DETERMINANTS OF BLOOD DONATION PRACTICE AMONG SELECTED TERTIARY COLLEGE STUDENTS IN HOMA BAY COUNTY KENYA

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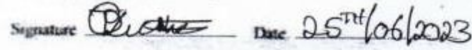
A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF PUBLIC HEALTH DEGREE IN EPIDEMIOLOGY OF MOUNT KENYA UNIVERSITY

JULY 2023

DECLARATION AND APPROVAL

Declaration

This thesis is my original work and has not been presented for a degree in any other University or for any other award.

Signature  Date 25TH/06/2023

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We confirm that the work reported in this thesis was carried out by the candidate under our supervision.

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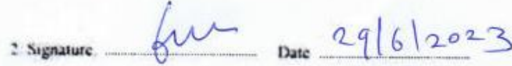
2. Signature  Date 29/6/2023

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DEDICATION

The study is dedicated to my Dad Charles Okuthe, Late Mum Judith Okuthe, wife Pamela Okuthe, Son Derick Okuthe and daughter Abby Okuthe.

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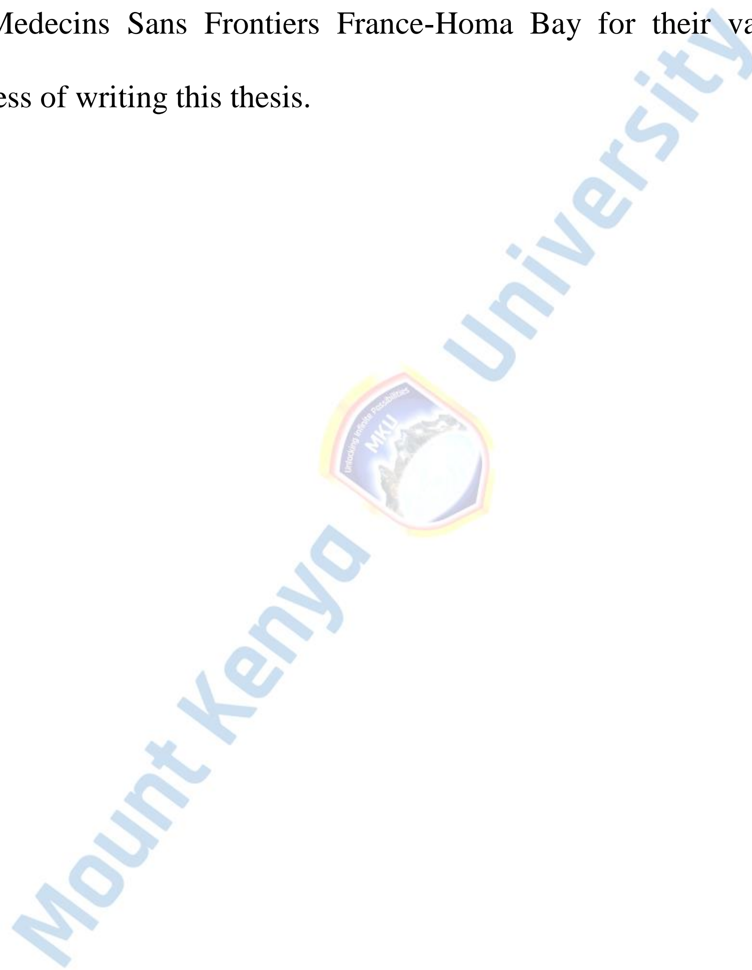
My sincere appreciation to my supervisors Dr. Alfred Owino Odongo of Mount Kenya University and Dr. Esther Wanjiku Muitta of Murang'a University of Technology both who have patiently guided me to develop this thesis. Am also grateful to Mount Kenya University Ethical Review Committee (ERC), Staff of Mount Kenya University, All respondents, Ministry of Health Homa Bay County, Kenya National Blood Transfusion Services and Medecins Sans Frontiers France-Homa Bay for their valuable inputs during the process of writing this thesis.



ABSTRACT

Globally, most countries are struggling with inadequacy of blood. The enthusiasm of a population to give blood determines donation rate of a country. Most Kenyans are still not willing to donate with only less than 10 percent of adult Kenyans donating. Unfortunately, the country is struggling with perennial shortage of blood and KNBTS is only able to collect 16% of the one million units needed by the country way below the target. Their statistics shows blood is mainly donated by secondary school students, college and university students and 80 percent of the donors aged between 16 and 25 years. Blood donors of younger age have the potential of longer donor careers and good health, consequently directing recruitment efforts toward them is strategic to achieve universal access. Kenya has an estimated population of 47million, to claim sufficiency; 470,000 units of blood need to be collected annually. To increase adequacy of blood supply, locally relevant evidence is needed to understand the characteristics, motivators and barriers of tertiary college students. Numerous studies have been undertaken to understand the characteristics, barriers and motivators of potential donors more so in developed countries with few studies done locally in other parts of the country but not in Homa bay County. This was a descriptive cross sectional study which mixed method approach (qualitative and quantitative) for triangulation purposes. It was carried out from April 2021 to July 2021 in three public tertiary institutions and one private tertiary institution in Homa Bay County. The county is situated in western part of Kenya bordering Lake Victoria. A total of 424 participants were recruited in the study. The institutions were purposively sampled and systematic random sampling on the spot without a population list was used to sample the students. The numbers of students sampled in each institution was proportionately based on the total study population of 2627. SPSS software version 21.0 was used to conduct statistical analysis. Reliability was analyzed using test retest method and Pearson's correlation calculated. In addition to reliability, simple percentage agreement was also calculated with values from 75% to 90% demonstrating acceptable level of agreement. Descriptive statistics (arithmetic average and standard deviation) and Chi square (x^2) test for association was conducted for quantitative data while transcripts coded thematically and similarities identified for qualitative data. Logistic regression was carried out for all significant independent variables and Odds Ratio (OR) and 95% Confidence Interval (CI) used to estimate the strength of association. The study revealed that sex OR-0.493 p =.013 and blood type A-(OR) 8.597 p=.0.009, and O+ (OR) 2.189 p=0.012 of the students were significant socio- demographic characteristics associated with blood donation, while collectivism and altruism main motivating factors. Selling of blood was the lead barrier to blood donation. Homa Bay County satellite blood bank, should come up with customized blood donation messages targeting female donors, and all donors should be motivated with non-monetary incentives like donor's card and Community strategy should be used to share key customized massages through community health volunteers (CHVs) regarding blood donation.

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LIST OF ABBREVIATIONS AND ACRONYMS

FGD	Focused Group Discussion
FRD	Family Replacement Donor
KHIS	Kenya Health Information System
Km sq.	Square Kilometer
KMTC	Kenya Medical Training College
KNBTS	Kenya National Blood Transfusion Services
NBTS	National Blood Transfusion Services
SPSS	Statistical Package for Social Sciences
SSA	Sub Saharan Africa
TTIs	Transfusion Transmissible Infections
UK	United Kingdom
USA	United States of America
VNRBD	Voluntary Non-Remunerated Blood Donor
VNRD	Voluntary Non-Remunerated Blood Donation
WHA	World Health Assembly
WHO	World Health Organization

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CHAPTER ONE

1.0 Introduction

Supply of blood in Kenya is linked to policy that blood can only be procured through voluntary blood donations with no material incentives provided to induce supply (Blood Transfusion Bill, 2020). Blood donation process offers one way of saving lives. One pint of blood donated is able to save up to three lives. Three different life saving components are available in blood which include plasma, platelets, and red blood cells. Blood and its components still remain a scarce precious commodity which cannot be manufactured but only acquired from generous donors.

1.1 Background of the Study

Blood and blood components are only obtainable from altruistic individuals thus a precious resource. Utilization of blood routinely alongside its components in health facilities especially in emergency circumstances contributes significantly in saving lives (Moore et. al.2020). Various types of donations are being practiced worldwide namely; commercial blood donation –the donor is paid for donating, voluntary non-remunerated blood donor- majorly practiced in Kenya and no money is involved or coercion, autologous donation- blood donated by an individual and used by the same individual for an upcoming surgery and family replacement donation- donors replace blood utilized by family and friends. The criteria for donating blood must be met before donating blood. Preferably, donations should be out of free will without any payment and compulsion. Individuals who donate repeatedly are the safest donors and voluntary blood donors have lesser rates of transfusion transmissible infections (TTIs) compared to family replacement donors (WHO, 2022).

Globally, high income countries contribute nearly 50% of all donations with a donation rate 9 times greater than in low-income countries. To meet the national requirement of

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most countries, there is urgent need for more people to willingly donate blood to ensure steady supply of blood to mitigate the ever rising request for plasma, blood and its components (Moore et. al.2020). Most developing countries majority in Africa are still struggling to supply adequate blood and that has led to high morbidities and mortalities being witnessed in health facilities. A prompt and consistent blood supply in all health facilities offering blood transfusion services is critical; however, demand in many developing countries is still higher compared to supply.

According to (WHO,2022) out of 39 members states participating in blood availability, safety and quality survey, 16 had more than 80% of voluntary non-remunerated blood donation (VNRBD), and 19 had less than 50% of VNRBD. The proportion of VNRBD and family replacement donations (FRD) was 71.0% and 27.3% before the pandemic compared to 66.5% and 32.7% after the pandemic.

In East Africa the supply of blood is still low. Despite the highest population and highest blood demand in East Africa Tanzania still has the lowest collection rate compared to neibouring countries of Kenya and Uganda i.e. Tanzania (3.6), Kenya (4.1) and Uganda (6.3) (Shabani et, al, 2020). Main source of blood is from voluntary non paid blood donors (79%) and the remaining 21% comes from family replacement. In Rwanda blood transfusion services is exclusively received from voluntary non paid donors. Generally, voluntary unpaid blood donation dropped significantly across the region as a consequence of COVID-19. Most of blood donation in developed countries depends on unpaid donors, contrary to developing countries where family replacement donations (FRDs), is common. Conversely, 64percent of donors in Kenya are unpaid donors while 36 percent are FRDs (Moore et. al.2020).

In Homa Bay County, 99.5 percent of the donors are non-paid donors and only 0.5 percent walk in donors according to monthly summary reports (KHIS, 2019). Provision of safe blood to hospitals is the obligation of Kenya National Blood Transfusion Services. It coordinates several centers of transfusion six in number; located in Mombasa, Embu, Kisumu, Nakuru, Eldoret and Nairobi. It also oversees satellite centers in Nyeri, Garissa, Machakos, Thika, Lodwar, Bungoma, Meru, Kakamega, Kericho, Voi, Kisii, Kitale, Naivasha and Malindi.

Blood obtained from the regional blood transfusion center Kisumu or Kisii satellite center is not adequate to meet the demands of the nine transfusing facilities within the county. Blood campaign drives have been initiated to mitigate on the shortage. Young people remain a significant and favorable group of possible blood donors and emphasis should be made to recruit them. Therefore to enhance enrolment and retaining of adequate regular unpaid blood donors, understanding characteristics, motivators and barriers of donors is critical. The study aimed to assess blood donor characteristics among tertiary college students with the goal of improving the current blood donation program and promotion in Homa Bay County.

1.2 Problem Statement

Most of the countries worldwide more than 100 lack adequate blood supplies to meet medical needs. It is estimated that 272 million units ae required globally to meet demand. However, the total global demand in 2017 was approximately 303 million units - a shortfall of around 31 million blood units. Across the 119 countries with insufficient supply, the shortfall totaled more than 100 million units, which was equal to around 1,849 units per 100,000 people (The Lancet Haematology, 2019).

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Africa, needs 7,000,000 units of blood to meet blood demand in the region. Only 5.5 million donations are generated every year across Africa leaving a deficit of more than 1.5 million. (The Africa report 2021). WHO recommends collecting at least 10 units per 1000 population as the amount of blood required for blood transfusion needs in a country every year. Africa had a deficit of 3, 290, 289 blood units in 2020 in 38 countries (WHO, 2020).

In East Africa region the supply of blood is still low. In Tanzania, the blood demand is 550,000 units of blood annually but the country only collects 330,000 units of blood yearly which is equivalent to 60 percent (Citizen, 2022). In Uganda the country is supposed to collect 450,000 units of blood annually but only manages to collect 300,000 units. While in Rwanda, in 2021, the demand for blood was 105, 243 units of blood while 102,689 units were supplied.

Worldwide, 45% of donations are given by donors aged 25 to 44 years. Donors of the age groups 18 to 24 years contributed 25% of the total donations, clearly showing the low participation of youthful adults in blood donation (WHO, 2022). Most Kenyans are still not willing to donate with only less than 10 percent of adult Kenyans donating. Like many other countries in the region, KNBTS is struggling to supply adequate blood. In 2020, one million units was required, however, only 160,000 units (16%) was collected in the country. The COVID-19 pandemic put further strain as donors stayed away from blood drives in fear of contracting the virus (KNBTS, 2022).

Tertiary colleges denote great resources for blood collection agencies. Unfortunately, most of the tertiary college students do not tend to donate blood. According to the KNBTS, High school students contribute 60 percent of the blood collected by KNBTS while University and college students contribute 20 percent only.

1.3 Objectives

1.3.1 General Objectives

To assess determinants of blood donation among selected tertiary college students in Homa Bay County Kenya.

1.3.2 Specific Objectives

1. To establish socio-demographic characteristics of student blood donors at selected tertiary institutions in Homa Bay County Kenya.

2. To determine motivators to donate blood by students of selected tertiary institutions in Homa Bay County Kenya.

3. To identify barriers to donate blood by students of selected tertiary institutions in Homa Bay County Kenya.

1.4 Research Questions

1. What are the socio-demographic characteristics of student blood donors at selected tertiary institutions in Homa Bay County Kenya?

2. What are the motivators to donate blood by students of selected tertiary institutions in Homa Bay County Kenya?

3. What are the barriers to donate blood by students of selected tertiary institutions in Homa Bay County Kenya?

1.5 Justification of the Study

High utilization of blood and low number of blood donors is an important health issue thus, an important area for study. To meet a countries basic requirements, 1% of the population should donate according to WHO. However recent studies suggest this this figure is low.

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Most countries in the world are exposed to critical shortage due to inadequate supply of blood and high demand for it that is not met, 119 (61%) out of 195countries of the world lack enough in their banks to meet hospital needs (The Lancet Haematology, 2019). For example, the National Health Service in the United Kingdom, is explicitly saying the country needs more young people to give blood to maintain current supply levels. It further says 400 new donors – or 135,000 a year – must sign up to give blood to meet demand and replace those who can no longer donate (NHS, 2022). Additionally, republics, which include every country in central, eastern, and western sub-Saharan Africa, Oceania (not including Australasia), and south Asia, are missing roughly 102,359,632 units of blood, according to (WHO, 2022) goals.

Blood transfusions are a pillar of modern medicine that save millions of lives every year. But in low- and middle-income countries, many hospital patients do not have access to a timely and safe supply. Kenya has an estimated population of 47million, to claim sufficiency; 470,000 units of blood need to be collected annually. But in 2018/2019, only 164,000 units of blood were collected, much less than is required, as Kenyans are reluctant to donate (KNBTS, 2022).

Blood donors of younger age have the potential of longer donor careers and good health, consequently directing recruitment efforts toward them is strategic. Most blood donors in Kenya are students in high school and tertiary institutions aged between 16 and 25 years. According to (KNBTS, 2019), they constitute 80 percent of blood donors in Kenya.

Presently in the county, no studies have been undertaken on blood donors among college students. The county has the highest HIV prevalence (19.6%) (MOH, 2022) and very high maternal mortality ratio of 583per 100,000 live births (Onono et.al, 2019).

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Furthermore, the leading causes of maternal mortality are obstetric hemorrhage (31.4%) and HIV/AIDS (10.7%).

Tertiary institutions across Homa Bay County with healthy and youthful students are prospective sources for blood donation that can be recruited. They can help increase the low supply of blood and reduce morbidity and mortality attributed to lack of adequate blood. This valuable source of safe blood should be maximized by studying factors that inspire and discourage college students from donating blood. This can help the county establish effective strategies to inspire blood donors, retain them and significantly expand the existing donor pool.

Table0.1 : Blood Demand, Supply & Gap

No.	Region	Blood Demand	Blood Supply	Gap
1.	Global	303,000,000 units	272, 000,000 units	31, 000,000 units
2.	Africa	7,000,000 units	5,500,000 units	1,500,000 units
3.	East Africa	1, 105, 243 units	732, 689 units	372, 554 units
4.	Kenya	1,000,000 units	160,000 units	840,000 units

1.6 Scope of the Study

The study was carried out in Homa Bay County to assess blood donor characteristics among selected tertiary college students. A total of 424 participants were recruited between April 2021 and July 2021. Only socio-demographic characteristics, motivators to donate and barriers to donate were investigated.

1.7 Limitations of the Study

1. This study was confined only to four tertiary institutions in Homa Bay County.

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2. Participants' responses are reflection of, and confined to their personal experience.
3. Tertiary institutions were selected purposively; therefore the sample may not be representative of the population.
4. The researcher may introduce bias due to the interpretive nature of qualitative data.

1.8 Delimitations of the Study

1. Systemic sampling without a population list was used to sample students due to challenges of creating students master list at the individual tertiary institutions. Common classes for Certificate, Diploma and Degree programs depending on the institution was identified that all students must attend and sampling on spot done systematically as the students exited the classes randomly.
2. Selected tertiary Institutions had participated in blood campaign activities with the Kisumu regional blood bank. Therefore institutions which had not participated were excluded.
3. A descriptive cross-sectional study with mixed method (quantitative & qualitative) for triangulation purposes was adopted for the study.
4. Some participants did not know their blood type and the questionnaire were adjusted to capture unknown as an option.

1.9 Assumptions of the Study

1. Questions were answered truthfully by participants.
2. Participants had sincere interest to participate and not for any other reasons.

1.10 Operational Definition of Terms

Blood Donation: Voluntary process of giving blood to be used for transfusion.

Blood Donors: Persons who give blood to be given to others for transfusion.

Blood: Fluid tissue that supplies nutrients and oxygen to all body parts and flows through human veins and arteries.

National Blood Transfusion Services: The organization mandated to supply hospitals with safe blood within a country.

Retention: Helping donors to remain active to avoid lapsing and eventually becoming inactive.

Screening: Laboratory testing for blood borne infections such as Syphilis and HIV prior to transfusion.

Transfusion: Transfer of a volume of blood initially taken from a healthy person to another. **Voluntary Non Remunerated Blood Donors:** Individuals who freely give blood without coercion or incentive.

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CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This section highlights blood donation situation and trends with regard to socio-demographics, motivators, barriers and perceptions of blood donation Globally, Africa, East Africa and within the country. Globally, several key resolutions have been adopted through the world health assembly (WHA) since 1975, to guarantee accessibility and wellbeing of blood. In the recent past, the assembly has also emphasized on global need for blood availability and safety to achieve the millennium development goals (WHO, 2020). Other significant resolutions adopted include; launch of World Blood Donor Day in 2005; and pronouncement on 100% voluntary non- paid donation of blood and blood components in Melbourne June 2009. These resolutions have become important strategic direction for ensuring safe, secure and sufficient supply of blood. Despite these resolutions, adequacy is a challenge in many countries or regions. The global need was 304 711 244 pints in 2017 while the global supply was 272 270 243 pints (Roberts et.al, 2019).

2.1 Global Situation

In any health unit, provision of blood in addition to other blood components is vital in saving life. Worldwide, most countries are still struggling with inadequacy of blood. This is attributed to insufficient donors, increasing demand including weak donor recruitment strategies leading to inadequate supply and chronic blood shortages (WHO, 2020).

Blood donation rates vary across WHO regions, with Africa having the least donation rate of 0.2 to 39.7 (median 5.7) while Europe has the highest of 3.9 to 57.8 (median 33.6). Identifying and retaining sufficient blood donors is still difficult for most blood

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collection agencies worldwide. Developed countries are struggling with high number of aged donor population, donor deferral, increased utilization and difficulty retaining young donors (WHO, 2020).

