Factors influencing blood donation at selected sites in Nairobi, Kenya

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DECLARATION

This is my original work and has not been presented for a degree in any other university.

Signature…… Date……

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This thesis has been submitted for examination with our approval as university supervisors.

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DEDICATION

I dedicate this thesis to my dear husband Peter Muchai Wanjenga for his love and support during the course of this study.

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LIST OF ABBREVIATIONS AND ACRONYMS

BTS	Blood Transfusion Services
CREDOC	Centre de Recherché pour l'Etude et l'Observation des Conditions de Vie
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KEMRI	Kenya Medical Research Institute
KEMU	Kenya Methodist University
KENCOM	Kenya Commercial Bank
Kg	Kilogram
KNBTS	Kenya National Blood Transfusion Services
Km^2	square kilometre
KRCS	Kenya Red Cross Society
m	metre
NBTS	National Blood Transfusion Services
NPHLS	National Public Health Laboratory Services
SPSS	Statistical Package for Social Sciences
USA	United States of America
WHO	World Health Organization

DEFINITION OF TERMS

Anaemia A condition in which the number of red blood cells or their oxygen carrying capacity is insufficient to meet the body's physiologic needs.

Blue collar job A job that involves manual labour and receives an hourly rate of pay rather than an annual or monthly salary. It may involve manufacturing, mining, building and construction trades, mechanical work, repair and operations maintenance or technical installations.

Consecutive sampling This is a non-probability sampling technique in which all accessible subjects re included as part of the sample. It can be considered as the best of all non-probability sampling because it includes all subjects that are available hence making the sample a better representation of the entire population.

Sequential sampling A non-probability sampling technique wherein the researcher picks a single subject or a group of subjects in a given time interval, conducts his study, analyzes the results then picks another group of subjects if needed and so on.

White collar job A job involving non-manual labour often in an office and in which the worker receives a monthly or annual salary.

ABSTRACT

Blood donation has been used as a universal remedy for many centuries all over the world. The World Health Organisation (WHO) recommends that blood should only be collected from voluntary, non-remunerated donors. With new medical advances, there is increased demand for blood and blood products but in many countries, including Kenya, this demand has never been met. The objective of this study was to determine knowledge levels about blood donation amongst potential adult donors at selected sites in Nairobi, their attitude towards donation of blood and subsequently what factors, both negative and positive, influence their blood donation. A total of 456 adults aged 18-65 were selected through consecutive sampling at 3 sites in Nairobi within a period of 4 months from November 2010 to February 2011. Information was collected using a semi-structured questionnaire on socio demographic characteristics, perception concerning risks of donation and opinions on motivational and deterrent factors to donating blood. Data was analysed using SPSS version 10. It was found that 41% of the respondents had donated blood in the past but 59% had not. There was no significant difference between the numbers of males and females who had ever donated blood ($P>0.50$). The main reasons for donation were altruism (33.7%) and duty (32.1%). Other reasons were encouragement by a friend to donate (13.9%), hearing media appeal for blood (11.8%) and being compelled to donate at school (3.7%). Analysis on participants' opinions about what hinders individuals from donating blood revealed that the two most frequent responses were fear of having their HIV status checked (31.6%) and ignorance/lack of knowledge about blood donation (21.5%). Others included fear of pain, anaemia and infection from use of contaminated needles. Most of the participants (68.9%)

were of the opinion that enhanced education of the public about blood donation would encourage more people to donate blood. Multivariate analysis was done to identify independent predictors of donating blood ($p<0.05$). This analysis revealed that respondents who were currently willing to donate blood or thought that there was relatively small risk of acquiring a disease through blood donation or who thought that lack of time was not a hindrance to blood donation were likely to have donated blood in the past.This study shows that despite numerous media campaigns, enhanced education of the public is needed specifically addressing the fears that plague the potential blood donor so as to be able to recruit more blood donors and thus meet national targets.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background information

Blood and blood products are an essential part of health care for patients deficient in one or more blood components. The demand for blood and blood products in most countries, including Kenya, continues to increase because of the rise in human life expectancy and the implementation of new and aggressive surgical and therapeutic methods requiring large quantities of blood and blood products (Marantidou *et al.,* 2007). Blood services worldwide have struggled with a permanent shortage of blood. Blood needs have been increasing gradually on a global scale as a consequence of road accidents and diseases like sickle cell diseases, heart diseases and cancers like lymphoma or leukaemia (Sunitha *et al.*, 2007). Ensuring an adequate blood supply is thus a major concern. It is vital that efforts be made to educate the public about the importance of blood donation and encourage more people to become regular donors by devising successful recruitment and retention strategies.

The Kenya National Blood Transfusion Service (KNBTS) is responsible for the collection of blood so as to provide safe blood to Kenyan hospitals. Initially, it started off with an annual average of 10,000 units of blood whereby one unit of blood is equivalent to 450ml. This led to the formation of partnerships so as to collect more blood. Currently the KNBTS works in conjunction with Hope Worldwide which collects blood in the community and in faith based organizations, the Kenya Red Cross which is responsible for collection of blood in middle level

colleges and secondary schools and Bloodlink Foundation which is charged with the collection of blood from donors in universities and corporate institutions. These partnerships, as well as several national blood drives and media campaigns, have led to a significant increase in the amount of blood units collected nationally. Despite these efforts the national minimum target of 200,000 units of blood needed annually has never been reached. This study is to determine factors, both positive and negative, that affect blood donation in Nairobi, Kenya and hence determine how to motivate more people to donate blood.

1.2 Problem statement

Over the last 4 years, trends in donation of blood in Kenya have declined from 113,080 units collected in 2006 as compared to 107,552 units collected in 2009. According to the 2009 national census, Nairobi has a population of 3,138,295 people and about one third are adults. This population alone is enough to meet the country's blood needs and yet only a small fraction of the residents of Nairobi donate blood. In fact, blood donation in Nairobi has been declining over the years where 38,808 units of blood were donated in 2006 as compared to 30,840 units collected in 2009.

As an effort to meet the nation's blood needs, the KNBTS has started a 'retention and prevention' program whereby Kenyans are invited to be tested for HIV and thereafter to become regular blood donors since it was thought that the major reason for people not volunteering to donate blood was fear of finding out their HIV status. Despite this and the extensive media campaign against HIV by

promotion of voluntary testing, there has been no significant increase in numbers of people volunteering to donate blood in Nairobi in the last 5 years. There is therefore need to establish factors that hinder donation of blood and motivation factors that can help make the populace donate blood.

1.3 Justification

Blood is required in many instances in many hospital settings in Nairobi. However, it cannot be synthesized thus human donors are its only source. In addition, blood remains a perishable commodity thus cannot be stored beyond 35 days. It is therefore crucial for individuals to donate blood and do so regularly hence there is a need to motivate more people to donate blood and encourage them to become repeat donors as well as identify and address factors that hinder them from donating. This study aims to identify factors that motivate and hinder eligible blood donors at selected sites in Nairobi to donate blood.

