()
- iv. Sijawahi kuchangia damu maana sijawahi kuombwa kufanya hivyo. ()
- v. Sichangii damu maana kituo kiko mbali san ana kwangu, ila kama watakuwa karibu niko tayari kuchangia dam umara kwa mara ()
- vi. Huwa sichangii damu maana huwa damu inauzwa na mimi sipewi chochote kutokana na mauzo ya damu yangu, hivyo siwezi kuzitajirisha hospitali kwa damu yangu ()
- vii. Sipendi kwenda kuchangia damu maana naogopa kujigundua au kugundulika kuwa nimeathirika na virusi vya UKIMWI. Ni bora niishi kwa amani bila kujua kuwa nimeathirika kuliko nijue hali yangu ()
- viii. Naelewa kuwa uchangiaji wa damu kwa hiari ni muhimu ili kuokoa Maisha ya watu hivyo huwa ninachangia damu kwa hiari yang umara kwa mara. ()

Sehemu e. vyanzo vya Taarifa kuhusu uchangiaji wa damu kwa hiari

- i. Unaelewa nini kuhusu uchangiaji wa damu kwa hiari?
.....
.....
- ii. Unafikiri uchangiaji wa damu kwa hiari ni muhimu?
.....
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- iii. Umepata wapi Taarifa kuhusu umuhimu wa uchangiaji wa damu kwa hiari?
.....
..
- iv. Kwa maoni yako unafikiri nini kifanyike ili kuhimiza watu wachangie damu kwa hiari?.....
.....
...
- v. Ulishawahi kuchangia dam mara ngapi?.....
- vi. Nini kilikufanya uchangie damu?.....
.....
.....

Tunakushukuru sana kwa kutupa muda wako na michango yako ambayo imekuwa ya thamani kubwa sana. Pindi tutakapohitimisha majadiliano na makundi mengine pamoja na kukusanya Taarifa kutoka kwa wadau wengine tutakujulisha matokeo ya utafiti huu. Kwa mara nyingine tunakushukuru sana.

Timu ya utafiti.