Diverse types of fear have also been distinguished in various studies that act as barrier to blood donation. Fear of the needle and pain are examples. In America, according to (Klinkenberg et.al, 2018),African American first time donors are significantly more afraid of needles and that donating blood is painful compared to white first time donors. Fainting is also frequently mentioned and Klinkenberg et.al, 2018 further established that white individuals have a higher prevalence of fear of fainting compared to African Americans. Never the less, fear of fainting is still a major barrier for African Americans non donors. Fear for hospital and contracting disease are also donation barrier. Fear of contracting disease has been mention by African Americans and should be considered when planning for recruitment. Concerning ethnic minority groups, despite increasing in numbers in many countries they are significantly underrepresented in the blood donor population.

In the recent past, literature has increased worldwide describing socio-demographic characteristics of blood donors. Many countries have embarked on the process of changing the profile of blood donor from remunerated to non- remunerated. Numerous studies have been conducted targeting age, gender, income, education, and ethnicity as inclusion strategies towards specific groups to increase understanding of donor profiles. According to report on availability of blood globally and safety (GDBS) data 2021, worldwide, 45% of donations were given by donors aged 25 to 44 years. Donors of the age groups 45 to 64 years and 18 to 24 years contributed 24% and 25% of the total donations, respectively. Of the total donations, 4% were given by donors in the group

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aged 65 years and over, and 3% were given by donors aged younger than 18 years. This is a clear gap in terms of involvement of youthful donors.

Studies comparing donors to the general population have been done however; donor demographic studies have not determined a clear picture of the typical donor. Regarding age of the donors, preceding studies have found blood donor populations either to be younger or older compared to the general population (Klinkenberg et.al, 2018). Similar divergent concerns the donor sex composition. A number of studies report men to have higher donor prevalence than women (Moore et.al, 2020), however, a study in United Kingdom reported that 55% of their donors were women. According to WHO, 2021 report on blood donor profile, 33% of the total blood donated is from women. Generally, men tend to donate more compared to women. This is a gap that need to be bridged with blood availability and sustainability in mind.

Studies further show individuals with better socioeconomic status, whether measured by education or personal income, are more likely to be blood donors than individuals with lower status, although (Moore et. al.2020) reported a lower prevalence of donors with higher education. In their study (Klinkenberg et.al, 2018) found that African American migrants and refugees with moderate knowledge on blood donation had a times higher odds of donating initially compared to those with poor knowledge. Those with higher level of knowledge on the other hand, the odds were greater compared with those with poor knowledge. Regarding limited awareness, for both African American donors and African American non-donors, lack of information where donation is done (23.9%) both donors and none donors and not knowing that donating blood is important (23.1% donors; 21.8 non-donors) were important self-reported barriers. Other evidence show African Americans within the general population more often did not know where to

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donate compared to white individuals. Lack of information on blood donation activities is a gap in many countries by most blood collection agencies.

Attitude also has a critical role towards blood donation especially negative attitude. African American first time donors are likely to report experiencing bad treatment and poor staff skill compared with white first time donors. Mistrust is also another critical barrier towards blood donation. Whites (White men 29%, White women 19%) are less worried that hospitals want to know more about their personal affairs compared to African Americans (Men 48%, women 37%) and that harmful experiments had been conducted on clients uninformed (AA men 72%, AA women 50%, White men 29%, White women 28%).

Regarding doubting National blood Supply Agencies, White individuals had less issue about the safety of blood donation compared to African Americans who believed that not all blood donation were tested for acquired immunodeficiency syndrome(AIDS) and were able to get AIDS from donating blood(43.1% AAs; 15.9% White). African Americans were more doubtful towards claims of blood shortage and were more likely to believe that their blood was not wanted and could not be used.

Identification and ethnic discrimination; Personal perceived discrimination is also negatively associated with donating blood. Individuals who feel discriminated against believe that the general population does not want their blood. Other studies show that discrimination outside the blood donation setting has a negative impact on African American towards blood donation. These studies show that even discrimination within health care settings Sub Saharan Africans felt treated worse than others by health care personnel. Furthermore, several studies indicate that Sub Saharan African Americans would prefer to donate within their own community or rather for family members and

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close friends. In addition, due to discrimination and social exclusion, these groups preferred to donate blood for their friends and family rather than for the overall population (Klinkenberg et.al, 2018).

Since lowering the thresh hold of blood donation age, the USA blood collection industry has become increasingly reliant on young donor. Donors aged 16 to 24 years provided 19.3% of allogenic collections. High school aged donors 16 to 18 alone are responsible for 10.5% of collections. In terms of education, USA and Canadian donors tend to have above average education. In terms of occupation if unemployment rates persist in some European countries among young people leading to a lost generation of employees, blood collection agencies may lose collections from young donors who would have otherwise donated at work place blood drives (National Blood Collection and Utilization Survey Report, 2019). Blood type is also key, in the USA 15% of the general population is rhesus negative but in Europe the frequency is higher especially in Spain and France. This may necessitate targeted blood campaign to preserve Rhesus negative blood. The United States blood supply is mostly dependent on volunteer donors and only 5 percent out of 60 percent of the eligible population donates blood (National Blood Collection and Utilization Survey Report, 2019).

Klinkenberg et.al, 2018, further states that older people will be the majority and census data predicts they will be individuals aged 65 years and above, leading to increased blood transfusion cases since a larger proportion of the population will be at risk of malignant cases, and other conditions requiring blood transfusion. The US has been importing blood from Europe to meet its demand through the New York Blood Center as early as the mid-70s. Data reviewed for the period 1975 to 1980s shows that blood supply increased to meet the demand when imports from Europe were added. Unfortunately, things changed during the AIDS crisis with reduced volunteer donation,

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higher blood utilization, increased autologous donation and designated blood donation. He further recommends focusing recruitment efforts towards youthful blood donors since they are physically healthy with longer donor careers. Regrettably, youthful donors are few in US.

A similar scenario exists in the UK; within the National Health Service, demand for blood is predicted to increase by 29 percent among the aging population between 2004 and 2029 (UK Census, 2019). It therefore implies a reduction of the eligible population to donate and increased demand for blood by the elderly population than the younger population. In Japan, blood donors have also decreased by 15percent because of the aging population (UK Census and National Health Service data, 2019). Despite concerted efforts to motivate blood donors in Canada, only 3 percent to 4 percent of the total population is donating. Due to the aging population, new innovative medical procedures and deferral of donors, blood shortage in the future is inevitable. The problem is similar across developed countries (Canadian Blood Services, 2019).

In Eastern Europe, above 1.3 million people in Russia donated blood in 2019. Russia's Federal Medical Biology Agency (RFMGA, 2020) promote voluntary blood donation as a healthy life styles since all whole want to donate blood must undergo a comprehensive medical examination and 99.6% of the donors are voluntary non –paid donors. As most countries struggled with drastic shortages during the COVID-19 pandemic, Russia managed well since the blood donation rate dropped only by 0.7%. The country's transfusion system started way back in 1832 when an obstetrician transfused blood to a woman in labour from the husband and salvaged the life of the woman. The country also marks 20th April as a National Blood Donor Day alongside 14TH June.

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In Norway, WHO statistics show the country has less donors in comparison to other countries especially in the same category like Finland and Sweden. In January 2016, the country had a population of 5, 213,985 and averagely recruits 100,000 donors annually. It therefore means the country has 19.18 donors per 1000 population the second lowest in Europe. Compared to Finland and Sweden which have 25 and 30 donors respectively per 1000 population donation rate Norway is lagging behind it peers. A cross in Denmark, there are 48 donors per 1000 population while the average for Europe is 31.5%. 50% of the blood donated is by repeat donors (Stegane, 2020).

A third of the world's population is found in South Asia which is more than 1.7 billion. The region has one of the most populace country India with a population of about 1.2 billion alongside other smaller countries like Bhutan with a population of 0.7 million. Most of countries in south Asia fall under South East Asia Regional Office (SEARO). The region has eleven countries namely; DPR Korea, Thailand, Nepal, Myanmar, Timor-Leste, Maldives, India, Bhutan, Indonesia, Sri-Lanka and Bangladesh. Total blood need for this region is 16 million units, however, about 10 million blood units are usually collected giving a deficit of 6 million(38%) which is very high.

Bhutan has a total population of about 709,000 and a land mass of 38, 394 sq. km. and buffered between China and India. The country has 27 blood banks which collect about 8028 pints of blood of which 3686 (46%) is from voluntary non-remunerated donors while 4342 (54%) is from family replacement donors. Other major challenges affecting blood donation in the country is harsh terrain and most of the donation more than 50% is from relatives. In Bangladesh, yearly collection should be 15,000,000 however, total collection per year is only 4, 000,000 with a total population of 158,570, 600. 60% of the donations come from Family replacement donors, 31% comes from voluntary non remunerated donors and 9% from paid donors (PAHO, 2019).

India has the largest blood transfusion services in the South Asia area. According to norm 1% blood donation by population the country is supposed to collect 12 million units of whole blood but instead only 8 million is collected every year leaving a deficit of 4 million units. Blood shortage continuous to be a major public health problem in India. Approximately 12,000 people lose their lives every single day due to lack of blood and its products. The current blood transfusion service is fragmented with almost 3,700 blood centers only which 70% are located in eight states and two blood center. Limited space and increasing population has led to establishment of health care facilities without blood centers in their premises, which depend on nearby centers for blood. Regrettably, India has one of the greatest shortages of blood supplies worldwide in the wake of increasing diseases requiring blood transfusion (WHO, 2020).

The Covid -19 Pandemic also increased the shortage attributed to the reduction in transport and social distancing rules which limited the availability of voluntary non-paid donors. The national blood transfusion council has tried to ensure safety during donation by releasing guidelines for safe blood donation, but worries and stigma among donors regarding the possibility of getting infected has led to cancellation of outdoor blood donation drives which has continued to worsen the situation. Recent studies also show the shortage of blood to be around 2.5 donations per 1000 eligible donors which is approximately shortage of 1 million units. The blood is needed majorly for surgery cases and anemia cases. The major sources of blood in India is a combination of voluntary non-paid donors and replacement donors. At present, the source of donated blood is a combination of voluntary donors and replacement donors. Despite the fact that commercial donors are forbidden in India, the still persist in the guise of family donors. Only 80% of the donors constitute voluntary non-paid donors, who donate

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based on altruism and to support community. In Nepal, averagely 2, 100,215 units of whole blood are collected annually and 85% of donors are voluntary.

Pakistan is home to 187, 343,000 million people. 1.6 million Units of blood is collected annually. Blood transfusion services are not nationally coordinated and proper regulatory mechanisms are not available. Family replacement donors are the majority at 90% while 10% are paid donors. Sensitive tests are required for screening blood due to high disease burden among blood donors and transfusion services in Pakistan are mostly hospital based. The country has nearly 150 public and 450 private blood banks which are mostly unregistered and unregulated contributing to alarming proportions of substandard and unscreened blood. Poor education of education and awareness about the need for safe blood in the community, importance of voluntary unpaid blood transfusion and high prevalence of Hepatitis B, C, HIV/AIDS, anemia and lack of blood donor retention strategy and requirements are the major factors responsible for low blood collection (THE NEWS, 2019).

Timor-Leste a newly born nation with a land mass of 14,874 sq.km with a population of 1, 178.000, only 20% of the donations come from voluntary non-remunerated blood donors and the rest is collected from relative donors. Sri Lanka is an island nation with a population of more than 21, 284,000 and a land mass of 64,630 sq. km. Its blood transfusion services is one of the best in the South Asia which is nationally coordinated and managed by the government. It collects about 330,000 units per year. 86% of the blood donated is from voluntary non-paid donors. Analysis of the above information clearly shows that voluntary blood donation is high in Sri Lanka (86%) and Nepal (85%). Pakistan (90%) and Timor-Leste (80%) on the other hand, has high dependence of family replacement donors.

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Most agencies including WHO and International Red Cross Crescent Society (IRCS) discourage paid donors. However, in Pakistan and Bangladesh paid donors exist officially and about 10% of their blood is collected from paid donors. About 66% of blood in this region is collected from voluntary non paid donors and repeat voluntary donors are still less in number. In totality, this region requires 17 million units of whole blood and there is a deficit of 6.5 million units every year.

In South East Asia region, the total blood need is 16 million units, however, about 10 million blood units are usually collected giving a deficit of 6 million(38%) which is very high. China is a significant contributor of blood in this region. It has an increasing aging population which is leading to high blood demand for clinical use. In the year 2020, the country collected 15.53 million units of blood regardless of the impact of COVID-19 pandemic (China's National Health Commission, 2020).In the past, paid donation has caused significant issues on public health and fear to donate among potential donors. The country's blood donation system has steadily shifted from paid blood donation to mandatory and non –remunerated donation and eventually to the fully voluntary donation in 2011. According to the (National Health Commission of China, 2018), un-paid blood donation rate has increased from 4.8% in 1998 to 11% in 2017 and just achieving the goal of 10-20% voluntary blood donation rate set by the World Health Organization 2020.

In North East Asia, comprising of Japan, Hong Kong, Mongolia, Korea and Taiwan., Taiwan has one of the best blood transfusion services. It has a blood transfusion rate of 78.9 donations per 1000 people and all the blood collected is 100% form voluntary unpaid donors for clinical use. The median blood donation rate of the country is twice the median rate in high –income countries. Annually the country collects about 1, 834, 521 units. Most of the blood collected 99.08 percent undergo blood plasma fractionation

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for the production of various blood products such as red blood cells, platelets, and plasma which is higher than in high income countries which the rate is 91% in middle income countries, 72% in middle income countries and 31% in low income countries. Generally, World Health Organization (WHO) recommends screening blood for HIV, hepatitis B, hepatitis C and Syphilis prior to use. Taiwan has gone a step further and added three more tests which include; alanine aminotransferase (ALT or SGPT, a liver test), Human T cell lymphotropic virus type I and II and alloantibodies.

In South Korea, blood issues are managed by the ministry of health and welfare (MOHW) and the ministry of food and drug safety (MFDS). The Ministry of health and welfare is responsible for safe distributions of blood and policy formulation while MDDS is responsible for work related to plasma derivatives. The division of Blood Safety Surveillance is affiliated to MOHW and is in charge of National Institute of Organ, Tissue and Blood Management. The Red Cross is in charge of 15 regional blood centers country wide, three laboratories for screening of transfusion transmissible infections, a blood transfusion research institute and a plasma fractionating center. The rest of the facilities in the country are supplied by non-Red Cross center (Hanmaeum) plus 53 hospital blood centers which serve the respective facilities (MOHW, 2019)

Most of the blood donated is received by the Red Cross (94%) and the remaining 6% is received by non- Red Cross blood centers. In 2020, the blood donation for the whole country was 5.04% which is slightly higher than the rate of 3. 15% in high income countries. Recent decline in blood donation rates have been attributed to COVID-19 infection. The country has managed to collect 2, 611, 401 units in 2020 from 49.9% registered donors. Youth and teens donate the most at 65%, adults in their 30s and 40s contribute 38% while the old in their 50s and 60s contribute 7%. The country is therefore

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supporting the middle age group in terms of policies to promote blood donation. The country collects whole blood in two volumes, 320 ml and 400 ml.

In Latin America and Caribbean, there has been a drop in blood collection in 2020 by 20% compared to 2017 when 36 countries reported. More than 8.2 million units of blood was collected and 48% came from voluntary donors which represent an increase of 2% compared to 2017. Only four countries collected 74% of the total blood collected in the region while the remaining was collected by 30 countries. 14 countries managed to surpass the regional average (48%) of voluntary donation and nine countries did not reach 10% of voluntary donation (WHO, 2020). As mentioned earlier, unpaid voluntary blood donors reach 48% of the regional blood donation.

The role of governance is critical with regard to provision and access to safe blood and components for transfusion and the participation of community through voluntary unpaid donors. The WHO recommended coordination of blood transfusion services centrally by the national governments through an effective and well organized blood supply network. In addition, the national blood systems should be governed by the national blood policies and legislative framework of the respective countries the will enable the uniform implementation of standards and consistent quality and safe blood and blood products.

As mentioned earlier, unpaid voluntary blood donors reach 48% of the regional blood donation. The countries that exceed the average for the region include; Costa Rica, Cuba, Ecuador, Nicaragua, Brazil, Guyana, Venezuela, Cayman Islands, Turks and Caicos Islands, Suriname, Argentina, Colombia, Bermuda and Uruguay. With regard to age and sex of the blood donors, women contributed 50.35% of the blood donated. The age group of 24 to 44 years old donated 49.68% of the total blood donated while donors

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under 24 years contributed 25.02%. 20.23% was accounted for by the age group 45-64. The age group 65 and above was the least represented with 1.86% of the donors. The impact of the COVID-19 Pandemic also had significant effect on blood donation in the region. The collections of 2020 in comparison to 2019 indicate 17 countries reduced the numbers of units collected with the greatest reduction observed in El Salvador, Honduras, Peru, Guatemala, Mexico, Ecuador and Bolivia. However, in the Caribbean's, the impact was not significant (PAHO, 2020).

In Cuba, 414, 500 blood donations were made in 2016, the second highest figure in a span of ten years attributed to volunteer donors. The health authority confirms that for consecutive 50 months from November 2012 to December 2016 the country has been able to achieve it targets through voluntary blood donors. The 415,500, donations however did not surpass the 2015 figure of 416,900 and 350, 000 blood components (red blood cells, plasma platelets) made for transfusion. In 2014, the country collected 407,989 units of blood. The countries blood supply is from 100% voluntary blood donation and 50% of the donors are repeat voluntary donors. It country also has an estimated 6.5 million citizen aged between 18 and 65 years old who are fit to donate blood and 5% of them donate blood every year (HAVANA TIMES, 2019)

In Ecuador, only 1.4% of the population donate blood and the Red Cross plays a critical role in collection and supply of safe blood in the country. It is responsible for communication and creating awareness among the community and supplies 92% of the public health facilities with blood. 97% of the countries blood supply is from voluntary blood donors. The COVID-19 pandemic has also affected the country's supply drastically. The collection fell by 78% in April 2020 from 18000 donors per month to 4,420. Nevertheless, the Red Cross has done tremendous work in creating awareness and encouraging the community to use homes services through mobile units and also

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collecting donors from their homes to the donation centers for those who prefer the centers. The efforts yielded returns and the donations grew by 200% in June 2020 from 4,420 to 13, 384 blood donors. The country need to raise the donation rate to 2% to meet its countries needs for surgeries, child birth, cancer treatments trauma among other requirements (IFRC, 2020).

According to National Institute of Health in Colombia, only 220,000 citizens donate blood in the country. The country has 81 blood banks across the country that support treatment of leukemia, anemia, surgery, cancer among other diseases. 2,400 transfusions are made on a daily basis and the demand is still rising. In 2019, the country collected 830,000 units of blood. Majority of the donors were men donating 52.6% of the blood while women donated 47.4 of the blood. Out of the total collections, 22.1% were repeat donors (donating at least twice a year) and 77.9% were first time donors (donating for the first time). In Colombia, apart from screening for HIV, Hepatitis B & C and syphilis, they also screen for Chagas disease and Human T-Lymphotropic Virus (HTLV).

The Middle Eastern countries, majority in the region face challenges in making sufficient blood available while also ensuring its quality and safety, especially during humanitarian emergencies and conflicts. Greater than 90 percent and of the blood is collected from voluntary, unpaid donors, aged from 18 to 44, with an increasing proportion of repeat donors. What is more, blood demand is unpredictable and even differs with each blood type. Other report shows wide variations in annual blood-donation rates among countries, ranging from 0.7 per 1,000 population in Yemen to 29 per 1,000 population in Lebanon. (Arab News, 2019).

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In 2020 the country collected 342,460 of which frequent donors contributed 82.5% while 17.5% were first time donors. 2. 51% of the total contribution was donated by women (Sharma et, al. 2016). The median donation rate of the country is 15 donations per 1000 people which is equivalent to that of upper middle –income countries. Furthermore, blood is donated mostly by voluntary non paid donors constituting 59.98% while family replacement donors constitute 36%. Non- Saudi citizens contribute 27.19% of the total donations. With regard to the fragmented nature of the blood transfusion system, the country is still struggling with many issues including; lack of data on blood donor demographics (age, marital status, donation frequency) which limits ability to characterize donors, inadequate reporting on blood banks on shortages or overstocks which can help reduce wastages among others.