1.4 Objectives

1.4.1 General objective

The general objective of this study was to determine the factors influencing blood donation at selected sites in Nairobi.

1.4.2 Specific objectives

1.4.2.1. To establish the socio-economic and demographic characteristics of blood donors and potential blood donors at selected sites in Nairobi.

1.4.2.2. To establish the factors that encourage or discourage donation of blood by residents of Nairobi.

1.4.2.3. To determine perceived risks associated with blood donation at selected sites in Nairobi.

1.5 Hypothesis

Null hypothesis: There are no factors influencing blood donation at selected sites within Nairobi, Kenya.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Global view

2.1.1 Blood donation in the USA and Canada

The USA uses a blood supply barometer in which ‘green’ indicates that a blood centre has at least a 3 day supply of blood while ‘red’ indicated that the centre has less than that. The US Department of Health and Human Services Advisory Committee on Blood Safety and Availability recommends that a 5- to 7-day supply is the desirable goal for the nation's blood centres but many centres cannot sustain even a 3-day supply (Holmberg and Brecher, 2004). Traditionally, it has been found that people tend to donate more in the holiday seasons like December hence most centres were in the ‘green’ but come January most go to ‘red’ as the blood becomes depleted and this leads to cancellation of elective surgeries and broadcasting of urgent appeals for blood. This pattern has been noted in the last 15 years and hence there is need to understand the blood donor (Popovsky, 2006). 60 percent of the US population is eligible to donate blood but it is estimated that less than 5 percent donate each year (Heinrich, 1999; National Health Interview Survey, 1993; Popovsky, 2006). One study found that 45 percent of people in the USA have donated at least once in their lifetime hence about half of the eligible US population has donated blood at one time, but stopped for some reason (National Health Interview Survey, 1993). Many studies have identified altruism as the primary reason given for donating, with awareness of the need for blood, social pressure;

need to replace blood used by family or friend, and increased self-esteem and recognition also serving as important motivators (Edwards and Zeichner, 1985; Piliavin, 1990; Julius and Sytsam, 1993; Glynn *et al.*, 2002). Altruism was demonstrated as the primary cause of donation immediately following the September 11, 2001 bombing of the twin towers of New York where almost 500,000 units of blood were collected nationwide after this national catastrophe, with about 60 percent of donors giving blood for the first time at some centres (Schmidt, 2002*;* Ouellette, 2002).

While altruism was the dominant reason for donating, logistical issues such as lack of time, inconvenience and fear of disease were most significant for donation avoidance (Lemmens *et al*., 2009; Shaz *et al*., 2009). One study in the USA showed that the lack of a convenient location was the most important factor for both first time (32-42%) and repeat donors (26-43%). The "convenience factor" was much more important to donors who were age 25 or younger (Schreiber, 2006). A corresponding study amongst Canadian university students showed similar results with altruism as the main reason for donating while logistical issues were the main deterrents (Hupfer *et al.,* 2005). In one study it was shown that despite all of the media appeals and information being presented about the importance of donating blood, most of the participants were unaware of the need for blood and that fear and inconvenience were the greatest deterrents to donating blood. Better education campaigns to allay fears about donating and workplace drives were considered important motivators (Mathew *et al.,* 2007). Incentives like monetary remuneration

and time off work were found to have more of an influence in first time and high-risk donors (Glynn *et al.*, 2002).

2.1.2 Blood donation in Europe and Australia

There have been surprisingly few studies carried out in Europe and Australia concerning blood donation in the 1980s and 1990s unlike the 1960s and 1970s. We, however, live in a world where the pace of changes in technical, cultural, social, political, philosophical and moral influences on the individual is increasing and the subject's attitudes, opinions, beliefs and behaviour are consequently subject to significant alterations. It is therefore not reasonable to assume that motives and incentives for complex acts such as blood donation are the same as 30 years ago (Sojka and Sojka, 2008). This realization led to the implementation of several studies in the last 10 years or so.

Donations of blood in most of Europe and Australia are by non-remunerated volunteers. Studies of volunteer, non-remunerated donors may be especially important now that many western countries are encountering difficulties in recruiting and maintaining their donor pools (Heier and Bosnes, 2001; Finnish Red Cross Blood Transfusion Service, 2003). Demand for blood and blood products emanates from demand for blood transfusion therapy, both for blood loss and deficiencies and this is especially true with the advances in medical management. This demand may often not be met as industrialized countries have a relatively limited voluntary blood donor pool (Godin *et al.*, 2005; World Health Organization, 2007). In France, for instance, only 4% of the general population donated blood in

2005 (Bazin and Malet, 2006). It is therefore important to determine the socio-demographic characteristics and factors that motivate or deter blood donation in these regions.

In Australia it was found that areas with young women aged 20-29 and older men aged 40-49 had a higher proportion of blood donors while areas with young men aged 20-29 and people born overseas, that is naturalized Australians, had a lower proportion of blood donors. This was thought to be because Australian blood drives target young women more than young men and the fact that immigrant Australians may not feel sufficiently integrated to participate in blood donation (Hollingsworth and Wildman, 2004).

Norway has remained self-sufficient in blood and plasma products since 1982, using only voluntary, non-remunerated donors. There are 56 Norwegian blood banks which are integrated parts of public hospitals, and each maintains its own donor pool (Solheim *et al.*, 1996). In this country, it was found that the blood donor socio-demographic characteristics were found to be similar to that of the general population which meant that all in the population donated blood equally and that motivational factors were altruism and empathy; social reasons (such as the influence of friends and family); strengthening of one's self-esteem; positive experiences associated with donation; and a moral obligation to donate (Misje *el al.*, 2005).

In the French population, several studies have been done to determine barriers to donation. One study showed that the primary barriers to blood donation among non-donors are lack of time (40%), lack of solicitation (36%) and medical reasons (30%) (Institut Louis Harris, 2002). According to another survey, the main barriers to blood donation in the French population are negligence of the issue (34%), lack of solicitation (32%) and medical reasons (31%) (CREDOC, 2007). These findings were corroborated by a more recent study which showed that the main obstacles to blood donation were medical reasons (32%), lack of time (15·12%), fear (12·20%), negligence (10·03%), lack of information (7·69%), no particular reason (7·18%), lack of solicitation (6·18%), lack of opportunity (5·18%) and prior deferral (4·43%) (Duboz and Cunéo, 2010).

In Sweden, it was noted that altruism ranked as the most general motive for donation of blood and also for continuing to be an active blood donor. Yet, for the first blood donation, direct 'influence from friends/relatives', 'media appeal' and other types of recruitment were more commonly reported as reasons or motives for donating blood than altruism. The most commonly reported obstacle to becoming a regular blood donor was 'laziness' (19·1%) followed by 'fear of needles' (10·5%) (Sojka and Sojka, 2008).

2.1.3 Blood donation in Asia and the Middle East

The China Blood Donor Law only allows for two whole-blood donations per year thus suggesting that recruitment in China must be both efficient and sustained. Before 1998, most Chinese donors were paid but in 1998 the law prohibited paid donation. (Shan *et al.*, 2002). Blood banks are now moving to implement a

voluntary, nonremunerated system to comply with this law. This has not been easy as in many urban areas throughout China many unpaid donors are pressured to donate blood by their employers, social units, or schools. An example is Xinjiang where blood donation is essentially required of all university students. In China, blood donation takes place either at blood collection centres or at mobile collection buses. It is thought that donors who donate at blood centres may have higher levels of coercion to donate, through their places of employment, compared with those, mostly voluntary donors, who give at the mobile collection buses. Indeed, workers from factories are commonly brought as a group to the blood centres to give blood (Zaller *et al.*, 2006).

In Iran, one study done at Yazd, an urban city, showed that 100% of all donated blood is from voluntary, non-remunerated donors (Iranian Blood Transfusion Organization, 2002–2003). Another study showed that although the attitude of women in Iran towards blood donation is good, only a small percentage actually donate blood (Javadzadeh *et al.*, 2006). In Iran, the percentage of women donors varies between 18·9% and 1·6%, but only 5% of blood donors in Yazd are women (Iranian Blood Transfusion Organization, 2002–2003). In Iran, the sense of moral duty and spiritual reward are the main reasons for donations with 85·6% of the population under study reporting altruism as the most important motivational factor, making the job of donor recruitment relatively easier in Iran (Javadzadeh *et al.*, 2006).

At present, only a voluntary system exists for blood collection in Thailand and although blood banks have been in existence for many years, the blood supply is

still insufficient (Wiwanitkit, 2000). In Thailand, the main group of blood donors comprises university students (National Blood Centre, Thai Red Cross Society). For this reason, most studies done concerning blood donation are carried out amongst university students. One such study showed that most of the subjects had good knowledge about blood donation but only 11% had ever donated blood voluntarily while most non-donors (85%) indicated fear as the major reason for not donating blood, including uncertainty as to the safety of donating blood. For those who actually did donate blood, no main reason (88%) was given for doing so (Wiwanitkit, 2002).

2.2 Blood donation in Africa

Availability of adequate blood supply remains an issue of concern especially in developing countries where 82% of the global population lives. Interestingly, only 39% of the world's blood supply originates from there (WHO, 2004). It is expected that by 2012, blood transfusion services in Africa should achieve specific targets such as drafting and/or implementing a national blood policy and collecting blood from more than 80% of voluntary non-remunerated donors (Takpo *et al.*, 2007). Knowledge of the sociologic characteristics of the blood donor is crucial to ensuring adequate blood supply in Africa and several studies have been carried out in various African countries to determine these characteristics. It was noted that in Sub-Saharan Africa, the blood donor was more often a family or replacement donor and accounted for over 70% of blood donor populations in most instances (Takpo *et al.*, 2007). Most donors were under 30 years of age (Cunha *et al*, 2007; Hladik *et al.*, 2006; Nébié *et al.*, 2007) and more than 70% of the donors were male (Nébié

et al, 2007; Allain *et al.*, 2008). In 2003, UNESCO reported that only 26·5% of sub-Saharan Africans had at least completed secondary school education thus, illiteracy and poor education are common in Africa suggesting that the blood donor is more often than not poorly educated (Tagny *et al.*, 2010).

There are few studies that have examined issues that influence donor motivation and perceptions in sub-Saharan African donors for example Olaiya *et al*. (2004) in Nigeria and Agbovi *et al.* (2006) in Togo. These studies showed that blood donors have unfounded fears: fear of knowing one's HIV serologic status, fear of being infected with diseases and myths which purport that donating blood can decrease one's libido, cause weight loss, cause high blood pressure or even lead to death. Several countries implemented programs to counter these fears and one Ghanaian study showed that providing an environment that adapts to the local cultural background is effective not only in recruiting first-time donors but also in generating repeat donations (Allain *et al.*, 2008). One Senegalese study showed that the major motivating factors to blood donation were altruism (43%) and awareness of a blood shortage (20.3%) and never having been contacted to give blood was the number one obstacle to blood donation (37.3%) (Duboz *et al.*, 2010). All in all, most sub-Saharan countries have not reached their blood reserve targets hence more effort is required in the drive for education, motivation and recruitment of regular donors.

2.3 Blood donation in Kenya

Initially, blood donation and transfusion services in Kenya were run by the National Public Health Laboratory Services which was a division of the Ministry of Health. Under NPHLS, structured blood transfusion services were mainly hospital based and were coordinated by provincial and district medical laboratory technologists at their own levels. Kenya had 190 hospital-based BTS institutions which were distributed as follows: Nairobi Province 16, Central Province 25, Eastern Province 26, North Eastern Province 3, Coast Province 16, Rift Valley Province 43, Nyanza Province 38 and Western Province 23. This meant that blood donation and transfusion services were hospital based and were integrated with other hospital services whereby major hospitals and other health facilities collected and screened blood for their own use. This resulted in most of the donors being family replacement donors which is contrary to the WHO recommendation that donation be by voluntary non-remunerated donors (WHO, 2004). It also resulted in blood shortages in some hospitals and subsequent loss of life.

Until 2001, Kenya did not have a national blood policy with a developed and coordinated framework to oversee supply of adequate safe blood for its requirements. In 2001, the Kenya National Blood Transfusion Services was established to collect, test, process and distribute blood and blood components to health facilities and support appropriate blood use in these facilities. It provides blood to both public and private health institutions. The KNBTS works with three other organizations to mobilize for blood donors in the country: Kenya Red Cross, Hope Worldwide Kenya and Bloodlink Foundation. The KNBTS and these

organizations only recruit voluntary blood donors by appealing for blood donation through campaigns in market places, work places, worship places, schools and the media (Kimani *et al.*, 2011). Since the establishment of NBTS, national blood collection has increased from about 22 000 units in 2001 to 107,552 units in 2009 (KNBTS, 2010). Despite this increase in donations, this translates to only three blood units per 1000, which is far below the WHO recommended level of 10–20 units per 1000 population (WHO, 2004). However, intense campaigning by the KNBTS shows that there is a gradual shift in blood donation from reliance on family replacement donors to voluntary donors. Voluntary donors represented 2 in 10 blood donors in 2001, 4 in 10 in 2003 and 6·5 in 10 in 2007 (KNBTS, 2007).