2.2 Regional Blood Donation (Africa)

According to (WHO,2022) out of 39 members states participating in blood availability, safety and quality survey, sixteen had more than 80% of voluntary non-remunerated blood donation (VNRBD), and nineteen had less than 50% of VNRBD. Central Africa and West Africa sub regions represent 2.8% of paid donation and reported in Democratic republic of Congo, Cameroon and Nigeria. The blood donation rate has slightly increased after the COVID-19 pandemic 5.9/1000 compared to before the pandemic when it was 4.9/1000. On the other hand, the proportion of VNRBD and family replacement donations (FRD) was 71.0% and 27.3% before the pandemic compared to 66.5% and 32.7% after the pandemic. The report further indicates that the region discarded 344,724 units representing 10.3% of the total blood donated. Major reason for discarding were transfusion transmissible infections in the blood units and processing problems (1.6%).

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Other factors highlighted contributing to lack of blood donors is due to inappropriate infrastructure for provision of blood services, harsh terrain that hinder access to donation sites, inadequate funding for blood campaign activities, poor communication network ,misperception about blood, cultural influence knowledge gap, and high transfusion transmissible infections(Mohammed et.al, 2018). Subsequently, developing countries have a very low blood donation rate compared to developed countries (WHO, 2021).

The major challenge for most African countries is the difficulty to establish efficient transfusion services through unpaid donors. The continent has low supply of blood compared to demand coupled with high population and poverty index (Moore et.al, 2020). The limited supply has led to high mortality rates associated with anemia and hemorrhage. It is therefore important to come up with appropriate strategies to meet the transfusion needs that will subsequently reduce maternal mortality, child mortality and also reduce the burden of HIV/AIDS and Malaria in line with millennium development goals.

WHO recommends harvesting at least 10 units per 1000 population as the amount of blood required for blood transfusion needs in a country every year. The regions had a deficit of 3, 290, 289 blood units in 2020 in the 38 countries. Over dependency on donor funding to run national blood transfusion agencies is also a problem. In Lesotho, lack of donor funding for donation campaigns following end of CDC/PEPFAR project and staff shortage have significantly affected availability of adequate blood between 2018 and 2020. Definitely, Limited number of blood donor recruiters, counsellors and nurses obviously affect performance of blood donation agencies. Furthermore, certain policies also do not favour blood donation activities. In Lesotho, the ministry of education no longer allows blood donor recruitment and collection at secondary schools

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where a significant amount of blood units were usually collected. Generally, within the region family replacement donation, and paid donors are still the predominant mainly in remote rural areas where the cultural beliefs against blood donation are still very strong.

To meet blood requirements, demographic information about blood donors is critical. More young people donate blood in low-and middle income countries compared to high-income countries. GDBS data 2016, further shows that 42%, 33%, and 28% of blood donations were given by donors aged below 24 years in low- income countries, lower-middle-income countries, and upper-middle income countries respectively. High-income countries gave 21%.According to (CDC, 2018) most blood donors were men 65% in 2014 and 86% in 2016.Female donors aged 20 years-24 years also increased tremendously from 4,424 in 2014 to 146,571 in 2016.

In South Africa, tremendous effort has been made by the South African National Blood Services (SANBS) to increase donations from black South Africans from 43269 in 2005 to 246686 in 2015. In 2018 less than 1 percent of south Africans donated blood despite the increase in the black donor pool. According to SANBS, to increase the current group of donors, efforts should be made to increase regular donors and also increase first time donors.

Global Database for Blood Safety (GDBS) report 2021 indicates that Egypt has a low blood donation rate ranging between 10 to 19.9 per 1000 people. The absence of a blood donation mentality in Egypt has led to chronic shortage of blood supply. Structural failures in policies organizing blood donation and transfusion have also contributed to the shortage. To meet the countries basic need, 2 percent to 3 percent of the population is required to donate yet only 1 percent of the total population donates.

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In Ethiopia, annually the National Blood Bank collects 200,000 units of blood from donors which is equal to 200,000 pints/94,000 liters. To sustain the demand of blood, the country requires 18,000 units of blood (18,000 pints/8,460 liters) daily, however, the blood bank collects on average 1,100 units (1,100 pints/517 liters) a shortfall of 16,900 pints/7943 liters. 60% of blood collected in the country is from schools and the community. The country is still struggling with lack of voluntary blood donors, access to blood donation centers is limited within the communities and low participation of blood donors as part of its challenges.

The country has been struggling with gross inadequacy and inequity in access to blood. Annually, the country requires between 80,000 and 120,000 units, but only collects 43%. Blood collected from voluntary non paid donors and the annual blood collection rate is extremely low. Only 22% of blood is donated by voluntary non-paid donors. The country is listed among countries that have few number of voluntary non paid donors (Group C, countries with less than 50% voluntary non-paid donors).

West Africa harbors 30% of Africa’s population and is composed of 16 countries namely; Cape Verde, Guinea Bissau, Mali, Mauritania, Niger, Guinea Conakry, Ghana, Gambia, Senegal, Nigeria, Sierra Leone, Cote d’Ivoire, Benin, Burkina Faso, Liberia and Togo. In the year 2020, during the COVID-19 Pandemic, none of the West African countries reached the WHO bench mark of 10 whole blood collections per 1000 inhabitants. Only Gambia, Benin, and Togo had close figures near to WHO recommendations as follows 7.2, 6.6 and 5.9 respectively. Thirteen out of the sixteen West African countries have developed national blood policies however, implementation has been a challenge attributed to inadequate funding, lack of political will and open mindedness to innovative ideas of safe blood donor recruitment

(Okoroiwu et.al, 2021). High Proportion of voluntary unpaid blood donation was only managed in Cape Verde, Senegal and Benin.

In Nigeria, annually the country needs 15 million units of blood, but only about 1 percent of the population is turning out to donate translating to 500,000 units of blood. Local and international agencies have also expressed concern regarding low number of donors and increasing number of paid donors, commonly recognized as "blood touts"(Mohammed et.al, 2018). Out of 38 percent of eligible population, only 3 percent donates blood annually. The situation is similar in Ghana. Annually, the country is expected to collect 250,000 units of blood, however, in 2016 only 160,624 units were collected and unpaid donors are still very few. Most of the sources of blood is via family replacement and commercial remunerated donors. Transfusion Transmissible Infections (TTIs) in donated blood in the region is high ranging from 0.1 to 6.7 for HIV, 0 to 4.9 for Hepatitis C virus, 0.02 to 4.2 for syphilis and 1.6 to 16.6 for Hepatitis B virus. In Nigeria, 14.96% of donors are infected with one of the four major transfusion transmissible infections. The Transfusion Transmissible Infections were 4.2%, 4.1%, 3.1% and 3.6% for HIV, HBV HCV and syphilis respectively. On the other hand, in Burkina Faso, studies have shown Transfusion Transmissible Infections prevalence of 1.8%, 13.4%, 6.3% and 2.1% for HIV, HBV, HCV, and syphilis, respectively. In Senegal, HIV has a prevalence of 3.5 per 100,000 donations, 102.45 per 100,000 donations for Hepatitis B virus (HBV) and 138 per 100,000 donations for HCV.

2.3 East Africa

In East Africa, Uganda has an estimated population of 46 million but collects way below what is required. The country is supposed to collect 450,000 units of blood annually but only manages to collect 300,000 units. Disheartening traditional and religious beliefs about blood donation and lack of information have been a major

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hindrance to donation of blood. Some people also view donation as a taboo and associate it with human sacrifice. The challenge of transfusion transmissible infections especially HIV has been a problem and people shy from donating fearing that tests taken on people before they donate blood can reveal they are HIV positive. Others also believe that if they donate blood their blood supply will dwindle and lead them to death. The issue of selling blood has also significantly contributed to low donation rates with many people not donating because the blood will be sold yet it is freely donated. Supplies of blood donor kits and testing reagents have also contributed to low donation rates in Uganda.

In Tanzania, the blood demand is 550,000 units of blood annually but the country only collects 330,000 units of blood yearly which is equivalent to 60 percent (Citizen, 2022). Despite the highest population and highest blood demand in East Africa Tanzania still has the lowest collection rate compared to neibouring countries of Kenya and Uganda i.e. Tanzania (3.6), Kenya (4.1) and Uganda (6.3) (Shabani et, al, 2020). In 2017, the Tanzania National Blood Transfusion Services (NBTS) reported only meeting 36% of the blood need in the country. Main source of blood is from voluntary non paid blood donors (79%) and the remaining 21% comes from family replacement.

In Rwanda blood transfusion services started way back in 1975 and from 1985 they have been exclusively receiving blood from voluntary non paid donors. Annually, between 45000, and 50,000 people donate blood in Rwanda and 12 units of blood are consumed every hour. Most of the blood is consumed by pregnant mothers with severe anemia, malaria patients, mothers with birth complications, accident victims and cancer patients.

Unfortunately during the 1994 genocide the health infrastructure system was devastated but the government has made tremendous effort in rebuilding the blood transfusion services which is critical for a sound health system. Strict measures have been put in place country wide to improve safety and availability of blood which has consequently led to significant reduction in child mortality and maternal mortality.

The country's terrain especially the rural and remote areas is a major challenge in providing blood to those in need. The terrain includes impassible mountains and damaged roads. To overcome the challenge Rwanda is using a drone technology called Zipline which reduces delivery time for blood from four hours to only 15 minutes in some instances (WHO, 2019).Generally, voluntary unpaid blood donation dropped significantly across the region as a consequence of COVID-19, on the contrary Rwanda has seen experienced increase in blood supply in 2021 compared to previous years. Despite the limited mobility due to restricted movement among other challenges blood donors in Rwanda continued to donate blood and other blood products for patients in need.

For example, in 2020, there was demand for 100,935 units of blood, and 93,993 units were supplied which amounted to 93.12 percent. In 2021, the demand for blood was 105, 243 units of blood while 102,689 units were supplied amounting to 97.57 percent satisfaction in 78 hospitals. Nonetheless, it does not mean the remaining satisfaction percentage on supply was not met, but rather that a patient received the blood component units on the following day or recovered without additional blood.

2.4 Blood Donation in Kenya

The enthusiasm of a population to give blood determines donation rate of a country. To achieve universal access, more emphasis should be made on recruitment of more

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donors. Kenya has an estimated population of 40million, to claim sufficiency; 400,000 units of blood need to be collected annually. In 2018, only 149,642 units were collected way below the target of 182,000 set by (KNBTS, 2018).

Most Kenyans are still not willing to donate with only less than 10 percent of adult Kenyans donating. Like many other countries in the region, KNBTS is struggling to supply adequate blood. Their statics show that blood is mainly donated by secondary school students, college and university students and 80 percent of the donors aged between 16 and 25 years. Previous studies show that 64% of the donation was voluntary and majority were less than 25 years while the rest family replacement donors. They further determined that most of the Kenyan donors were well educated young male.

According to KNBTS, barriers to donate blood include; dying in the process of donation, fear of knowing ones HIV status, low blood levels, blood might be used for witchcraft, blood borne infections and saving blood for family members.

2.5 Blood Donation in Homa Bay County

Despite collecting blood from the regional blood transfusion center Kisumu and Kisii satellite center, the county is still struggling with inadequate supply. This has necessitated initiation of blood campaign drives to complement what is collected from Kisumu and Kisii. Most of the times the blood drives are done by volunteers aged between 16-20 in schools, colleges and universities around the county but due to COVID- 19 there has been low turnout. This blood is transported to Kisumu for screening, grouping of donors, sorting pints and processing of components.

In the financial year 2014/ 2015 the Department of Health Services recognized the need to set up a satellite blood center in Homa Bay County and approached the KNBTS. This was after experiencing acute shortage of blood in the County. In 2014 the hospitals

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demand was 3421 units while the supply from RBTC Kisumu was only 274 units and in 2018 the demand was 4811 units while the supply from RBTC was 183 blood units (Assembly report, 2020). In the year 2019 a new building was constructed and handed over for blood banking activities; this led into separation of blood banking activities and general clinical lab activities. This was then followed by gazzetment of the facility by the Kenya National Blood Transfusion Services (KNBTS) into a county satellite blood bank.

The satellite serves up to 18 transfusing facilities within the county namely; Homabay County Referral Hospital, South Sub-County Hospital, Rachuonyo North Sub-County Hospital, South Sub-County Hospital, Suba North Sub-County Hospital, Ndhiwa Sub-county hospital, Ogongo Sub-county hospital, Kandiege Sub-county hospital, Matata Nursing Home, Kendu Adventist Hospital, St. Paul's Hospital, St. Lawrence Hospital, Osani community hospital, Asumbi Mission Hospital & Termary Hospital Homabay. The collected units can also be shared with other transfusing facilities outside the county as need and request may arise. The average yearly consumption for the county is 5,600 units of blood. This demand has not been achieved since the establishment of the satellite. The highest collection was 2,421 blood units in the year 2021. The table 2 below shows the high demand against low supply between Sep-Dec 2021at the Homa Bay County Teaching and referral Hospital (HBCTRH).

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Table 0.1: Blood Demand & Supply (HBCTRH)-2021

		Paediatric	Medical	Ob/Gyne	Surgical Ward	Total
30-Sep-21	Demand	37	52	24	12	125
	Supply	35	44	14	9	102
	% Supply Rate	95.59%	85%	58.33%	75..00%	81.60%
31-Oct-21	Demand	55	97	108	44	304
	Supply	47	79	52	20	198
	% Supply Rate	85.45%	81.44%	48%	45.45%	65.13%
30-Nov-21	Demand	67	77	114	28	286
	Supply	44	61	67	15	187
	% Supply Rate	65.70%	79.20%	58.80%	53.60%	65.40%
31-Dec-21	Demand	90	71	141	52	354
	Supply	62	59	49	26	196
	% Supply Rate	68.89%	83.10%	34.75%	50.00%	55.37%

The gap above has led to crisis and even loss of lives. For example the leading causes of maternal mortality are obstetric hemorrhage (31.4%) followed by HIV/AIDS at (10.7%) (Athmani et.al, 2021). The county has very high maternal mortality ratio of 583per 100,000 live births (Onono et.al, 2019). It has also resulted into improper distribution of blood units making patients to travel long distances to get blood transfusion services.

Several factors influence blood donation rate and for Homa bay county the following factors can negatively influence blood donation among the population. The county has the highest HIV prevalence (19.6%) in the country (MOH, 2020).

Transfusion transmissible Infections is also another threat to availability of blood. Globally, 1.6 million units of blood are destroyed annually due to transfusion transmissible infections with 10% being discarded in Africa. In Kenya, huge amount of

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blood is 5.26% is still discarded annually owing to TTIs seropositivity. 2% risk of transfusion-transmitted HIV was reported in 2018 (Onyango et.al, 2018). Furthermore, Kenya National blood transfusion services (KNBTS) has reported discarding HIV, HBV, HCV and Syphilis seropositive blood estimated at 2.6, 3.9, 2.2, and 0.5% respectively in western region covering Kisumu, Siaya and Homabay counties. At the county level, the KNBTS has reported discarding HIV, HBV, HBC & Syphilis seropositive blood at 2.2, 3.8, 3.5 & 1.9 respectively (KNBTS, 2018).

The Homa Bay County Teaching and referral Hospital is the largest consumer of blood. Data analyzed from the hospital of donated and screened blood show an increasing positivity rate of transfusion transmissible infections in the year 2021. This continues to compound the problem of blood scarcity.

Table 0.2 : TTI Positivity (HBCTRH)-2021

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
HIV	3	5	9	10	8	6	13	18	37	25	2	13
HBV	4	8	3	7	9	10	12	11	17	12	22	13
HCV	3	3	2	1	1	4	5	4	2	0	1	1
Syphilis	1	2	3	1	2	5	10	7	0	1	2	2
TOTAL	11	18	17	19	20	25	40	40	56	38	27	29

Distribution of TTIs among blood donors is influenced by socio-demographic characteristics. KNBTS rely on young voluntary blood donors, particularly from secondary schools, colleges and university, majority in the age range of 15-24 years for safe blood. Young voluntary donors have low HIV prevalence estimated at 1%

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compared to 6.6% prevalence recorded in adults aged 30-34 years (Onyango et.al, 2018). What inspires or discourages individuals to donate blood vary from place to place and efforts should be made to understand these factors to strengthen focused recruitment and retention thus increasing the existing pool of donors.

2.6 Perceptions of Blood Donation

A common perception identified in most studies regarding blood donation is that blood is essential for the sustenance of life. Blood donation is commonly viewed as good and lifesaving. According to (Moore et.al, 2020) some perception reflect spiritual and religious connotations of blood donation. In most sub Saharan African Countries, blood is considered a substance that is common to family, kin or tribe, precious and should not be taken out of the body only when it is for saving a family member who is in dire need. Probably that's why people would prefer to donate to family members only and not to strangers. Communalism and kinship concept is so deeply rooted and donating blood for families is a strong incentive which is not reflected in current policies that seek to eliminate the family replacement donor.

In South Africa, there is racial discrimination attached to acceptability of donated blood for transfusion however this was an isolated finding. In Nigeria, there are beliefs that females cannot donate blood including male in some cases and that blood is reserved for the military. In some community, blood was considered to have the potential to make a person weak or lead to death. On the flip side of it, receiving weak blood was also believed to make the recipient weak. Others belief that donating blood can cause disease in the donor despite noting that blood was important.

Globally there is chronic blood shortage attributed to only minority of the country's population donating blood. Sound safe and sustainable transfusion services world over

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rely on voluntary blood donation. The mind set of altruism through blood donation is affected by several factors like; fear of knowing ones HIV serological status, fear of blood borne infections and false belief that giving blood can increase ones libido, loss of weight, blood pressure and death. Emphasis should be put on donor motivation, education and recruitment to increase understanding and knowledge.

To sustain blood donation services, motivation of blood donors should be given maximum attention both at the National government and County governments in terms of policies and plans. Creating a system that encourages individuals in the community to start and then continue donating blood should be the aim of Kenya National Blood Transfusion Services. Despite the fact that donating for family and friends is always presumed to make it possible to donate for family, personal request is the most mentioned trigger factor to make people decide to donate blood. Personal approach to support blood donation activities can be very helpful in recruiting new donors.

A study by (Moore et. al., 2020), indicate reasons that motivate and deter people from donating. Key motivators include; Altruism and collectivism. Altruism is mostly associated to blood donation, and describes the willingness of an individual to donate blood to help others especially strangers. On the other hand, collectivism describes the drive of individuals to help family, friends or community. Other important factors include; incentives to blood donation, public recognition for blood donation and also the desire to know ones blood group. (Mohammed et.al, 2018) concurs; that altruism, incentives and donating for family are major motivators.

There are two major barriers to blood donation described in literature. The first one is related to personal perception of the blood system and blood donation. It is influenced by misinformation, misunderstanding and lack of information. Secondly, non-donation

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is related to practical circumstances, infrastructure, time, distance, sociocultural background, economic level and health status. Most frequently mentioned barriers are undesirable effects to health in addition to unfavourable attitude. Unfavourable attitude include use of blood for witchcraft and transfer of behavior from donor to recipient. Weight loss, fever and hypertension are examples of unfavourable health effects (Mohammed et.al, 2018), also established fear and cultural influence as the main barriers in Africa.

Fear is a major deterrent to the mind set of altruism through blood donation. In other parts of the globe fear of needle prick, pain and adverse effects of donation may be common, in sub Saharan Africa other aspects of fear, such as fear of blood being used for rituals, and fear that able bodied men who donate blood may become impotent are significant. Therefore there is need for targeted interventions that address these specific issues. KNBTS needs to have a much more in depth understanding of what information is required by donors so they can improve their interventions to address the fears and misconceptions.