Several studies have been carried out in Kenya to determine the characteristics of the blood donor in Kenya. They determined that most Kenyan blood donors were younger, well educated males (Kimani *et al.*, 2011; Basavaraju *et al.*, 2010; Rajab *et al.*, 2005). However, not many studies have been done to determine motivational or deterrent factors toward blood donation in the Kenyan population.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study design

This was a descriptive cross-sectional study.

3.2 Study site

The study was conducted in Nairobi, Kenya. Nairobi is located in the southern part of the country, has an elevation of 1795m above sea level and occupies 696 km^2. It is the capital city of Kenya and is the most populous East African city with a population of 3,138,295 people according to the 2009 Kenya national census. The study was conducted at three sites, namely:

- KENCOM bus stage – this is a major bus terminal located outside Kenya Commercial Bank (KENCOM) building on Moi Avenue within the central business district of Nairobi city through which a cross-section of Nairobi residents pass. This is a very busy bus stage with most of the buses that ply the city routes stopping here hence is a high flow area for foot traffic.
- Kenya Methodist University, Nairobi campus – this is a university which has its main campus in Meru and it's 2^{nd} largest campus within the city of Nairobi. The study site was located at KEMU Hub building along Koinange Street in Nairobi.
- Unilever Kenya – this is a large multinational company situated within Industrial area in Nairobi, Kenya.

The 3 sites were chosen to represent the 3 strata of educational institutions, corporate and street sites where the KNBTS regularly carries out blood donation activities.

3.3 Study population

3.3.1 Inclusion criteria

The study included males and females who had the following characteristics:

i. Age - between 18-65 years.
ii. Weight – 50 kg or more. This is a medical requirement for all donors.
iii. Those who gave consent.

3.3.2 Exclusion criteria

The study excluded the following people:

i. Pregnant women – this is because they are medically ineligible as potential donors. Women were asked about their last menstrual period and any who were suspected to be pregnant (that is, who had not had menses for 4 weeks or more) were excluded.
ii. Age – people <18 years or >65 years.
iii. Weight – all who weigh <50 kg as they were medically ineligible to donate blood.
iv. Those who did not consent to take part in the study.

3.4 Sample size estimation

Sample size estimation was done using the formula by Fischer *et al* (1998) at 95% confidence interval and prevalence of 50% because the exact proportion of Nairobi population that donates blood is not well known.

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

Where;

n = Minimum sample size required

d = Absolute precision (5%)

α = Level of significance at 95% confidence interval (5%)

Z = Standard normal deviate corresponding to 95% confidence interval (1.96)

P = Assumed proportion of the population that donates blood (this is not known hence it is assumed to be 50%).

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

An allowance of 18% was calculated for spoilt or incomplete questionnaires hence this figure was adjusted to 456 which was distributed as evenly as possible within the three sites.

3.5 Sampling procedure

Blood donation centres generally fall into 3 strata: the street, educational institutions and corporate institutions. The 3 study sites were chosen from among many sites at which the KNBTS carries out regular blood donation exercises. This was done as follows:

- Out of the 12 universities with campuses within Nairobi that regularly carry out blood donation activities (Appendix3), KEMU was randomly selected to be representative using the lottery method of simple random sampling.
- Out of the 70 corporate organisations in Nairobi that regularly carry out blood donation activities (Appendix 4), Unilever was randomly selected to be representative using the lottery method of simple random sampling.
- Out of the 7 street locations in Nairobi where blood donation exercises are regularly carried out (Appendix 5), KENCOM bus stage was randomly selected to be representative using the lottery method of simple random sampling.

Sequential sampling of respondents was done at the KENCOM site while respondents at KEMU and Unilever were selected using consecutive sampling until adequate sample size was attained. The selection within the university was done within 5 core classes that all students must attend while at Unilever it was done at the staff canteen where all staff usually takes their lunch. This ensured that all the respondents at the three study sites had equal chance of being chosen for this study.

3.6 Pretesting

A Preliminary pre-test of a semi-structured questionnaire was conducted on 20 individuals at KENCOM. This was used to fine-tune the questionnaire including an estimate of the duration the questionnaire was expected to take on one person.

3.7 Data collection and verification

A semi-structured pre-tested interviewer administered questionnaire was applied to participants who consented to the study drawn from all the 3 study sites. The questionnaire was administered either in English (Appendix 1a) or Kiswahili (Appendix 1b) depending on the preference of each respondent. It comprised of 19 items on socio-economic variables including monthly income, number of times the respondent has donated blood, respondents' views on incentives to donation and perceived risks of donation. All questionnaires were serialized using a unique number per respondent in order to facilitate the validation and accountability process. There was consistent use of a standardized interview translation protocol, training procedures, and use of appropriate language to minimize interpersonal variation in data quality. Completed questionnaires were checked for completeness and later stored by the researcher.

3.8 Data management and analysis

Data collected from the study was coded and double entered into a computer database designed using MS-Access application. Data verification and validation was performed by rechecking all data entries with the original data forms to achieve a clean dataset that was then exported into a Statistical Package format (SPSS). A clean dataset was stored in a computer hard drive disk ready for analysis. Back up

files were stored in flask discs. This was done regularly to avoid any loss or tampering. All the questionnaires were stored in a lockable drawer for confidentiality.

Data analysis was conducted using SPSS statistical software. Exploratory data techniques were used at the initial stage of analysis to uncover the structure of data and identify outlier or unusual entered values. Descriptive statistics such as proportions were used to summarize categorical variables. Pearson's Chi-square test or fisher exact test was used to test for the strength of association between categorical variables.

All exposure variables (independent factors) were associated with the dependent variable (*ever donated blood*) to determine which ones had significant association. Odds Ratio (OR) and 95% Confidence Interval (CI) were used to estimate the strength of association between independent variables and the dependent variable. The threshold for statistical significance was set at $\alpha = 0.05$ and a two-sided p value at 95% confidence intervals (CI) reported for corresponding analysis.

All independent variables identified to significantly associate with *'ever donated blood'* were considered together in a multivariate analysis. This was performed using binary logistic regression where backward conditional method was specified in order to eliminate confounders and effect modifiers. Adjusted odds Ratios (AOR) with their respective 95% Confidence Interval (CI) were used to estimate the strength of association between the retained independent variables and *'ever donated blood'*.

3.9 Ethical considerations

The study involved human subjects aged 18 years and over hence ethical consideration was pertinent. Clearance to carry out the study was obtained from the KEMRI scientific steering committee (Appendix 6) and the National Ethics Committee (Appendix 7) as well as the Public Relations office of Unilever Ltd and the Student's Welfare Authority of KEMU. Written consent was also sought from each respondent (Appendix 2). The respondents were expected to willingly participate in the study and they were given all information about the study in order to make an informed decision about participating or not.

Respondents were protected by keeping the information given confidential and no questionnaires contained any of the respondents' names. The identity of individuals was protected by using numbers only. Respondents were also assured that any information obtained was to be used only for the purpose indicated in the objectives and that their consent would be sought before revealing their information for any other purposes. The study did not cause any physical or psychological harm to the respondents.

3.10 Study limitations

For those who had donated blood before, there was difficulty in recalling the pre-donation questions hence difficulty in grading them. This may have led to some recall bias. To minimize this recall bias, it was ensured that a copy of the pre-donation questions was available to the respondents.

CHAPTER FOUR

4.0 RESULTS

4.1 Demographic characteristics

4.1.1 Sex, age and distribution of the respondents at the study sites

There was a higher proportion of males (58.6%; 267) compared to females (41.4%; 189) as seen in Table 4.1. Majority of the respondents (66.4%; 303) were aged 18 – 28 years with a small proportion (4.2%; 19) aged 49 years or more.

Table 4.1: Distribution of respondents according to gender and age

Variables	n=456	%
Sex		
Male	267	58.6
Female	189	41.4
Age in years		
18-28	303	66.4
29-38	84	18.4
39-48	50	11.0
49-58	15	3.3
59-65	4	0.9

4.1.2 Education level and religion of the respondents

A majority of the respondents (79.0%; 360) were highly educated (tertiary and university) as shown in Table 4.2. A majority of the respondents (93.4%; 426) were noted to be Christian.

Table 4.2: Distribution of respondents according to education level and religious affiliation

Variable	n=456	%
Highest education level		
None	13	2.9
Primary	9	2.0
Secondary	74	16.2
Tertiary	123	27.0
University	237	52.0
Occupation		
White collar	113	24.8
Blue collar job	117	25.7
Unemployed	26	5.7
Student	200	43.9

4.1.3 Occupation and income of the respondents

Assessment of monthly incomes revealed that a higher proportion of the respondents (69.1%; 315) were earning 15,000 or less as seen in Table 4.3. The proportion of those in white collar jobs (24.8%; 113) was comparable to that of respondents in blue collar jobs (25.7%; 117).

Table 4.3: Distribution of respondents according to income and occupation

Variable	n=456	%
Average net income per month in KES		
0-15,000	315	69.1
16,000-30,000	53	11.6
31,000-45,000	24	5.3
46,000-60,000	26	5.7
>60,000	38	8.3
Religion affiliation		
Christian	426	93.4
Muslim	22	4.8
Traditional/Atheist	8	1.8

4. 2 Blood donation practices amongst the respondents who had ever donated blood

Out of the 456 respondents, 41.0% (187) had ever donated blood as shown in Figure 4.1.

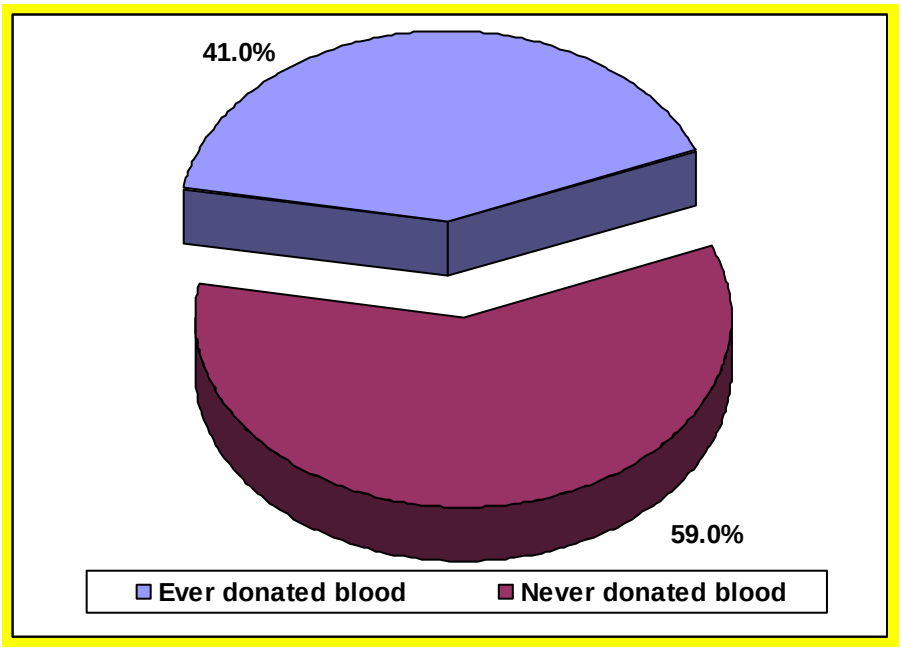

Figure 4.1: Proportion of respondents in relation to blood donation

Of the 187 respondents who had ever donated blood, 53.5% (100) had donated blood once in the last 12 months with 9.1% (17) donating twice or thrice. Considering donation in a lifetime, 46.0% (86) had donated blood twice or more as shown in Table 4.4.

Table 4.4: Number of times the respondent had donated blood

Responses to questions	n=187	%
In the last 12 months		
None	70	37.4
Once	100	53.5
2 - 3 times	17	9.1
In a lifetime		
Once	101	54.0
2-5 times	78	41.7
More than 5 times	8	4.3

The respondents' main reason for donating blood revealed a broad range of outcomes as shown in Table 4.5. The two most frequent responses were; because it's the right thing to do as indicated by 33.7% (63) of the respondents and that a friend/relative needed blood as indicated by 32.1% (60) of the respondents.

Table 4.5: Main reasons for donating blood

Reasons	n=187	%
Because it's the right thing to do	63	33.7
Friend/relative needed blood	60	32.1
Encouraged by friend or accompanied friend to donate blood.	26	13.9
Heard appeal for blood in the news/radio	22	11.8
To get biscuits and soda after the transfusion	9	4.8
Compelled to donate while in school	7	3.7

Most respondents (96.3%; 180) indicated that all the questions asked prior to donation were important for their safety and that of the receivers of their blood while 94.7% (177) indicated that the questions were clear and easy to understand

and 93.6% (175) of the respondents indicated that they told the whole truth when answering the pre-donation questions. However, 29.4% (55) did not disclose all the facts regarding the questions asked at the time of donation (Table 4.6).

Table 4.6: Distribution of responses to questions asked before donation

Questions asked	**n=187**	**%**
All important for my safety and that of the receivers of my blood		
Yes	180	96.3
No	7	3.7
Clear and easy to understand		
Yes	177	94.7
No	10	5.3
I always tell the whole truth when answering these questions.		
Yes	175	93.6
No	12	6.4
I did not disclose all the facts regarding the questions asked at the time.		
Yes	55	29.4
No	132	70.6

Analysis of client satisfaction among those that ever donated blood revealed varying outcomes using the Lickert scale as shown in Table 4.7. Most respondents agreed that the donation site was clean (96.3%; 180), warm and welcoming (94.3%; 176). Further, majority of the respondents (92.0%; 172) agreed that the attending staffs were helpful and courteous while 67.4% (126) agreed that the waiting time was reasonably short.