Other studies include indolence as a major factor for not donating. According to (Shah et.al, 2019) in their study more than half of their respondents answered indolence as important reason for not deciding to become a donor suggesting that 70% of non-donors would be triggered to become donors for helping family/friends and also personal use. The issue of access can also be related to indolence. Some people finding it difficult to donate if the donation site is far away. For example students may finding it difficult to go and donate outside campus. Availability of blood donation centers within learning institutions can also improve knowledge and awareness with regard to blood donation and practices.

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Not round the clock blood donation is another factor that hinder most people from donating. There are people who believe that blood is only required during calamities and emergencies. Lack of trust is also another issue to consider as a barrier to blood donation. People may not be sure how the blood they donate will be used to truly support the people in need or not. Perception that only lower class donate blood and the "not me" mentally from the upper class is also a challenge for optimizing blood donation. The higher income population do not donate blood 48% according to shah et.al, 2019).

People who have initially donated blood and had a bad experience; the fact that people who voluntarily donate blood do not get it when they need it is a draw back towards recruiting more donors. Moreover, public and private facilities do not acknowledge donor cards when blood is needed for replacement. The general feeling that blood is sold is a further deterrent alongside the impression that only private hospitals sell blood. Most people are not aware that selling of blood is prohibited by law or are triggered by other factors to engage in the practice. Conduciveness of blood donation centers is another factor contributing to low donor turnout during campaigns. Other studies have established that the environment at the blood donation centers do not favour privacy and confidentiality of the blood donors and it makes donors shy away from blood donation practice which in turn affect availability of blood and voluntary blood donation practice.

In a study conducted by (Wilkinson et al, 2016) among youth, 85.5% of the youth interviewed had not donated blood. As per other studies the figure was found on average to be 70%. It clearly indicates that majority of youth who are being relied on for safe blood are not donating blood. This state of affairs needs to be reversed soon to mitigate on the dire shortage of blood globally. Most of the youth did not have a clear reason for not donating blood indicating total lack of knowledge on the importance of

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blood donation. This situation could be attributed to the fact that none of their family members have also ever donated blood or needed blood for transfusion. The family members can influence a member to donate or not. In some cases, people do not donate blood because the family members are not in agreement with the action.

According to (Salem et al, 2021) socio-demographic factors may be able to develop a certain amount of conscious effort in individuals which will carry a behavioral intention. In the last decade, several studies have been undertaken to understand demographic characteristics of donors and non-donor. Findings indicate donors are more religious, married, low risk takers, have above average education, and a higher socio-economic status (Moore et.al, 2020). This is critical in dealing with myths which hinder potential donors from donating.

Socio-economic difficulties and compensation in relation to blood donation is also significant. A worrying factor is that most donors who assume to be voluntary non remunerated donors also still expect to be compensated for donating blood. Kenya National Blood Transfusion including other stakeholders should explore more non-cash incentives such as awards and recognition for dedicated blood donors. Furthermore, better education, can help people appreciate better the need to voluntarily donate blood as opposed to demanding for incentives.

2.7 Theoretical Frame work

This study adopted theory of planned behavior-TPB (Ajzen, 1991) that links ones belief and behavior. This theory is based on the assumption that humans are rational, and deliberately use the information available to them to form and guide their intentions to perform a behavior. It combines the three independent variables; attitude towards behavior (ATB), subjective norms (SN) and perceived behavioral control (PBC).

Attitude towards Behavior (ATB):- A persons individual feeling and evaluation of the behavior. Do they see this behavior or action as good or bad? Attitudes represent individual's feelings and beliefs about giving blood.

Subjective Norms (SN). A person will be using information about others in order to adjust their own behavior and as a result, he or she will perform the same behavior and perceive it as a common behavior in the group. The support of society or family to donors to bestow blood donation.

Perceived Behavioral Control (PBC):-Perceived as the individuals perception of how difficult or easy it will be performing the behavior because it reveals the past experiences of hindrance and predictable obstacles related to their donation. If a person is confident with his or her ability to survive after the blood donation process, willingness to donate may be high. While, those who feel blood donation is not in their control, will not engage with the actual behavior.

All the three variables of TBP are inclusively linked by a corresponding set of beliefs namely behavioral belief (perceptions of the advantage and disadvantage of donating blood), normative beliefs (perceptions of sustenance of vital people for donating) and control beliefs (sights enablers and obstacles to donating).

Generally, TPB, a well-known theory for a number of disciplines has been adapted in many prior studies and has shown predictive success of the required behavior. In the field of blood donation, it is examined that, most of the prior studies conducted to test the constructs of the TPB have shown a significant association between the constructs of ATB, SN and PBC with the intention to donate blood. All the TPB components are proving to be relevant and significant in foreseeing the people's intention to perform the behavior (Salem et al, 2021).Identifying and measuring these variables(ATB, SN and

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PBC) can assist in understanding what factors student blood donors hold important in their formation of intention to donate blood specifically eventually become repeat donors.

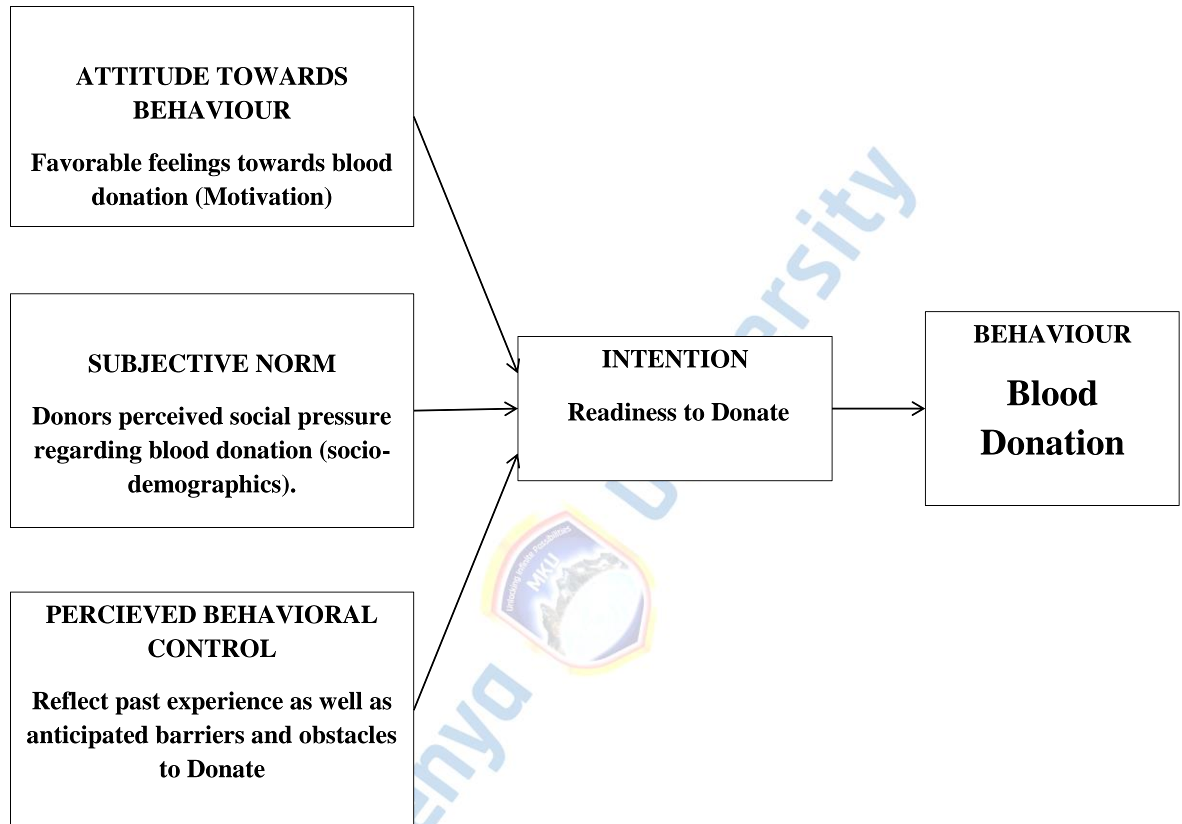

Figure 0.1 : Theory of Planned Behaviour (Ajzen, 1991)

2.8 Conceptual Framework

The study variables included three independent variables, intervening variable and one dependent variable. Practice of blood donation was the dependent variable. Policy was intervening variable. Independent variables include;

Motivators:-which included, Help family or friend, Good for health, Benefit others, Rare blood group, Blood donor certificate and Refreshment after donation.

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Socio-demographic factors: - Religion, Age, Sex, Blood Type, Marital Status, Program of study and Learning Institution.

Barriers: - Blood banks sell blood, Lack of time, insufficient information regarding blood donation, Lengthy donation period, Previous bad experience; Ineligible for donation.

This implies that motivational factors (favorable attitude), Socio-demographic factors (subjective norms) and Barriers (perceived behavioral control) would influence intention to donate blood and hence affect turn up for blood donation.

Table0.3 : Study Variables & Indicators

Concept	Variables	Indicators
Blood Donation	**Motivators**	Help family or friend, Good for health, Benefit others, Rare blood group, Blood donor certificate and Refreshment after donation.
	Socio-Demographics	Religion, Age, Sex, Blood Type, Marital Status, Program of Study and Learning Institution.
	Barriers	Blood banks sell blood, Lack of time due to studies, insufficient information regarding blood donation, Lengthy donation period, Afraid of feeling unwell(fainting); Ineligible(medical reasons).

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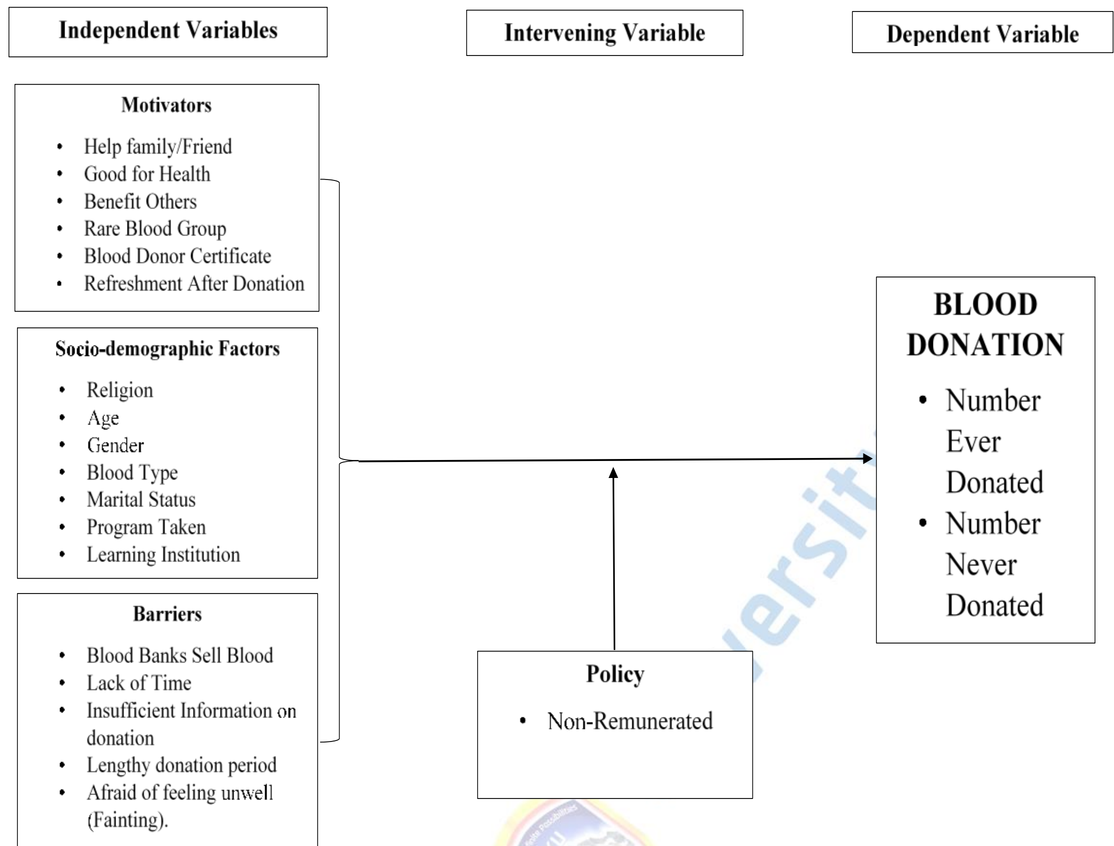

Figure 0.2 : Conceptual Framework

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CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter describes the methods used in this study. It focuses on; the study design, study location, target population, sample size determination, proportionate sample size calculation, sampling techniques and procedure, inclusion criteria, exclusion criteria, data collection and tools, validity and reliability, statistical analysis, and ethical considerations. Each of these elements is discussed below as follows;

3.1 Study Design

A descriptive cross-sectional study with mixed method (quantitative & qualitative) for triangulation purposes to enable collection of rich comprehensive data was used in this study. Using different methods (Questionnaire & Topic Guides) to collect data on the same subject from different sources (KIIs, FGD) made results more credible. If the qualitative and quantitative data converge, this strengthens the validity of the study conclusions. The strengths of one type of data often mitigate the weaknesses of the other. For example, solely quantitative studies often struggle to incorporate the lived experiences of participants, so adding qualitative data deepens and enriches quantitative results.

3.2 Study Location

The study was conducted in Homa Bay County which is 3,183.3 Km^2 in size situated western part of Kenya bordering Lake Victoria. It neighbors Kisumu, Migori, Kisii and Nyamira counties. It can be accessed by road, lake and air. The County has eight sub-counties namely Homa Bay Town, Rachuonyo East, Rachuonyo South, Rachuonyo North, Ndhiwa, Rangwe, Suba North, and Suba South. There are 24 Divisions, 130 Locations and 297 Sub-locations. According to the 2019 Population and Housing

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Census, the county had a population density of 3,150.3 persons per square kilometer, which is projected to increase to 405 persons per square kilometer by the year 2023. The county population is 1,131,950 persons consisting of 539,560 males, 592,367 females, and 23 intersexes. This population is domiciled in 262,036 households, with 260,290 categorized as conventional households and 1,746 being group quarters.

3.3 Target Population

The target population comprised all students (2,627) from three public colleges and one private college namely; Tom Mboya University, Homa Bay Youth Polytechnic, Homa Bay Kenya Medical Training College and Kendu Adventist School of Medical Sciences respectively. Data was collected between April 2021 and July 2021 targeting students aged between 16 years and 65years.

Table0.1: Population Distribution among Institutions

Tertiary Institutions	Student Population
Homa Bay KMTC	877
Homa Bay Youth Polytechnic	200
Kendu Adventist School of Medical Sciences	350
Tom Mboya University College	1200
Total Target population	**2627**

3.4 Sample Size

The formula by Fischer et al (1998) at 95% confidence interval and prevalence of 50% was used to estimate the sample size since the precise proportion of college students' population that donates was unknown.

- $n = \frac{Z^2 P(1-P)}{d^2}$

Where;

n = Required sample size

d = Precision 5%

α = Significance level at 95% confidence level (5%)

Z = Standard normal deviation set at 1.96 corresponding to 95% confidence level

P = Proportion of the population that donates blood (assumed to be 50% since it is not known)

Hence, $$n = \frac{(1.96)^2\ 0.5(1-0.5)}{(0.05)^2} = 385$$

The sample size was adjusted and distributed proportionately among the four sites after calculating an allowance of 10% for spoilt or incomplete questionnaires.

Sample size= (0.1x385) +385=423.5

Sample size =424

Proportionate sample size calculation: - In each college, the required number of participants was established based on proportionate sampling. Out of the 424 participants required, we expected to enroll 33% from KMTC Homa Bay, 8% from Homa Bay Youth Polytechnic, 46% from Tom Mboya University College and 13% from Kendu Adventist School of Medical Sciences as shown in the table below.

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Table0.2 : Proportionate Distribution of Sample Size

COLLEGES	STUDENTS POPULATION	PROPORTION
KMTC Homa Bay	877	877/2627*424=142
Homa Bay Youth Polytechnic	200	200/2627*424=32
Tom Mboya University College	1200	1200/2627*424=194
Kendu Adventist School of Medical Sciences	350	350/2627*424=56
Total	**2627**	**424**

3.5 Sampling Techniques and Procedure

Purposive sampling: –One private college and three public colleges namely; Tom Mboya University College, KMTC Homa Bay, Kendu Adventist School of Medical Sciences and Homa Bay Youth Polytechnic were selected purposively since they had participated in blood donation exercises at least twice targeted by the Kisumu Regional blood center hence the students had deep experience and understanding of the research questions and also due to their high student population and ease to access.

Systematic Random sampling: - Due to challenges of creating students master list (complete list of every member of the population) at the individual tertiary institutions and contacting or accessing each member of the population, common classes for Certificate, Diploma and Degree programs depending on the institution was identified that all students must attend and sampling on spot done systematically as the students exited the classes. Every Kth (2627/424) student was approached and issued with the questionnaire until the required number of students in each college was reached. The first student sampled corresponded to a random number between 1 and 6. The

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subsequent student was that number plus the value of K (6) and so on until the desired sample size was achieved.

3.6 Inclusion Criteria

The study only included students who met the following criteria;

- Students from selected public & private colleges.
- Students consenting to the study.
- Students available during data collection.

3.7 Exclusion Criteria

The study excluded students based on the following criteria;

- Students from other facilities other than selected facilities.
- Students who decline to consent.
- Students with chronic illness.

3.8 Data Collection and Tools

Quantitative Data: – Students were issued with structured questionnaires. The questionnaire captured categorical and numerical data which included; information on socio-demographic variables, barriers and motivators of blood donation. The lead researcher briefly introduced the study team and the study objectives at the four selected tertiary colleges and there after self-administered questionnaires were issued to willing and consenting students by the lead researcher assisted by trained research assistants.

Qualitative Data

FGDs- A topic guide designed by the researcher was used to moderate the discussions and audio recorder to record the deliberations. The topic guide was used to explore what are the experiences, feelings, opinions and reactions of the participants towards blood donation and why they donate, and also understand barriers for not donating. Three

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FGDs were held at a neutral place comprising of six male students and six female students selected purposively. The trained data collectors assisted the researcher in conducting the FGDs and at the end of the sessions the participants were offered soft drink as a show of appreciation. Confidentiality was maintained by coding the participants.

KIIs- A topic guide designed by the researcher was used to moderate the discussions and audio recorder to record the deliberations. The topic guide included eight questions focused on the study objectives. The choice of respondents was based on the study objectives. The study included people with vast knowledge and experience on blood donation activities to avoid biased results. This enabled analysis of varying perspectives and underlying issues. Three key informants were purposively selected; Director of the Kisumu Regional Blood Transfusion Centre (KRBTC), Laboratory Manager of the Homa Bay County Referral Hospital and Partner supporting blood campaign activities in Homa Bay County- Medicines San Frontiers France (MSF) Laboratory focal Person. The sessions had a moderator, audio recorder and time keeper. The sessions were held at a neutral place.

3.9 Validity and Reliability

3.9.1 Reliability

To verify acceptability of the questions, willingness of the respondents to answer the questions and the average length of time an interview would take, pretesting was done on 10% of the sample size equivalent to 42 students at Asumbi Teachers Training College. Reliability was analyzed using test retest method and Pearson's correlation calculated. Each question in the questionnaire was assigned one mark. The questionnaire was issued again to the 42 students after a fortnight. In addition to reliability, simple percentage agreement was also calculated with values from 75% to

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90% demonstrating acceptable level of agreement. Coefficient of stability was used to measure reliability with coefficient of stability greater than 0.7 being acceptable.

3.9.2 Internal Validity

Triangulation of data, using interview notes, in-depth interviews and focused group discussions was utilized to maintain the validity of the study findings. The study instruments were also validated by the supervisors and appropriate changes made based on their suggestions and inputs. Through member checks the results and interpretations were taken back to the participants in order to be confirmed and validated. Participants were encouraged to be honest during the interviews.