Table 4.7: Distribution of responses concerning clients satisfaction during the last donation site visit

Responses	n=187	%
It was clean and presentable		
Agree	180	96.3
Disagree	7	3.7
It was warm and welcoming		
Agree	176	94.3
Disagree	11	5.7
The attending staff was helpful and courteous		
Agree	172	92.0
Disagree	15	8
The waiting time was reasonably short		
Agree	126	67.4
Disagree	61	32.6

4.3 Reasons for not donating blood amongst those who had never donated

Out of the 456 respondents, 59% (269) had never donated blood. Among those who had never donated, the two main reasons for not donating blood in the past were lack of time to go and donate blood (37.2%; 100) and fear of needles (21.9%; 59). Other reasons included poor health, fear of fainting, fear of blood and fear of being tested for HIV amongst others as shown in Figure 4.2

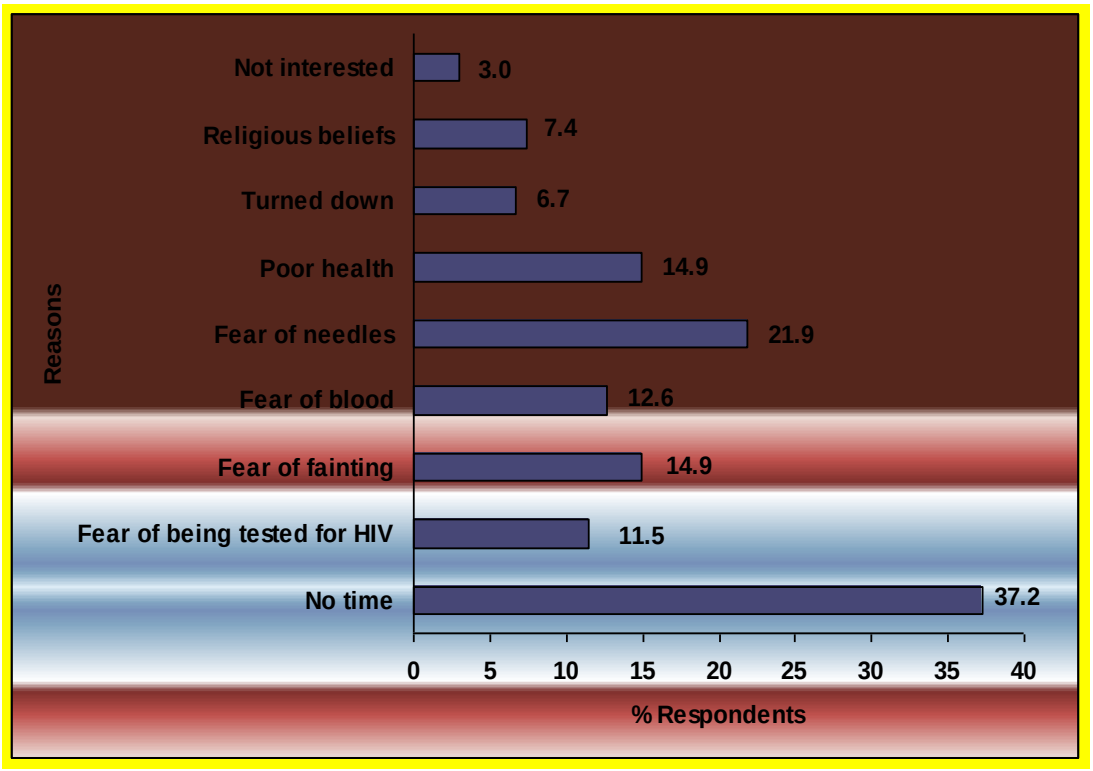

Figure 4.2: Reasons for not donating blood in the past

4.4 Respondents' opinions of barriers to blood donation

Analysis of all the respondents' opinion about what hinders individuals from donating blood revealed several outcomes as shown in Figure 4.3. The two most frequent reasons were; Fear of having their HIV status checked (31.6%; 144) and Ignorance/lack of knowledge about blood donation (21.5%; 98). Other reasons were fear of needles, fear of anaemia, poor health status, lack of time to donate blood, fear of use of contaminated needles and religious beliefs.

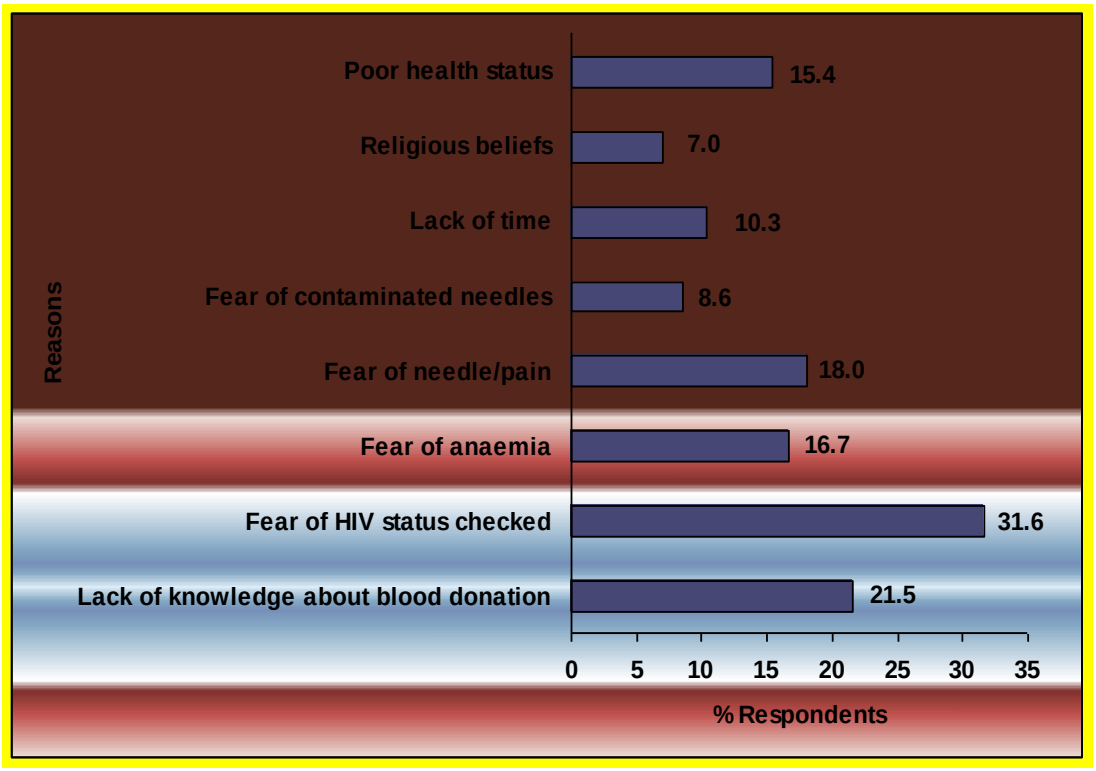

Figure 4.3: Reasons that hindered people from donating blood in the past

4.5 Respondents' opinions of motivational factors to promote blood donation

Opinion on what can be done to encourage more people to donate blood was mainly inclined to one opinion as shown in Figure 4.4 whereby 68.9% (314) of the respondents suggested that education of public through the media/barazas would encourage more people to donate blood. Others included monetary compensation to donors and establishing more accessible donation centres.

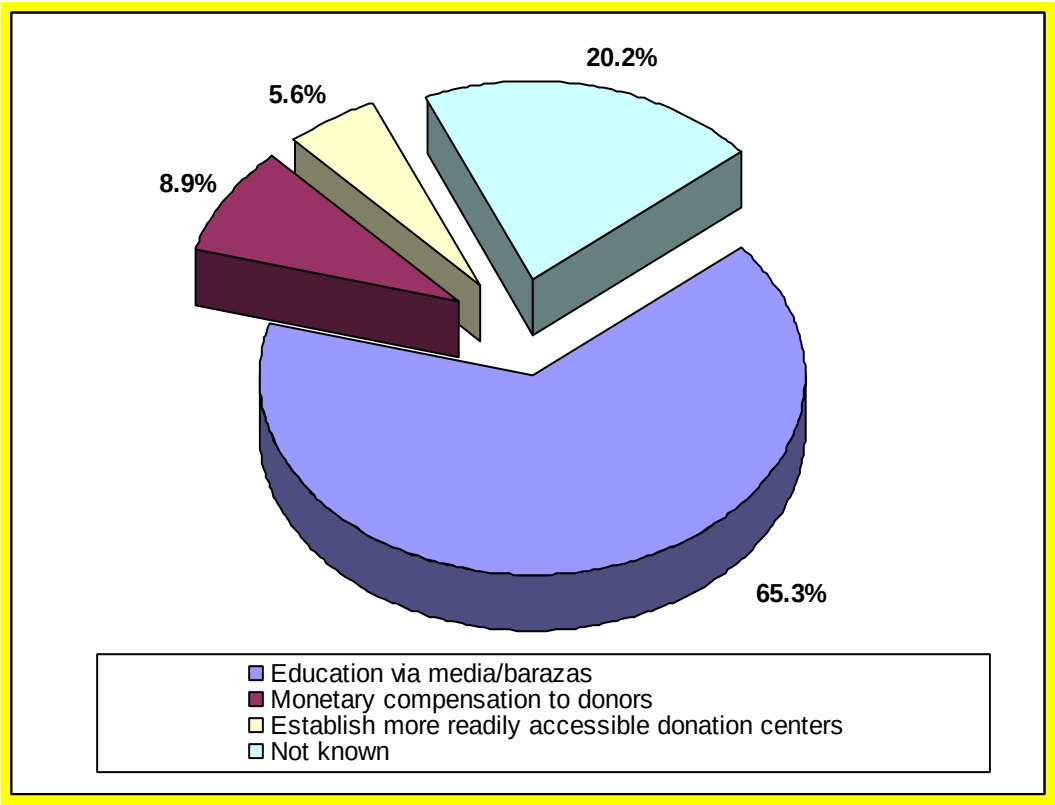

Figure 4.4: Opinions on mitigation to encourage more people donate blood

4.6 Risks of blood donation as perceived by the respondents

Perceived risk to donating blood varied in terms of rating across specific risks as presented in Table 4.8. A large proportion of respondents rated fainting as a small risk (57.9%; 264), feeling weak as a medium risk (36.0%; 164), lots of pain due to the needle as a small risk (62.5%; 285), anaemia (withdrawal of too much blood) as a high risk (46.7%; 213) and getting a disease when donating blood as a high risk (44.1%; 201).

Table 4.8: Distribution of responses on perceived risk of blood donation

Risks	n=456	%
Fainting		
Small risk	264	57.9
Medium risk	125	27.4
High risk	67	14.7
Feeling weak		
Small risk	162	35.5
Medium risk	164	36.0
High risk	130	28.5
Lots of pain due to the needle		
Small risk	285	62.5
Medium risk	94	20.6
High risk	77	16.9
Anaemia (withdrawal of too much blood)		
Small risk	134	29.4
Medium risk	109	23.9
High risk	213	46.7
Getting a disease when donating blood		
Small risk	180	39.5
Medium risk	75	16.4
High risk	201	44.1

4.7 Relationship between blood donation and demographic characteristics

Relationship between blood donation and demographic characteristics was analyzed as presented in Table 4.9. None of the demographic factors was significantly associated with the practice of blood donation ($P>0.05$).

Table 4.9: Blood donation in relation to demographic characteristics

Variables	Ever donated blood (N=187) n	%	Never donated blood (N=269) n	%	Total N (%)	OR	95% CI Lower	Upper	P value
Sex									
Male	113	42.3	154	57.7	267(100)	1.14	0.78	1.67	0.498
Female	74	39.2	115	60.8	189(100)	Ref			
Age in years									
18-28	121	39.9	182	60.1	303(100)	0.22	0.02	2.16	0.194
29-38	32	38.1	52	61.9	84(100)	0.21	0.02	2.06	0.178
39-48	23	46.0	27	54.0	50(100)	0.28	0.03	2.92	0.290
49-58	8	53.3	7	46.7	15(100)	0.38	0.03	4.55	0.446
59-65	3	75.0	1	25.0	4(100)	Ref			
Highest education level									
None	6	46.2	7	53.8	13(100)	1.26	0.41	3.86	0.687
Primary	5	55.6	4	44.4	9(100)	1.84	0.48	7.01	0.374
Secondary	30	40.5	44	59.5	74(100)	1.00	0.59	1.70	0.996
Tertiary	50	40.7	73	59.3	123(100)	1.01	0.65	1.57	0.979
University	96	40.5	141	59.5	237(100)	Ref			
Occupation									
White collar	46	40.7	67	59.3	113(100)	0.95	0.59	1.52	0.824
Blue collar job	48	41.0	69	59.0	117(100)	0.96	0.60	1.53	0.865
Unemployed	9	34.6	17	65.4	26(100)	0.73	0.31	1.72	0.473
Student	84	42.0	116	58.0	200(100)	Ref			
Average net income per month in KES									
0-15,000	129	41.0	186	59.0	315(100)	0.86	0.44	1.69	0.655
16,000-30,000	16	30.2	37	69.8	53(100)	0.53	0.22	1.27	0.157
31,000-45,000	13	54.2	11	45.8	24(100)	1.46	0.52	4.07	0.470
46,000-60,000	12	46.2	14	53.8	26(100)	1.06	0.39	2.88	0.911
>60,000	17	44.7	21	55.3	38(100)	Ref			
Religion affiliation									
Christian	181	42.5	245	57.5	363(100)	1.23	0.29	5.22	0.778
Muslim	3	13.6	19	86.4	22(100)	0.26	0.04	1.72	0.164
Traditional/Atheist	3	37.5	5	62.5	8(100)	Ref			
Study site									
KEMU	70	41.7	98	58.3	168(100)	1.17	0.74	1.84	0.501
KENCOM	62	43.4	81	56.6	143(100)	1.25	0.78	2.01	0.349
Unilever	55	37.9	90	62.1	145(100)	Ref			