3.10 Statistical Analysis

3.10.1 Quantitative Analyses

Data collected at the end of the study was analyzed by the researcher using SPSS statistical software version 21.0. Descriptive analysis was done. Arithmetic average and standard deviation was used for continuous variables that are normally distributed, whereas frequencies and proportions used to present categorical data. Association between blood donation and motivation to donate blood, socio-demographic characteristics and barriers of blood donation was determined using Pearson's chi-square. Significance level was set at 0.05. To avoid confounding effects, Logistic regression was carried out for all significant independent variables and Odds Ratio (OR) and 95% Confidence Interval (CI) were used to estimate the strength of association.

3.10.2 Qualitative Analyses

Transcripts were coded thematically. Next, similarities identified, differences resolved, and consensus achieved. Verbatim passages were selected from the transcript to illustrate the theme. A six step process was followed to generate themes;

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familiarization, generating themes & coding, reviewing of themes, defining & naming themes and finally write up.

Table 0.3 : Steps for Generating Themes

Steps		Process
1	Familiarization with data	Focused on reading and rereading the data and noting down the initial ideas. Transcribing interview sessions and rereading at least twice to begin identifying patterns and meaning.
2	Generating Initial Codes	Highlighting sections of the text phrases or sentences and coming up with short hand labels (codes) to describe the content.
3	Generation of Themes	Collate codes into potential themes, gathering all data relevant to each potential theme.
4	Reviewing of themes	Ensuring the themes are useful and accurately represent the data. Comparing the themes to the data set and check if anything is missing.
5	Defining and Naming Themes	Formulating what each theme means and figuring out how each helps to understand the data.
6	Writing up	Focus on analyzing the data and writing a narrative about the data.

3.11 Ethical Consideration

The research was only done after obtaining ethical permit to undertake the research from Mount Kenya University Ethical Review Committee (ERC). After getting

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introductory letter from the ERC, application for clearance by National Council of Science, Technology and Innovation (NACOSTI) to collect data for the study was done. After clearance by NACOSTI, approval for data collection within the County was obtained from Homa Bay County Research and Ethics Committee and finally, official letters submitted for approval before data collection to the administration of the selected institutions.

Questionnaires were only administered to verbally consenting individuals. Minors were to sign assent forms before participating in the study. The students were briefed on objectives of the study without coercion to participate in the study. They were also informed of their option to opt out since participation was voluntary. To maintain confidentiality, all records generated throughout the study were accessed only by the study team. A pass word protected lap top secured by a firewall was used to store all the data

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CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

This chapter describes the research findings and results, and presentation from the quantitative and qualitative analysis addressing the three research questions presented in this study which were; 1. What are the socio-demographic characteristics of student blood donors at selected tertiary institutions in Homa Bay County? 2. What are the motivators to donate blood by students of selected tertiary institutions in Homa Bay County? 3. What are the barriers to donate blood by students of selected tertiary institutions in Homa Bay County? Base line results (results on reliability and simple percentage Agreement), Objective 1 results, Objective 2 results and Objective 3 results which will include descriptive analysis (univariate analysis) and associations (bivariate analysis). Finally, interpretation and discussion for the respective objectives.

4.1 Pilot Study Results

Systematic random sampling on the spot was used to recruit total of 41 students out of 42 that were targeted for the pilot study (response rate of 98%). On the second (fortnight) admission of the questionnaire one student was away for school fee. During the pilot study it was established that most students did not know their blood type and therefore the questionnaire was adjusted to include unknown as one of the options for blood type. A more desirable measure of reliability should reflect both degree of correlation and agreement between measurements. This study revealed acceptable and significant positive correlation between the test and retest scores, r (39) = (.82), P= (.000). Simple percentage agreement was used to assess concordance between first score and second score which was 78%, with 32 students responding exactly the same way they did in the first assessment. Acceptable levels of agreement for this study were

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values from 75% to 90%. Therefore, reliability of the measurement procedure adopted for this study was achieved based on the correlation and agreement revealed by the baseline results. Correlation was significant and scores did not change substantially over time. The nine students who gave different responses from the initial response could have been due to participant's changes which introduced error.

Table0.1 : Percentage Agreement between Scores

Variables	**Frequency**	**Percentage**
Same Response	32	78
Different Response	9	22
Total	**41**	**100**

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4.1.1 Socio-demographic characteristics of students.

Of the 424 students approached, 380 consented to fill the questionnaire (response rate of 90%), and 15 were excluded because participants did not answer all or most of the questions thus limiting the analysis. Most of the respondents were male 221(60.5%) compared to female 144(39.45%). Other socio-demographic characteristics cited included level of education, income level (financial status), and health status from the qualitative analysis. One of the students said level of education "*Impacts much on acceptability –knowledgeable students donate easily*" FGDI. Regarding program undertaken and institution of learning a student said **"***Medical students appreciate the need for blood and to donate***"** FGDI and another said "*Medical students see patients suffering and prompted to donate.*" FGDII. Income level was also a concern for some students and cited severally for example low income was "*A student is a casual laborer and may not be able to donate because of fatigue and fear of fainting*" FGD III and

"*Some students cannot afford balanced diet & fruits and this hinders blood donation*". FGD III. For some key informants students' health status was key. For example one said **"***Endemicity of certain diseases, affect donation negatively especially if they suspect exposure***"** KIIb another said "*Under lying conditions like HIV and Diabetes may hinder blood donation*" KIIa**.** Despite religion and marital status not being significantly associated with blood donation they were mentioned in the FDGs and KIIs. For example, one key informant said marital status **"***Will affect if they have their spouses within because there is that stigma my spouse will know my status*" KIIa another said donation is influenced by the partner "*My boyfriend said I should not donate blood*" KIIb. Regarding religion, one participant said "*Some faith prohibit one to donate since it's against their believe.*" FGDIII and one informant also said "*Akorinos do not allow members to donate*" KIIa while another said **"***Students who are altruistic donate easily. However other religions object the process. Generally more students donate blood*" KIIb.

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Table 0.2 : Socio-Demographic Characteristics of Students (N-365)

		Blood Donation among Students		Total	Proportions
		Non-Donors	Donors		
Gender	Female	77	67	144	39.45%
	Male	89	132	221	60.55%
	Total	166	199	365	100%
Age (Years)	16-18	16	14	30	8.21%
	19-21	65	93	158	43.29%
	21-23	47	47	94	25.75%
	>24	38	45	83	22.73%
	Total	166	199	365	100%
Marital Status	Married	23	38	61	16.71%
	Single	143	161	304	83.28%
	Total	166	199	365	100%
Blood Type	A-	2	13	15	4.11%
	A+	9	11	20	5.48%
	AB-	3	9	12	3.29%
	AB+	10	9	19	5.20%
	B+	22	11	33	9.04%
	B-	2	1	3	0.82%
	O+	33	49	82	22.47%
	O-	6	11	17	4.66%
	Unknown	79	72	151	41.37%
	Total	166	199	365	100%
Religion	Christian	155	176	331	90.68%
	Muslim	11	23	34	9.32%
	Total	166	199	365	100%
Tertiary Institution	H/B Youth Polytechnic	23	9	32	8.77%
	KASM	26	17	43	11.78%
	H/B KMTC	65	55	120	32.88%
	TMUC	52	118	170	46.58%
	Total	166	199	365	100%
Respondents Program	Certificate	23	11	34	9.32%
	Diploma	92	75	167	45.75%
	Degree	51	113	164	44.93%
	Total	166	199	365	100%

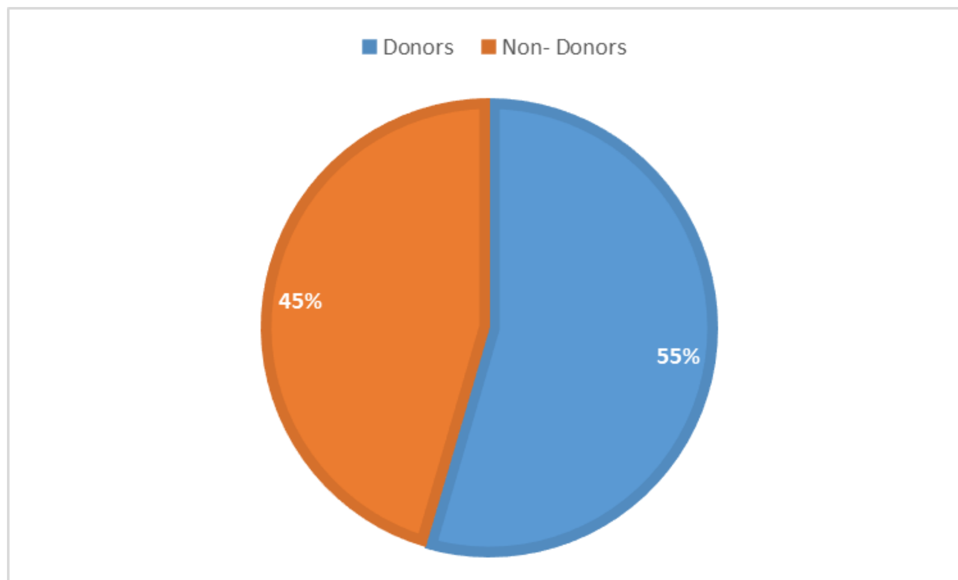

Figure 0.1 : Blood Donor among Respondents

Note: More than half of the respondents were blood donors 199(55.00%).

Bivariate analysis reveal that sex, blood type, program undertaken and tertiary institution were statistically significant in regards to blood donation but not significant with religion, age, marital status, program taken and learning institution as shown in table 6 below.

Table 0.3 : Association of Socio-Demographic Characteristics with Blood Donation

Character	Chi-square	P value
Sex	6.127	0.013
Blood Type	13.383	0.063
Tertiary Institution	31.741	0.000
Program Undertaken	26.639	0.000
Religion	2.605	0.107
Age	2.724	0.436
Marital Status	1.785	0.181

4.1.2 Motivators of blood donation among the students.

Bivariate analysis revealed significant association between motivators to donate with blood donation $X^2(3, N=365) = 365, p < .001$. Majority of Blood donors donate blood because they want to help others. Helping family or friends (41.7%) and donating to benefit others (31.7%) were the leading motivators. Quantitative findings were consistent with qualitative findings regarding the leading motivators for blood donation. Altruism and Collectivism were mostly cited as motivators for donation. A participant said "*I have a rare blood group O negative, someone offered me Ksh 25000/= but I rejected the money and still donated to save life*" FGD I, another said "*Have encounter someone who needs blood hence understand the importance of blood donation*" FGDIII. With regard to collectivism, a participant said "*Donating for someone you know is easy*" FGD I another "*My sister was very sick and in need of blood, my neighbor donated for her. It's pay back because someone saved my sisters life*" FGD I.

Other motivators included non-monetary incentives(refreshment-soda & bread), and peer pressure(friends are donating).There was concern regarding income levels with some participants saying "*In college budgeting is a challenge so the bread and soda come in handy*" FGD I, "*Blood donation is better in colleges than in the community because of promises like soda & bread* " FGD II and "*Instead of soda and bread food or fruits should be given*" FGD I. Regarding persuasion and peer pressure one of the informants said "*Unless you go to them they will not come to you. In general if you go to them they will donate. They have huge willingness*" KIIc.

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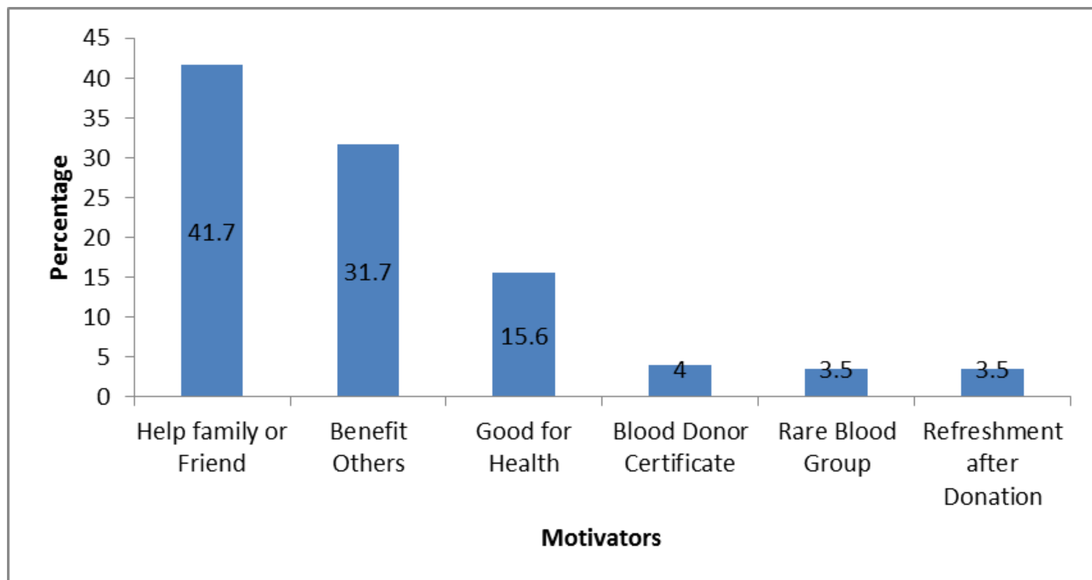

Figure 0.2: Donor Motivations

4.1.3 Barriers to blood donation by the students

Bivariate analysis revealed significant association between barriers to donate with voluntary blood donation $X^2(5, N=365) = 365, p<.001$. The leading hindrance was selling of blood by blood banks 43 (11.78%) followed by fear of feeling unwell 37 (11.23%), ineligibility (medical reasons) 34(9.32%). Quantitative findings were consistent with qualitative findings with selling of blood being the most frequently mentioned barrier to donate. A participant said "*Most students donate blood but blood is sold at Ksh 2000/=, but if you can't afford then you don't get blood-it's not motivating*" FGDIII, another also said "*Since blood is being sold there is no need to donate, you can as well buy"* FGDII. The aspect of selling blood was further corroborated by one of the key informants saying "*Blood donation is low, one there are myths, two they have connected to blood being sold*" KIIa. A participant also expressed the artificial shortage of blood due to selling as a barrier "*Artificial shortage of blood. People get discouraged to donate*" FGDI. Regarding ineligibility (medical reasons) a key informant said "*Most of them their Hemoglobin levels are on the border line*" KIIb and therefore cannot donate.

Other barriers included; Insufficient Information regarding blood donation and negative service experience. A participant said "*Most students lack adequate information regarding blood donation*" FGDIII and another said "*Inadequate involvement of key stakeholders in the process of awareness creation*" FGDI. In terms of negative service experience a participant said "*You are cheated by blood campaign team that after donating blood your relative will get blood for free in the hospital. Ultimately you even don't get a donors card*" FGDII**.** A good number of participants also cited lack of time as a barrier. One said "*I lack time to donate because of addiction to social media*" FGDI.

Table0.4: Non-Donor Barriers

		Blood Donation among Students		Total	Proportions
		Non-Donors	**Donors**		
Barriers	Afraid of feeling Unwell(fainting)	41	0	41	11.23%
	Blood Banks Sell Blood	43	0	43	11.78%
	Ineligible(Medical Reasons)	34	0	34	9.32%
	Insufficient Information Regarding Blood Donation	33	0	33	9.04%
	Lack of time due to studies	15	0	15	4.11%
	Donors	0	199	199	54.52%
	Total	166	199	365	100%

4.2 Discussions

4.2.1 Socio-demographic characteristics of student blood donors

Majority of respondent 158 (43.29%) belonged to the 19-21 age group, which was slightly lower than a study done in Ghana 45.2% (Sheila, 2015). However, there was no

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significant association between age $X^2(3, N=365) = 2.72, p=0.436$ and blood donation. This young age group is consistent with the national data (KNBTS, 2017) that shows majority of donors are secondary school students, college and university students and 80 percent of the donors aged between 16 and 25 years. This is also consistent with (Kimani et.al, 2010) findings that majority of donors are less than 25 years. Furthermore, regional data also affirm that more young people donate blood in low-and middle income countries compared to high-income countries (CDC, 2018).Blood donors of younger age have the potential of longer donor careers and good health, consequently directing recruitment efforts toward them is strategic. Tertiary institutions across the county with healthy and youthful students are prospective sources for blood donation that can be recruited. They can help increase the low supply of blood and reduce morbidity and mortality attributed to lack of adequate blood.

In this study, there was significant association between Sex $X^2(1, N= 365) = 6.13, p= 0.013$ and blood donation, more male 221(60.5%) donated compared to female 144(39.45%). similar to a study by (Abderrahmana et al. 2014) with 84.4% being male and 15.2% being female. Important to note most of the participants were blood donors 199(54.52%) while the rest were non-donors 166 (45.48%).This is consistent with other studies that majority of blood donors in the country and the region are male. According to (CDC, 2018) most blood donors were men 65% in 2014 and 86% in 2016. A study by (Kimani et.al, 2010) also determined that most of the Kenyan donors were well educated young male. Underrepresentation of female donors could be due to more deferrals and health conditions like anemia despite the fact that currently in the country there are more female compared to men (98.76 males per 100 females).

In terms of blood type, a huge proportion of the respondents 151 (41.37%) did not know their blood group while the most recurrent blood type was O+ which accounted for 82

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(22.47%). This was similar to a study by (Abderrahmana et al. 2014), those who didn't know their blood group were 248 (49.6%) and those with blood group O+ were 110 (22%). There was significant association between blood type $X^2(7, N=365) = 13.383$, $p=0.063$ with blood donation. The fact that most of the students did not know their blood type is a critical gap that needs to be corrected and could be attributed to inadequate information or probably lack of adequate educational programmes on blood donation within the learning institutions.

The study further established that tertiary institutions X^2 $(3, N=365) = 31.741$, $p<.001$ and programmes undertaken X^2 $(2, N=365) = 26.639$, $p<.001$ by the respondents were significantly associated with blood donation. This is in agreement with (Halima et al. 2013) that socio-demographic factors develop certain amount of conscious effort in individuals which carry a behavioral intention and that donors have above average education. In this study, out of the 199 blood donors, 113 were undertaking degree program, 75 diploma program and 11 certificate program. According to (Abderrahmana et al. 2014) education has a positive influence on attitude towards voluntary blood donation. Degree programs are usually undertaken by students who score well in their O levels and are above average academically. These students have higher cognitive ability and therefore can understand concepts like blood donation much faster and donate compared to the Diploma and Certificate students. In two of the focus group discussions the aspect of level of education/Knowledge was cited recurrently and corroborates the quantitative findings. For example, a participant said knowledge "*Impacts much on acceptability –knowledgeable students donate easily*" FGDI, another student also said "*Medical students see patients suffering and prompted to donate*" FGDII.

In this study, there was no significant association between religion $X^2(1,N=365)=2.605, p= 0.107$, age $X^2(3,N=365)=2.724, p=0.436$, marital status

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$X^2(1,N=365)=1.785, p=0.181$, with blood donation however they were mentioned during the focused group discussions. Other socio-demographic characteristic cited during the KII discussion were income level and health status. "*Endemicity of certain diseases, affect donation negatively especially if they suspect exposure*" KIIb. The conceptual frame work adopted for this study clearly links subjective norms (socio-demographic characteristics) to blood donation for which sex, tertiary institution and programme undertaken were significant. According to (Hamid, et.al 2013) subjective norms were proved to have positive and high value towards intention to donate blood.

4.2.2 Motivators of blood donation among the students.

According to (Hamid, et.al 2013) in their study application of the theory of planned behavior attitudes towards behavior (motivators) have positive and high value towards intention to donate blood. The major motivator to donate was to help family or friends 83(41.7%) followed by closely by donation to benefit others 63(31.7%). This was similar to findings by (Ibrahim et al 2019), who also established that the leading causes of motivation to donate were family or friends in need of blood (86.9%) and altruism (7.3%). The qualitative findings also revealed altruism and collectivism as key motivators to voluntary donation. One of the participants from the focused group discussions said "*My sister was very sick and in need of blood, my neighbor donated for her. It's pay back because someone saved my sisters life*" FGDI. These findings are also in agreement with (Zanin et. al., 2016) findings that Altruism and collectivism are key motivators.

Other factors such as health benefits, non-monetary incentives, persuasion and peer pressure were also cited as motivators to donate which concurs with (Yuan et. al., 2011) findings; that health benefits, incentives and persuasion and peer pressure are important motivators. In this study non-monetary incentives was frequently mentioned as a

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motivator among the participants in focus group discussions and by key informants and therefore equally important. One of the students said "*In college budgeting is a challenge so the bread and soda come in handy*" FGD1

4.2.3 Barriers to Blood Donation by the Students.

Regarding deterrents against blood donation, selling of blood was the most frequently cited 43 (11.78%) followed by fear of feeling unwell 37 (11.23%), and ineligibility (medical reasons) 34(9.32%). Critical to note is that even in the qualitative findings the theme of selling of blood was the most frequently mentioned. This finding was different to what (Mohammed et.al 2018) and (Mahfouz, et.al 2021) found. In their studies selling of blood was a barrier but not the major barrier as in our study.

In the recent past, incidents of selling blood have been on the rise. According to (Gathura G., 2019). A health worker in Kisumu was convicted in 2019 for receiving 28,000/= to arrange blood transfusion for a patient. He further asserts that in some public hospitals blood is being sold at a cost of 3000/= while very sick patients are asked for bribes to access blood. In 2020 KNBTS was on the spotlight for selling the scarce commodity to Somalia according to (Business Daily, 2020) and investigations initiated by directorate of criminal investigation. This year KNBTS was on the spot light again for selling blood to hospitals through an agency called life Bank Kenya at a cost of Ksh 2500/= per pint (Nation Africa, 2021). "*Most students donate blood but blood is sold at Ksh 2000/=, but if you can't afford then you don't get blood-it's not motivating*" FGDIII.

The other barriers fear of feeling unwell 37 (11.23%) and ineligibility (medical reasons) 34(9.32%) have been highlighted in other studies as important barriers to blood donation. Insufficient information, lack of time, negative service experience, were also

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cited according to the qualitative analysis and should be given much attention. For example, one of the participants said "*You are cheated by blood campaign team that after donating blood your relative will get blood for free in the hospital. Ultimately you even don't get a donors card*" FGDII**.** Appropriate and timely information is key with regards to donation activities and probably most of the students have had about donation but what is lacking is practical information (where and when), technical information (amount collected, how it is analyzed and stored) and physical information about the experience itself. Source of information is also critical and what seems to be appealing to most youth is social media. One of the participants said *"I lack time to donate because of addiction to social media*" FGDI. Consistent with this finding, (Abderrahmana, et.al 2014) also found in their study; negative service experience (did not receive blood when needed it), feeling unwell (side effects of blood donation extraction) and ineligibility due to medical reasons (having health problems) were the leading barriers to voluntary blood donation.

Multivariate Analysis

Binary Logistic regression was used to examine whether sex, program, institution, blood type, motivators and barriers were associated with the probability of donating blood since they showed

Significance (P <0.05) during bivariate analysis. They were subjected to logistic regression analysis to control for confounders and only sex and blood type retained significance in the final model as shown in table 8 below.

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Table0.5 : Logistic Regression Results

Variable		B	SE	Wald	df	P. Value	Odds Ratio	95% Confidence Interval	
								Lower	Upper
Sex	Male						1		
	Female	-0.708	0.236	8.991	1	0.003	0.493	0.31	0.782
Blood Type	Unknown					0.063	1		
	A-	2.151	0.822	6.582	1	0.009	8.597	1.171	43.044
	O+	0.783	0.311	6.357	1	0.012	2.189	1.191	4.025

The sex odds ratio of 0.493 suggests that female were 0.493 times less likely to donate blood compared to men. Students with blood type A- and O+ were 8.597 times and 2.189 times more likely to donate blood respectively.

The model was statistically significant $X^2(13, N=365) = 57.524$, $p=<0.001$, suggesting that it would distinguish donors from non-donors of blood. The model explained between 15% (Cox and Snell R square) and 20% (Nagelkerke R square) of the variance in the dependent variable and correctly classified 69.3% of the cases.

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CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

The purpose of this descriptive cross-sectional study with mixed method approach was to assess blood donor characteristics among selected tertiary college students in Homa Bay County. This chapter includes summary of study findings, conclusion and recommendations.

5.1 Summary of findings

5.1.1 Socio-demographic characteristics of student blood donors.

Most donors were male 221(60.5%) compared to female 144(39.45%). Majority of the respondents were single 304 (83.28%) with a small proportion being married 61(16.71%). There were more blood donors among the respondents 199 (54.52%) while the rest were non-donors 166(45.48%). Results from this study reveal that only sex (p=.013), and blood type (p=0.067) were significantly associated with blood donation.

5.1.2 Motivators of blood donation among the students.

Altruism and collectivism were the main motivators to donate as established from the quantitative results and qualitative findings.

5.1.3 Barriers to blood donation by the students.

The leading hindrance was selling of blood by blood banks 43 (11.78%) followed by fear of feeling unwell 41 (11.23%). and ineligibility (medical reasons) 34(9.32%). Insufficient information, lack of time, and negative service experience were also cited.

5.2 Conclusion

This study has yielded valuable insight into socio-demographic characteristics, motivation and barriers to donating blood among students attending tertiary college in Homa bay County.

1. The study has revealed that sex and blood type to be statistically significant socio-demographic characteristics associated with blood donation. A huge proportion of the respondents 151 (41.37%) did not know their blood type and only respondents with blood type O+ and A- were more likely to donate blood with O+ being the most recurrent blood type accounting for 82 (22.5%).
2. The main motivating factors towards blood donation are collectivism (to help family or friends) and altruism (to benefit others) however they were not significantly associated with blood donation in this study.
3. Major deterrents to blood donation were selling of blood by blood banks, fear of feeling unwell, negative service experience, lack of time, and insufficient information however they were not significantly associated with blood donation in this study.

5.3 Recommendations

a) Study Recommendations

1. KNBTS, regional blood transfusion center Kisumu and Homa Bay County satellite blood bank, should come up with customized blood donation messages targeting female potential donors emphasizing the fact that female donors need blood more to reverse the high maternal mortality ratio of 583per 100,000 live births mainly attributed to obstetric haemorrhage and HIV/AIDS.

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2. Tertiary institutions to emphasize on medical reports containing student's blood type and identification and recognition of female blood donation champions to encourage potential female donors in tertiary learning institutions to donate.
3. Homa Bay County blood bank satellite to establish networks of students with similar blood types especially the rare blood types through WhatsApp group for ease of communication and interventions when blood is needed.
4. Homa Bay County Blood Campaign team should also motivate the donors with non-monetary incentives like donors card which contains critical information like the donor's blood type, address, date of donation and next date of donation.
5. Community strategy should be used to share key customized massages through community health volunteers (CHVs) regarding practical information (where and when), technical information (amount collected, how it is analyzed and stored) and physical information about the experience of blood donation.

a) Recommendations for future considerations

1) Future research should endeavor to establish factors contributing to low female student donors compared to male in Homa Bay County.
2) Establish factors contributing to lack of knowledge of individual blood types among tertiary college students.

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REFERENCES

Abderrahmana, B. H., Salehb, M. Y. N. (2014). Investigating Barriers regarding blood donation Knowledge and Attitudes of blood donors in Jordan. *Procedia - Social and Behavioral Sciences, 16, 2146 – 2154*. doi: 10.1016/j.sbspro.2014.01.535

Agalo, R. A., (2018). Social Media And Tourism Awareness: A Case of Homa bay county, Kenya.Retrievedfromhttp://repository.rongovarsity.ac.ke/bitstream/handle/123456789/1682/Rose Agalo Masters thesis.pdf

Akuoko L. A. (2017). Deterrents, motivators and blood donors' perceptions, South of Saharan Africa – evidence review, *British Journal of Hematology, 177 (*6*), 864-877.* Doi: 10.1111/bjh.14588

Allain, J.P. et.al (2010) Comparative safety of replacement donors and first time volunteer in West Africa, *the Journal of AABB Transfusion*, *50*(2), 340-34. DOI: 10.1111/j.1537-2995.2009.02444.x

Benjamin, W. D., Sarah N. H., Morgan, C. B., Angela, G., Locksley, L., and Messam, McV. (2018). A blood donation barriers analysis experienced in Grenada, West Indies by North American and Caribbean university students, *Transfusion and Apheresis Science.* *57*(1), 40-45.Doi: https://doi.org/10.1016/j.transci.2017.11.026

Burgdorf , K. S., Simonsen, J., Sundby, A., Rostgaard,K., Pedersen, O. B., Sørensen, E., Nielsen, K. R., Bruun, M. T., Frisch, M., Edgren, G., Erikstrup, C., Hjalgrim, H., Ullum H. (2017). Danish blood donor's socio-demographic characteristics, *PLoS ONE, 12*(2), https://doi.org/10.1371/journal.pone.0169112

Business Daily (2020). Health officials face probe for selling donated blood. Retrieved from https://www.businessdailyafrica.com/bd/news/health-officials-face-probe-for-selling-donated-blood--2283600

Carneiro-Proietti, A. B., Sabino, E.C., Sampaio, D., Proietti, F.A., Gonçalez, T.T., Oliveira, C.D. (2010). Blood donors' demographic profile at three major blood centers in Brazil, *Journal of AABB Transfusion, 50*(4), doi:10.1111/j.1537-2995.2009.02529.x.

Center for Educator Conpensation Reform. (2012). Measuring and Promoting Inter-Rater Agreement of Teacher and Principal Performance Ratings. Retrieved from https://files.eric.ed.gov/fulltext/ED532068.pdf

Centers for Disease Control and Prevention. (2018). Tendencies and weakness in National Blood Transfusion Services- 14 Sub-Saharan African Countries, 2014–2016, 67(50).Retrieved from https://www.cdc.gov/mmwr/volumes/67/wr/pdfs/mm6750a4-H.pdf

Erhabor, O., Charles A, T. (2014). Blood transfusion service delivery challenges in sub Saharan Africa, *Journal of blood medicine, 2, 7–21*, Doi: 10.2147/JBM.S17194.

Mount Kenya University

Finck, R., Ziman, A., Hoffman M., Phan-Tang, M., and Yuan S. (2016). Potential Deterrents and Motivating Factors to Blood Donation in High School Aged Blood Donors. *Journal of Blood Transfusion*, *2016,* http://dx.doi.org/10.1155/2016/8624230

Gathura, G., (2019).Why Kenyans are turning to 'for hire' blood donors. Retrieved from https://www.rocketsciences.co.ke/2019/10/03/why-kenyans-are-turning-to-for-hire-blood-donors/

Giriyan, S.S., Chethana, H.D., Sindhushree, N., Agarwal, A., Nirala, N.K. (2017) Study of Utilization of Blood and Blood Components in a Tertiary Care Hospital. Journal of Blood & Lymph, 7(2), 7: 169. Doi: 10.4172/2165-7831.1000169

Grossman, B., Andre, R., Watkins, Fleming, F., and Michael, R. D. (2005). Cord Blood and Blood Donations Barriers and Motivators among American women of African origin. *American Journal of Hematology, 78*(3), 198-202. Doi: 10.1002/ajh.20308

Hamid, N. Z. A., Basiruddin, R., Hassan, N. (2013). Factors Influencing the Intention to Donate Blood: The Application of the Planned Behavior Theory. *International Journal of Social Science and Humanity, 3*(4), 344-348. DOI: 10.7763/IJSSH.2013.V3.259

Ibramim, I. N., Mamman, A. I., Balogun, M. S., Abubakar, A., Awwalu, S., Kusfa, I. U., Usman, A. B., Waziri, A. D., Muktara H. M. (2019). Attitude towards voluntary blood donation and motivation for donation among hospital blood donors in State Government Hospitals, Kaduna, Nigeria. *International Society of Blood Transfusion, 14, 345–351. DOI: 10.1111/voxs.12515*

Kate, L. F., Michael, J. P., Sandra, C. J., and Andre, M. N. R.(2018).Culturally-tailored campaign effects to increase knowledge, attitudes and intention to donate blood among African migrants in two Australian States: Victoria and South Australia. *PLoS ONE*, *12*(11), DOI: 10.1371/journal.pone.0188765

Kimani, D., Mwangi, J., Mwangi, M., Bunnell, R., Kellogg, T. A., Oluoch, T., Gichangi, A., Kaiser, R., Mugo, N., Odongo, T., Oduor, M., Marum, L. (2010) Kenyan blood donors: Population-based survey comparison of voluntary and family replacement donors. *International Society of Blood Transfusion, 100*(2), 212-218. https://doi.org/10.1111/j.1423-0410.2010.01376.x

Koo, T. K., Li, M. Y. (2016). A Guideline of Selecting and Reporting Intraclass Correlation Coefficients for Reliability Research. Journal of chiropractic medicine,15, 155-163 DOI: 10.1016/j.jcm.2016.02.012

Lattimore, S., Wickenden, C., Brailsford, S. R. (2014). England and North Wales Blood donors: patterns of donation and demography. *Journal of AABB Transfusion, 55*(1), 91-99. https://doi.org/10.1111/trf.12835

Mahfouz, M. S., Ryani, M., Hamzi1, N. A. S., Zaeri1, D. A., Dahdoh, A. A., Almalki1, A. J., Hakami, J. A. A., Aqeeli, A. A. A., Tawashi, I. H.(2021). Blood donation among university students: Practices, motivations, and barriers in Saudi Arabia, Avicenna Journal of Medicine, 11(2), DOI: 10.4103/ajm.ajm_113_20

Mount Kenya University

Mishra, S. K., Sachdev, S., Marwaha, N., and Ajit, A. (2016). A Study of knowledge and attitude among college-going students toward voluntary blood donation from north India. *Journal of Blood Medicine*, *7.* Doi: https://doi.org/10.2147/JBM.S91088

Mohammed, S., Essel, H. B., (2018). Potential barriers, Knowledge about blood donation and Motivational factors for donating blood, in first-time and repeat blood donors. *BMC Hematology 18*(36), https://doi.org/10.1186/s12878-018-0130-3

Murphy, E.L., Shaz, B., Hillyer, C.D., Carey, P., Custer, B.S., Hirschler, N. (2009). Representation of minority and foreign-born among US blood donors: 2006 demographics and donation frequency. *Journal of AABB Transfusion, 49*(10), 2221-2228. Doi: 10.1111/j.1537-2995.2009.02271.x

Nation Africa, (2021). Blood Money - Puzzle of Firm Selling Donations. Retrieved from https://nation.africa/kenya/

Ou, Y., Yau, K.K., Poon, C.M., Hui, Y.V., Lee, S.S., Lee, C.K. (2015). Demographic characteristics and its association with donation frequency. *Journal of the British blood transfusion society, 25*(6), 366-373.Doi: 10.1111/tme.12267

Psychometrics.(2021). Test-retest reliability. Assess the stability of a survey outcome across time. Retrieved from https://www.scalestatistics.com/test-retest-reliability.html

Raghuwanshi, B. N., Pehlajani, K., Sinha, M. K. (2016). Unpaid Donation of Blood among Students - A Cross-Sectional Study on Knowledge and Practice vs. Attitude. *Journal of Clinical and Diagnostic Research*, *10*(10), 18-22. Doi: 10.7860/JCDR/2016/21957.8733

Ritter, S., Hamouda, O., Offergeld, R. (2012). Donation frequencies and Demography of blood and plasma donor populations in Germany. Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz, 51(8), 915-25. Doi: 10.1007/s00103-008-0613-7.

Roberts, N., James, S., Delaney, M., Fitzmaurice, C. (2019). Availability of blood products and the global need: a modelling study. *The lancet Haematology, 6*(12), 606-615. Doi:https://doi.org/10.1016/S2352-3026 (19)30200-5

Rose, K. L., (2015). Blood Donor of the Future: Demographic Predictions. The Black Stone Group Inc. Retrieved from http://www.bgglobal.com/wp-content/uploads/Blood-Donor-of-the-Future_Demographic-Predictions-0215.pdf

Salaudeen, A. G., Odeh, E. (2011). Voluntary blood donation knowledge and behavior amongst learners of a tertiary institution in Nigeria. *Nigerian Journal of Clinical Practice*, *14*(3), Doi: 10.4103/1119-3077.86773

Sara, A., Zito, E., Simonetti, V., Pozzi, M. (2018). Knowledge, Motivations and Barriers among Students in Different Undergraduate Majors regarding blood donation. *American Journal of Applied Sciences 15*(9), 432-442. Doi: 10.3844/ajassp.2018.432.442

Mount Kenya University

Sharma, R. K., Verma, S., Sharma, M., Pugazhendi S. (2016). Voluntary Blood Donation: Attitude and Practice among Indian Adults. *Journal of Community Medicine & Health Education*, Doi:10.4172/2161-0711.1000436

Sheila, T., (2015). Perceptions of Voluntary Blood Donation among the Youth in La Dadekotopon Ghana. Retrieved from http://ugspace.ug.edu.gh

Tagny, C. T., Owusu-Ofori, S., Mbanya, D., Deneys, V. (2010).The sub-Saharan Africa blood donor: a review. *Transfusion Medicine*, *20*(1), 1-10. https://doi.org/10.1111/j.1365-3148.2009.00958.x

Takeshita, A., Adachi, M., Iwao, N., Kajiwara, M., Asai T. and Muroi K. (2014).Increasing Plan for Blood Donor Recruitment and Retention in High School Students; Analyses from Recent Inquiry Surveys. *The American Society of Hematology*, *124*(21), https://doi.org/10.1182/blood.V124.21.5100.5100

Tanywe, A., Matchawe, C., Fernandez, R., Lapkin, S. (2017). Blood donation perceptions among people in Africa a qualitative systematic review protocol. *JBI Database of Systematic Reviews and Implementation Reports, 16*(3), 648-652. Doi: 10.11124/JBISRIR-2017-003473

Toby, L. S. (2003). A personal reflection on the crisis in America's volunteer blood program. Where have all the donors gone? *Journal of AABB Transfusion*, *43*(2), 273-279. https://doi.org/10.1046/j.1537-2995.2003.00325.x

Veldhuizen, I. J. T., Doggen, C. J. M., Atsma F., De Kort, W. L. A. M.(2009). Donor profiles: demographic factors and their influence on the donor career. *International Society of BloodTransfusion,97,129*-138.DOI:10.1111/j.14230410.2009.01201.x2995.2011.03174.x

World Health Organization. (2016). Report on Blood Wellbeing & Accessibility Globally. Retrieved from https://apps.who.int/iris/bitstream/handle/10665/254987/9789241565431-eng.pdf;jsessionid=EC70A8F5A1E4FDF7EF3F37F7ECA8861A?sequence=1

World Health Organization. (2020). Blood wellbeing and readiness. Retrieved from https://www.who.int/news-room/fact-sheets/detail/blood-safety-and-availability

Yuan, S., Hoffman M., Lu, Q., Goldfinger, D., and Ziman, A. (2011). Deterrents and Motivating factors for blood donation among donors at a university campus–based collection center. *Journal of AABB Transfusion*, *51*(11), 2438-2444. Doi: 10.1111/j.1537M

Zanin, T. Z., Denise, H., Cone, D. C., Agrawal, P. (2016). Discerning into a vital resource: Comprehend the promoters and barricades to blood donation in Sub-Saharan Africa. *African journal of emergency medicine*, *6*(2), 70-79. Doi: 10.*1016*/j.afjem.2016.02.003

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APPENDICES

Appendix I: Consent Form

STUDY TITLE: ASSESSMENT OF VOLUNTARY BLOOD DONOR CHARACTERISTICS AMONG SELECTED TERTIARY COLLEGE STUDENTS IN HOMA BAY COUNTY

RESEARCHER: JAMES OCHIENG OKUTHE

We are doing a research study to establish the motivators and barriers to blood donation as well as understand donor characteristic among selected tertiary college students in Homa Bay County. A research study is a way to learn more about people. If you decide that you want to be part of this study, you will be asked to fill a form (questionnaire) by filling in the spaces provided by putting a tick (√) corresponding to your answer on the spaces provided. If you donate blood, ONLY fill section (I) and (II) and if you are NOT a donor, fill section (I) and (III) only. This may take approximately three to five minutes.

There are no direct benefits (A benefit means that something good happens to you) to you directly other than the opportunity to participate in the study and have your perspective included in the resulting thesis. However, the information you provide will help us in understanding barriers & motivators towards voluntary blood donation among tertiary college students and will be used to give feedback to the Homa Bay ministry of health Department and National Blood Transfusion Services.

When we are finished with this study we will write a report about what was learned. This report will not include your name or that you were in the study.

You do not have to be in this study if you do not want to be. If you decide to stop after we begin, that's okay too. You **MUST** have informed your parent/parents/guardian too.

If you decide you want to be in this study, please sign your name.

I, ________________________________, want to be in this research study.

________________________________ ______

(Sign your name here) (Date)

Appendix II: Blood Donation Motivators & Barriers Questionnaire

Serial No..........

BLOOD DONATION MOTIVATORS AND BARRIERS QUESTIONNAIRE

Date....................

The backbone of a well-organized blood transfusion service is the recruitment and retention of voluntary, non-remunerated low-risk blood donors and that has been a chronic challenge in the county for a long time. The county is currently experiencing an ever-increasing demand for blood transfusion that cannot be sustained by the supplies from the regional blood transfusion Center and the campaigns that are currently being done in the schools and colleges. While the demand has increased, the supply is still very inadequate. The purpose of this study is to establish the motivators and barriers to blood donation as well as understand donor characteristic among tertiary college students in Homa Bay County. This information is essential to helping the county health department ensure adequate and consistent availability of blood to help mitigate on health conditions that can only be resolved by blood transfusion. All information received on this form will be treated as strictly confidential. Please fill out the form completely and accurately.

Instructions

Please fill in the spaces provided by putting a tick (√) corresponding to your answer on the spaces provided. If you donate blood **ONLY** fill section (I) and (II) and if you are **NOT** a donor fill section (I) and (III) only.

Section (I) socio-demographic characteristics

1. Religion		2. Age	
a. Christian	[ ]	a) 16-18 years	[ ]
b. Muslim	[ ]	b) 19-21 years	[ ]
c. Hindus	[ ]	c) 21-23 years	[ ]
f. Others specify	[ ]	d) 24-65 years	[ ]

Serial No..........

3. Gender

a) Male [ ]
b) Female [ ]

4. Blood Type

a) O- [ ]
b) O+ [ ]
c) A- [ ]
d) A+ [ ]
e) B- [ ]
f) B+ [ ]
g) AB- [ ]
h) AB+ [ ]

5. Marital Status

a) Single [ ]
b) Married [ ]
c) Separated [ ]
c) Divorced [ ]

6. Learning Institution

a) Tom Mboya University college [ ]
b) Homa Bay Youth Polytechnic [ ]
c) KMTC Homa Bay [ ]
d) KAS Medical Sciences [ ]

7. Program taken

a) Certificate [ ]
b) Diploma [ ]
c) Degree [ ]
d) Masters [ ]

SECTION (II): Motivators

Which of the following factor (s) really motivates you to donate blood?

a) Help family or friend [ ]
b) Good for health [ ]
c) Refreshment after donation[ ]
d) Benefit Others [ ]
e) Rare blood group [ ]
f) Blood donor certificate [ ]

SECTION (III) Barriers

Which of the following factor (s) makes you not to donate blood?

a) Blood banks sell blood [ ]
b) Ineligible(medical reasons) [ ]
c) Lack of time due to studies [ ]
d) Insufficient information regarding blood donation [ ]
e) Lengthy donation period [ ]
f) Afraid of feeling unwell(fainting) [ ]

Appendix III: Blood Donor Questionnaire

KENYA NATIONAL BLOOD TRANSFUSION SERVICE

Donation Number

DONOR QUESTIONARE

Clinic Venue ------------------------------- County -----------------Clinic Code: --------- Donor Number ------------

SECTION 1: DAILY BLOOD DONOR REGISTRATION& SCREENING FORM (Donors please complete this section below)

Surname: ____________ ____________ **Other Names:** ____________ ____________ **GENDER:** F / M

Student Number/ National ID Number: ________________ **Date of Birth:** ------/------/----- (dd/mm/yy)

Marital Status: *(Mark in appropriate box)* | Single | Married | Divorced/Separated | Widowed |

Contact Details: Postal Address (where you would like to receive your correspondence)

____ Code

Home phone number: ------------------------------------ **Cell phone number:** -----------------------------------

Email: -- Residence (county) ---------------------------------

Level of education: None/ Primary/ Secondary/ Tertiary Occupation: ....

When did you last donate Blood? .... **Blood Group:** ....

SECTION 2: HEALTH QUESTIONNAIRE **Circle the appropriate answer**

1. Are you feeling well and in good health today?	Yes/No
2. Have you eaten in the last 6 hours?	Yes/No
3. Have you ever fainted?	Yes/No
In the past 6 months have you:	
4. Been ill, received any treatment or any medication?	Yes/No
5. Had any injections or vaccinations (immunizations)?	Yes/No
6. Female Donors: Have you been pregnant or breast feeding?	Yes/No
In the past 12 months have you:	
7. Received a blood transfusion or any blood products?	Yes/No
Do you have or have you ever had:	
8. Any problems with your heart or lungs e.g. asthma?	Yes/No
9. A bleeding condition or a blood disease?	Yes/No
10. Any type of cancer?	Yes/No
11. Diabetes, epilepsy or TB?	Yes/No
12. Any other long term illness Please Specify	Yes/No

Page 1 of 2 FRM CLN 01 Revision 01

KENYA NATIONAL BLOOD TRANSFUSION SERVICE

SECTION 3: RISK ASSESSMENT QUESTIONNAIRE

The lives of patients who receive your blood are totally dependent on your honesty & frankness in answering the questions below. Your answers will be treated in a confidential manner. Circle the appropriate answer.

In the past 12 months have you:	
1. Received or given money, goods or favours in exchange for sexual activities?	Yes/No
2. Had sexual activity with a person whose background you do not know?	Yes/No
3. Been raped or sodomized?	Yes/No
4. Had a stab wound or had an accidental needle stick injury e.g. injection needle?	Yes/No
5. Had any tattooing or body piercing e.g. ear piercing?	Yes/No
6. Had a sexually transmitted disease (STD)?	Yes/No
7. Live with or had sexual contact with someone with yellow eyes or yellow skin?	Yes/No
8. Had sexual activity with anyone besides your regular sex partner?	Yes/No
Have you ever:	
9. Had yellow eyes or yellow skin?	Yes/No
10. Injected yourself or been injected, besides in a health facility?	Yes/No
11. Used non-medical drugs such as Marijuana, Cocaine etc?	Yes/No
12. Have you or your partner been tested for HIV?	Yes/No
13. **Do you consider your blood safe to transfuse to a patient?**	Yes/No

SECTION 4: DECLARATION (Please read this before you complete the form with your name and signature below)

I declare that I have answered all the questions truthfully and accurately.

I understand that my blood will be tested for HIV, Hepatitis B & C, and Syphilis and the results of my tests may be obtained from the National Blood Transfusion Service.

I understand that should any of the screening tests give a reactive result, I will be contacted by use any communication medium(s) to send me **important information**. Such medium(s) shall include but not limited to e-mail, post office, mobile telephone and/or fixed telephone, and offered counselling to make an informed decision about further confirmatory testing and management.

I hereby give consent to KNBTS to use the contact details provided in this form to communicate to me as the need may be.

I understand the blood may be used for scientific research, main objective being to improve the safety of the blood supply to patients.

I consent to give blood; I understand that it may be used for transfusion for the benefit of others.

Signature: -- **Date:** --

For Official Use:

Weight (kg)	Hb >12.5g/dl	BP	Pulse

Donor is Accepted	
Yes	No

Report:

Name of Nurse / Counselor: ------------------------------ **Date:** ------------------------------

Low Volume	> 1 Venepuncture	Hematoma	Faint		
			Mild	Moderate	Severe

Time Needle In		Time Needle Out	

Report:

Name of Phlebotomist: ------------------------------ **Date:** ------------------------------

Appendix IV: Key Informant Interview (KII) -Topic Guide

ASSESSMENT OF VOLUNTARY BLOOD DONOR CHARACTERISTICS AMONG SELECTED TERTIARY COLLEGE STUDENTS IN HOMA BAY COUNTY KENYA

Key Informant Interview Guide:-

Introduction:

Thank you for agreeing to participate in this interview today. My name is James Okuthe a student of Mount Kenya University and working in the Ministry of Health Homa Bay County. I will be conducting this interview as part of my thesis to understand motivators & barriers of voluntary blood donation among tertiary college students in Homa Bay county Kenya.

The purpose of this study is;

1. To establish socio-demographic characteristics of student blood donors at selected tertiary institutions in Homa Bay County.

2. To determine motivators to donate blood by students of tertiary institution in Homa Bay County.

3. To identify barriers to donate blood by students of tertiary institution in Homa Bay County

During this interview, I will ask you questions related to your work as well as what you know about voluntary blood donation, barriers and motivators of blood donation. Please feel free to bring up any other issues you think are relevant. We're interested in understanding your perspective, as someone who has worked around the area of blood donation. A risk for participation may be that someone outside the research team could find out the responses you have to our interview questions. However, our research team will take appropriate steps to protect the privacy of your data. We will keep everything you share with us confidential. However, the results of the study may be published and full quotes may be used. We will identify all interviewees using generic descriptors for their organizational role, organization and country (e.g. Director, HIV/AIDS Organization, Kisumu). You will have the option to provide us with this descriptor at the end of the interview. With your consent, we will record the interview and transcribe it. After the study is over, all study records will be permanently deleted.

There are no direct benefits to you directly other than the opportunity to participate in the study and have your perspective included in the resulting thesis. However, the information you provide will help us in understanding barriers & motivators towards voluntary blood donation among tertiary college students and will be used to give feedback to the Homa Bay ministry of health Department and National Blood Transfusion Services.

Your participation is voluntary and you can decide not to answer any question or stop the interview at any time or for any reason.

If you have any questions about the research you can contact [Director for Health H/BAY] or MKU,

Do you have any question before we start? ☐ YES ☐ NO

Do you agree to participate in this interview? ☐ YES ☐ NO

Is it ok if I record the interview? ☐ YES ☐ NO

Questions:

1. What is your general view of voluntary blood donation in the region and country at large?
2. What is your general view of voluntary blood donation among tertiary college students?
3. What social demographic characteristics influence Voluntary Blood Donation among tertiary college students? Please give examples
4. What are the main challenges facing voluntary blood donation in Kenya?
5. What are the main challenges facing voluntary blood donation among tertiary college students? Please give examples
6. In your view what are some of the motivators of voluntary blood donation among tertiary college students. Please give examples
7. What will you say are the best practices on voluntary blood donation services in Kenya?
8. What recommendations would you give to improve voluntary blood donation among tertiary college students Kenya?
9. Any other general comments on how voluntary blood donation among tertiary college students can be further improved?

Thank you for your time and your responses!

Appendix V: Focus Group: Topic Guide

FOCUS GROUP: DISCUSSION GUIDE

Introduction: This focus group discussion is designed to assess your current thoughts and feelings about voluntary non remunerated blood donation as part of a study on assessment of voluntary blood donor characteristics among selected tertiary college students in Homa Bay County Kenya. The focus group discussion will take no more than two hours. May I tape the discussion to facilitate its recollection? (If yes, switch on the recorder)

Anonymity: Despite being taped, I would like to assure you that the discussion will be anonymous. The tapes will be kept safely in a locked facility until they are transcribed word for word, then they will be destroyed. The transcribed notes of the focus group will contain no information that would allow individual subjects to be linked to specific statements. You should try to answer and comment as accurately and truthfully as possible. I and the other focus group participants would appreciate it if you would refrain from discussing the comments of other group members outside the focus group. If there are any questions or discussions that you do not wish to answer or participate in, you do not have to do so; however please try to answer and be as involved as possible.

Ground rules

- The most important rule is that only one person speaks at a time. There may be a temptation to jump in when someone is talking but please wait until they have finished.
- There are no right or wrong answers
- You do not have to speak in any particular order
- When you do have something to say, please do so. it is important that I obtain the views of each of you
- You do not have to agree with the views of other people in the group
- Does anyone have any questions? (Answers).
- OK, let's begin

Warm up

First, I'd like everyone to introduce themselves. Can you tell us your name?

Guiding questions

1. What are your general views of voluntary blood donation?
2. What are your thoughts on voluntary blood donation among tertiary college students?
3. What social demographic characteristics influence Voluntary Blood Donation among tertiary college students? Please give examples
4. What are your thoughts on best practices on voluntary blood donation services
5. What are the main challenges facing voluntary blood donation?
6. What are the main challenges facing voluntary blood donation among tertiary college students?
7. In your view what are some of the motivators of voluntary blood donation among tertiary college students. What drives you to Donate?
8. What recommendations would you give to improve voluntary blood donation among tertiary college students?
9. Any other general comments on how voluntary blood donation among tertiary college students can be further improved?

Concluding question

- Of all the things we've discussed today, what would you say are the most important issues you would like to express about voluntary blood donation?

Conclusion

- Thank you for participating. Your opinions will be a valuable asset to the study
- If there is anything you are unhappy with or wish to complain about, please speak to me after this.
- I would like to remind you that any comments featuring in this report will be anonymous
- Before you leave, we have some soft drinks for you to reenergize and appreciate your contributions.

Appendix VI: Ethical clearance Letter

REF: **MKU/ERC/1752**
TO: **JAMES OCHIENG OKUTHE**

Date: 01 February 2021

REG: **MPH/2018/22127**

Dear Sir/Madam,

RE: ASSESSMENT OF VOLUNTARY BLOOD DONOR CHARACTERISTICS AMONG SELECTED TERTIARY COLLEGE STUDENTS IN HOMA BAY COUNTY KENYA

This is to inform you that **Mount Kenya University** has reviewed and approved your above research proposal. Your application approval number is **825.** The approvdl period is **01/02/2021 - 31/01/2022.**

This approval is subject to compliance with the following requirements:

i. Only approved documents including informed consents, study instruments, MTA will be used
ii. All changes including amendments, deviations and violations are submitted for review and approval by **Mount Kenya University**
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to **Mount Kenya University** within 72 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affect the safety or welfare of study participants and others or affect the integrity of the research must be reported to **Mount Kenya University** within 72 hours
v. Clearance for export of biological specimens must be obtained from relevant institutions
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal
vii. Submission of an executive summary report within 90 days upon completion of the study to **Mount Kenya University**

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://oris.nacosti.go.ke and also obtain other clearances needed.

Yours sincerely,

The Chairman
Mount Kenya University
Ethics Review Committee
P. O. Box 342 - 0100, Thika

Dr. Peter G. Kirira
Chairman, Mount Kenya University IERC

Main Campus, General Kago Road, P.O. Box 342-01000 Thika. Tel: +254 67 2820 000,
Cell: +254 720 790 796, 0709 153 000
Email:info@mku.ac.ke, Web: www.mku.ac.ke
Chartered and ISO 9001 : 2015 Certified Institution
Unlocking Infinite Possibilities

Appendix VII: Letter of Introduction

DIRECTORATE OF GRADUATE STUDIES

MPH/2018/22127

11th May 2021

The Director, Research Coordination Division
National Commission for Science, Technology & Innovation
Utalii House, 8th & 9th Floor
P O Box 30623- 00100
NAIROBI

Dear Sir/Madam,

RE: JAMES OCHIENG OKUTHE – REGISTRATION NO. MPH/2018/22127

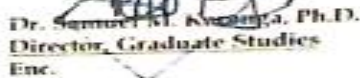
The purpose of this letter is to introduce the above named student who is pursuing **Master of Public Health** in the Department of **Epidemiology and Biostatistics** in the School of **Public Health**.

The title of his research is ***"Assessment of Voluntary Blood Donor Characteristics among Selected Tertiary College Students in Homa Bay County, Kenya."***

He has been cleared by the University's Ethics Review Committee (Certificate attached) and now has to proceed to the field to collect data for his research between **May and July, 2021**.

Any assistance accorded to him will be highly appreciated.

Thank you



Dr. [illegible], Ph.D.
Director, Graduate Studies
Enc.

Main Campus: General Kago Road P.O. Box 342-01000 Thika Tel: +254 67 2820 000 Cell: +254 720 790 796 /0709 153 000

Mou

Appendix VIII: Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 471978

Date of Issue: 19/May/2021

RESEARCH LICENSE

This is to Certify that Mr.. James Ochieng Okuthe of Mount Kenya University, has been licensed to conduct research in Homabay on the topic: ASSESSMENT OF VOLUNTARY BLOOD DONOR CHARACTERISTICS AMONG SELECTED TERTIARY COLLEGE STUDENTS IN HOMA BAY COUNTY KENYA for the period ending : 19/May/2022.

License No: NACOSTI/P/21/10614

471978

Applicant Identification Number

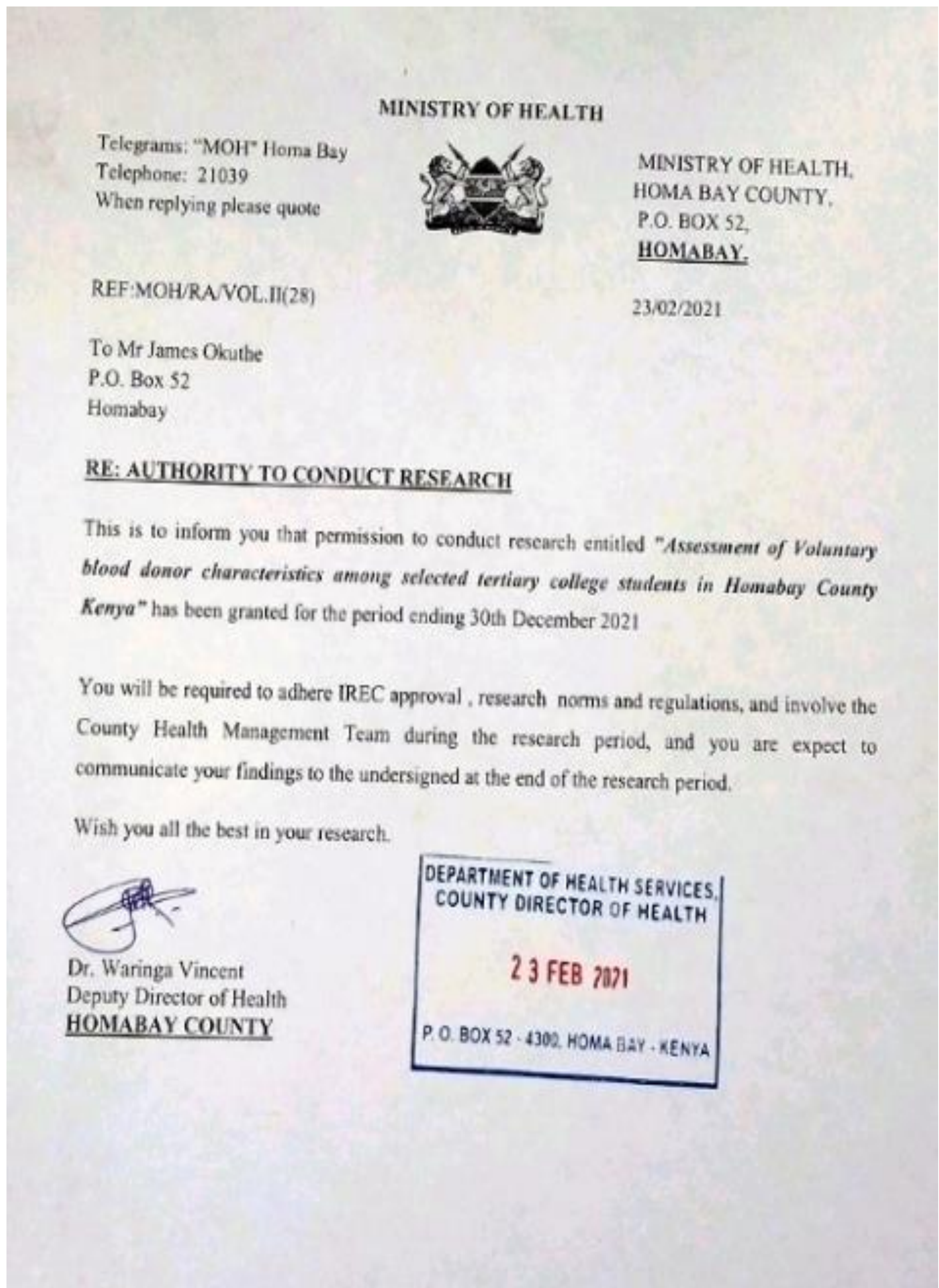
Director General

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

Appendix IX: Homa Bay County Department of Health Research Approval Letter



MINISTRY OF HEALTH

Telegrams: "MOH" Homa Bay
Telephone: 21039
When replying please quote

MINISTRY OF HEALTH,
HOMA BAY COUNTY,
P.O. BOX 52,
HOMABAY.

REF:MOH/RA/VOL.II(28)

23/02/2021

To Mr James Okuthe
P.O. Box 52
Homabay

RE: AUTHORITY TO CONDUCT RESEARCH

This is to inform you that permission to conduct research entitled ***"Assessment of Voluntary blood donor characteristics among selected tertiary college students in Homabay County Kenya"*** has been granted for the period ending 30th December 2021

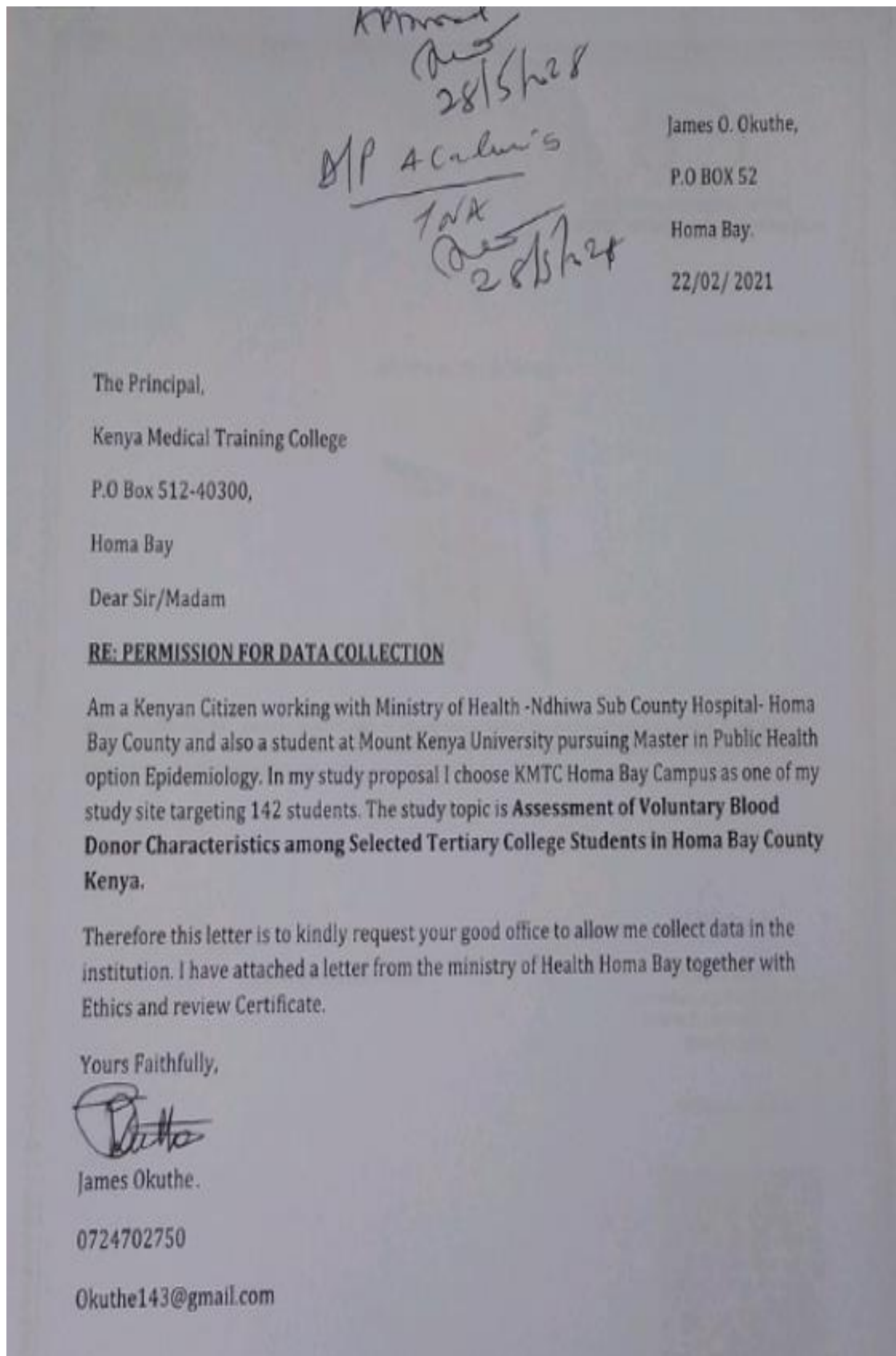
You will be required to adhere IREC approval , research norms and regulations, and involve the County Health Management Team during the research period, and you are expect to communicate your findings to the undersigned at the end of the research period.

Wish you all the best in your research.

Dr. Waringa Vincent
Deputy Director of Health
HOMABAY COUNTY

DEPARTMENT OF HEALTH SERVICES,
COUNTY DIRECTOR OF HEALTH
23 FEB 2021
P. O. BOX 52 - 4300, HOMA BAY - KENYA

Appendix X: Kenya Medical Training College-Homa Bay Data Collection Approval Letter



James O. Okuthe,

P.O BOX 52

Homa Bay.

22/02/ 2021

The Principal,

Kenya Medical Training College

P.O Box 512-40300,

Homa Bay

Dear Sir/Madam

RE: PERMISSION FOR DATA COLLECTION

Am a Kenyan Citizen working with Ministry of Health -Ndhiwa Sub County Hospital- Homa Bay County and also a student at Mount Kenya University pursuing Master in Public Health option Epidemiology. In my study proposal I choose KMTC Homa Bay Campus as one of my study site targeting 142 students. The study topic is **Assessment of Voluntary Blood Donor Characteristics among Selected Tertiary College Students in Homa Bay County Kenya.**

Therefore this letter is to kindly request your good office to allow me collect data in the institution. I have attached a letter from the ministry of Health Homa Bay together with Ethics and review Certificate.

Yours Faithfully,

James Okuthe.

0724702750

Okuthe143@gmail.com

Appendix XI: Kendu Adventist School of Medicine Sciences Data Collection Approval Letter

James O. Okuthe,

P.O BOX 52

Homa Bay.

24/02/ 2021

The Principal,

Kendu Adventist School of Medical Sciences,

P.O. Box 20.

Kendu Bay.

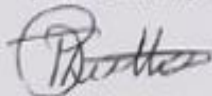
Dear Sir/Madam

RE: PERMISSION FOR DATA COLLECTION

Am a Kenyan Citizen working with Ministry of Health -Ndhiwa Sub County Hospital- Homa Bay County and also a student at Mount Kenya University pursuing Master in Public Health option Epidemiology. In my study proposal I choose Kendu Adventist School of Medical Sciences as one of my study site targeting 56 students. The study topic is **Assessment of Voluntary Blood Donor Characteristics among Selected Tertiary College Students in Homa Bay County Kenya.**

Therefore this letter is to kindly request your good office to allow me collect data in the institution. I have attached a letter from the ministry of Health Homa Bay together with Ethics and review Certificate.

Yours Faithfully,

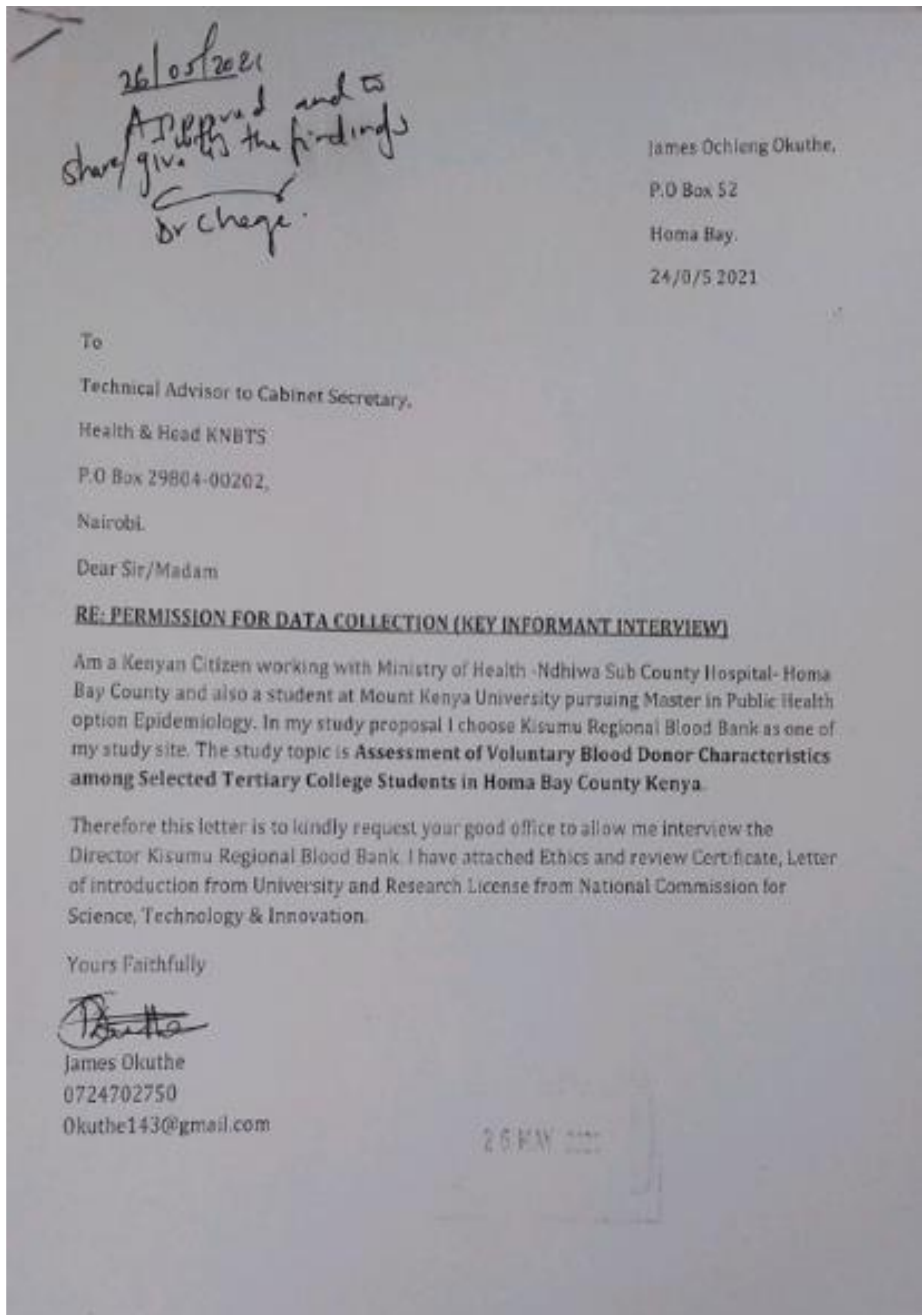


James Okuthe.

0724702750

Okuthe143@gmail.com

Appendix XII: Kenya National Blood Transfusion Services Data Collection Approval Letter



26/05/2021
Approved and to share/give us the findings
Dr Chege.

James Ochieng Okuthe,
P.O Box 52
Homa Bay.
24/0/5 2021

To

Technical Advisor to Cabinet Secretary,
Health & Head KNBTS
P.O Box 29804-00202,
Nairobi.

Dear Sir/Madam

RE: PERMISSION FOR DATA COLLECTION (KEY INFORMANT INTERVIEW)

Am a Kenyan Citizen working with Ministry of Health -Ndhiwa Sub County Hospital- Homa Bay County and also a student at Mount Kenya University pursuing Master in Public Health option Epidemiology. In my study proposal I choose Kisumu Regional Blood Bank as one of my study site. The study topic is **Assessment of Voluntary Blood Donor Characteristics among Selected Tertiary College Students in Homa Bay County Kenya**.

Therefore this letter is to kindly request your good office to allow me interview the Director Kisumu Regional Blood Bank. I have attached Ethics and review Certificate, Letter of introduction from University and Research License from National Commission for Science, Technology & Innovation.

Yours Faithfully

James Okuthe
0724702750
Okuthe143@gmail.com

Appendix XII: Homa Bay Youth Polytechnic Data Collection Approval Letter

James O. Okuthe,

P.O BOX 52.

Homa Bay.

23/02/2021

The Principal,

Homa Bay Youth Polytechnic

P.O. Box 174-40300.

Homa- Bay.

Dear Sir/Madam

RE: PERMISSION FOR DATA COLLECTION

Am a Kenyan Citizen working with Ministry of Health -Ndhiwa Sub County Hospital- Homa Bay County and also a student at Mount Kenya University pursuing Master in Public Health option Epidemiology. In my study proposal I choose Homa Bay Youth Polytechnic as a study site targeting 32 students. The study topic is **Assessment of Voluntary Blood Donor Characteristics among Selected Tertiary College Students in Homa Bay County Kenya.**

Therefore this letter is to kindly request your good office to allow me collect data in the institution. I have attached a letter from the ministry of Health Homa Bay together with Ethics and review Certificate.

Yours Faithfully,

James Okuthe

0724702750

okuthe143@gmail.com

Appendix XIII: Tom Mboya University Data collection Approval Letter

TOM MBOYA UNIVERSITY COLLEGE
(A Constituent College of Maseno University)

OFFICE OF THE PRINCIPAL

Tel: 0746401703/0746401706
Email: principal@tmuc.ac.ke

P. O. Box 199 - 40300
HOMA-BAY

REF: TMUC/REG/ADM2/37 Vol.I (34)

DATE: 1st March, 2021

MR. JAMES O. OKUTHE
P. O. Box 52 - 40300
HOMA-BAY
Tel; 0724702750
Email: okuthe143@gmail.com

Dear Mr. Okuthe,

RE: PERMISSION FOR DATA COLLECTION

Reference is made to your later received on 23rd February, 2021 in which you sampled Tom Mboya University College to collect data for your Master in Public Health research titled **"Assessment of Voluntary Blood Donor Characteristics among Selected Tertiary College Students in Homa Bay County Kenya".**

This is to inform you that your request has been considered and approval granted to enable you collect data for your research within the institution for the intended use and on condition that all ethical practices are observed.

Yours sincerely,

PROF. CHARLES O. OCHOLA, Ph.D
PRINCIPAL

Appendix XIV: Medecins Sans Frontiers Data Collection Approval Letter

Approved
PAUL OTIENO
FOR LAB MANAGER.

James Ochieng Okuthe,

P.O Box 52

Homa Bay.

28/05/2021

To

Laboratory Manager,

Medicines San Frontiers,

P.O. Box 881,

Homa Bay.

Dear Madam,

RE: PERMISSION FOR INTERVIEW (KEY INFORMANT INTERVIEW)

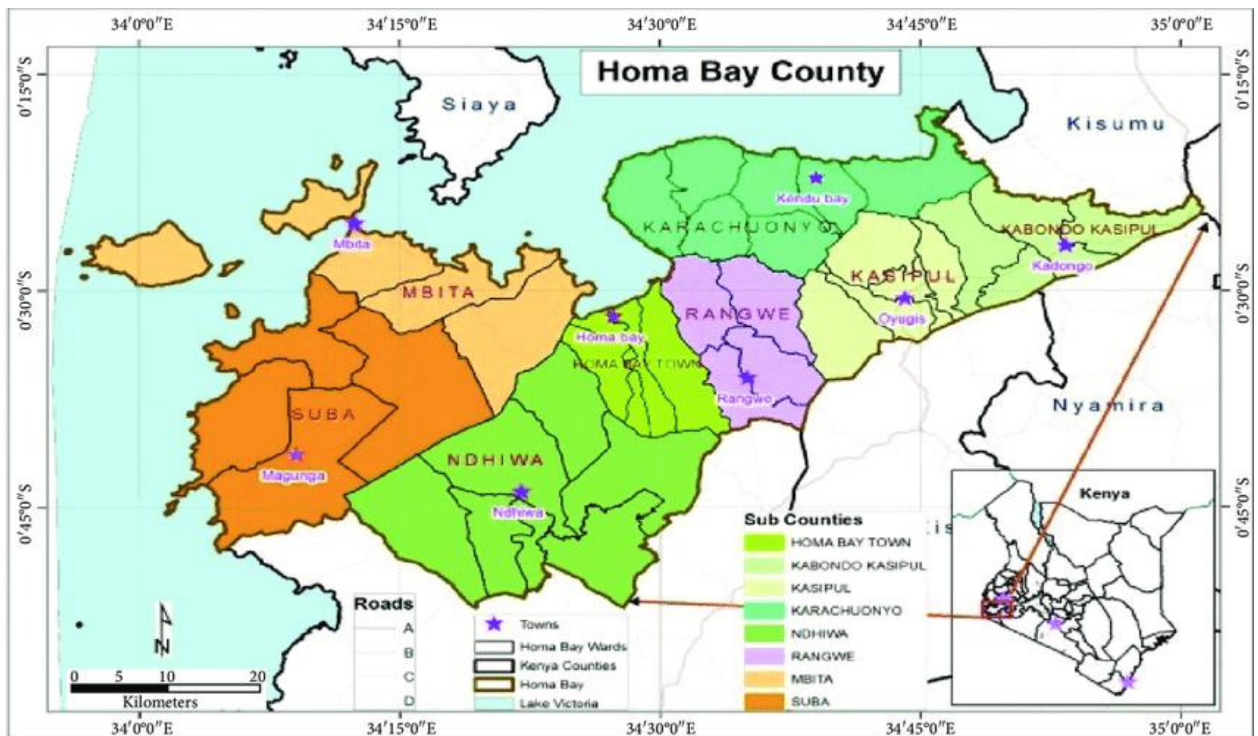
I am a Kenyan Citizen working with Ministry of Health -Ndhiwa Sub County Hospital- Homa Bay County and also a student at Mount Kenya University pursuing Master in Public Health option Epidemiology. In my study proposal I choose MSF Laboratory focal person Homa Bay as one of my study participants. The study topic is **Assessment of Voluntary Blood Donor Characteristics among Selected Tertiary College Students in Homa Bay County Kenya**.

Therefore this letter is to kindly request your good office to allow me have a key Informant interview regarding barriers and motivators of voluntary blood donation. I have attached a letter from the ministry of Health Homa Bay County, Ethics and review Certificate, Letter of introduction from University and Research License from National Commission for Science, Technology & Innovation.

Yours Faithfully

James Okuthe
0724702750
Okuthe143@gmail.com

Appendix XV: Study Location Map



Source: Researchgate.com

Mount Kenya

Appendix XVI: Similarity Index

DETERMINANTS OF BLOOD DONATION PRACTICE AMONG SELECTED TERTIARY COLLEGE STUDENTS IN HOMA BAY COUNTY KENYA

by James Ochieng Okuthe

Submission date: 03-Jul-2023 04:42PM (UTC+0300)

Submission ID: 2126019877

File name: G_SELECTED_TERTIARY_COLLEGE_STUDENTS_IN_HOMA_BAY_COUNT16_2.docx (4.89M)

Word count: 20045

Character count: 111484

DETERMINANTS OF BLOOD DONATION PRACTICE AMONG SELECTED TERTIARY COLLEGE STUDENTS IN HOMA BAY COUNTY KENYA

ORIGINALITY REPORT

20%	16%	10%	9%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

MATCH ALL SOURCES (ONLY SELECTED SOURCE PRINTED)

1%

★ Submitted to Hellenic Open University

Student Paper

Exclude quotes	On	Exclude matches	Off
Exclude bibliography	Off		