4.8 Association of blood donation and opinion on barriers to blood donation

Six out of eight reasons on what hinders individuals from donating blood were not significantly associated to the practice of blood donation (P>0.05) as seen in Table 4.10. However, a significantly higher proportion of respondents (50.0%) who had ever donated blood indicated that ignorance/lack of knowledge about blood donation hinders people from donating blood as compared to those that indicated otherwise (38.5%). A respondent with the opinion that ignorance/lack of knowledge about blood donation hinders people from donating blood was 1.59 [95% CI = 1.02 – 2.50] times more likely to have ever donated blood compared to one without that opinion.

Similarly, a significantly higher proportion of respondents (42.5%) who disagreed with the opinion that lack of time hinders people from donating blood had ever donated blood compared to those that indicated otherwise (27.7%). A respondent with the opinion that lack of time to go and donate blood does not hinder people from donating blood was 1.92 [95% CI = 1.00 – 3.85] times more likely to have ever donated blood compared to one without that opinion.

4.9 Blood donation and current willingness to donate blood

A significantly higher proportion of respondents (51.1%) that were willing to donate blood had ever donated in the past as compared to those that were not willing (18.9%) as seen in Table 4.10. A respondent showing willingness to donate

blood was 4.49 [95% CI = 2.73 – 7.43] times more likely to have donated blood in the past as compared to one that did not show this willingness.

Table 4.10: Distribution of responses on opinions on what hinders individuals from donating blood

	Ever donated blood (N=187)		Never donated blood (N=269)		Total		95% CI		P
Opinion	**n**	**%**	**n**	**%**	**N (%)**	**OR**	**Lower**	**Upper**	**value**
Ignorance/lack of knowledge about blood donation									
Yes	49	50.0	49	50.0	98 (100)	1.59	1.02	2.50	**0.041**
No	138	38.5	220	61.5	358(100)	Ref			
Fear of having HIV status checked									
Yes	59	41.0	85	59.0	144(100)	1.00	0.67	1.49	0.991
No	128	41.0	184	59.0	312(100)	Ref			
Fear of anaemia									
Yes	28	37.3	47	62.7	75(100)	0.83	0.50	1.39	0.479
No	159	41.7	222	58.3	381(100)	Ref			
Fear of needle/pain									
Yes	34	41.5	48	58.5	82(100)	1.02	0.63	1.66	0.926
No	153	40.9	221	59.1	374(100)	Ref			
Fear of infection from contaminated needles									
Yes	13	33.3	26	66.7	39(100)	0.70	0.35	1.40	0.308
No	174	41.7	243	58.3	417(100)	Ref			
Lack of time to go and donate blood									
No	174	42.5	235	57.5	409(100)	1.92	1.00	3.85	**0.049**
Yes	13	27.7	34	72.3	47(100)	Ref			
Religious beliefs									
Yes	14	43.8	18	56.3	32(100)	1.13	0.55	2.33	0.744
No	173	40.8	251	59.2	424(100)	Ref			
Poor health status									
Yes	25	35.7	45	64.3	70(100)	0.77	0.45	1.30	0.328
No	162	42.0	224	58.0	386(100)	Ref			
Current willingness to donate blood									
Yes	160	51.1	153	48.9	313(100)	4.49	2.73	7.43	**<0.001**
No	27	18.9	116	81.1	143(100)	Ref			

4.10 Association of blood donation and opinions on motivation to donate blood

A similar pattern to that shown by demographic characteristics was observed for respondents opinion on what can be done to encourage more people to donate blood. The relationship between ever donating blood and respondents opinion on what can be done to encourage more people to donate blood was analyzed as presented in Tables 4.11. None of the factors was significantly associated to ever donating blood (P>0.05).

Table 4.11: Distribution of responses on opinions on what can be done to encourage more people to donate blood

	Ever donated blood (N=187)		Never donated blood (N=269)		Total		95% CI		P
Opinion	**n**	**%**	**n**	**%**	**N (%)**	**OR**	**Lower**	**Upper**	**value**
Education of public through media/barazas									
Yes	133	42.4	181	57.6	294(100)	1.20	0.80	1.80	0.384
No	54	38.0	88	62.0	162(100)	Ref			
Monetary compensation for donors									
Yes	21	48.8	22	51.2	43(100)	1.42	0.76	2.67	0.273
No	166	40.2	247	59.8	413(100)	Ref			
Establish more readily accessible donation centres									
Yes	12	44.4	15	55.6	27(100)	1.16	0.53	2.54	0.708
No	175	40.8	254	59.2	429(100)	Ref			

4.11 Association between blood donation and perceived risks to donation

Blood donation in relation to perceived risk of donating blood is summarized in Table 4.12. One out of five perceived risk of donating blood was not significantly associated with ever donating blood (P>0.05). A significantly higher proportion of respondents who thought that there was a ‘small risk’ (50.0%; 81) that blood

donation caused one to feel weak had ever donated blood in the past as compared to those that thought it was a 'high risk' (36.2%; 47). Respondents with a perception that feeling weak is a 'small risk' were 1.77 [95% CI = 1.10 – 2.83] times more likely to have ever donated blood compared to those with a perception that it is a 'high risk'. The likelihood was reduced to 0.99 [95% CI = 0.61 – 1.60] among those with a perception that it is a 'medium risk'.

Similarly, a significantly higher proportion of respondents who thought that there was a 'small risk' of experiencing lots of pain due to needle during blood donation (44.9%; 128) had ever donated blood in the past as compared to those that thought it was a 'high risk' (32.5%; 25). A respondent who thought that blood donation had a 'small risk' of causing lots of pain due to needle prick was 1.70 [95% CI = 1.00 – 2.88] times more likely to have ever donated blood as compared to one with a perception that it was indeed 'high risk'. The likelihood was reduced to 1.18 [95% CI = 0.62 – 2.23] among those with a perception that it was a 'medium risk'.

A significantly higher proportion of respondents who thought that there was a 'small risk' (52.2%; 70) of anaemia caused by blood donation had ever donated blood compared to those that thought it was 'high risk' (33.3%; 71). A respondent who thought that there was a 'small risk' that blood donation causes anaemia was 2.19 [95% CI = 1.40 – 3.41] times more likely to have ever donated blood compared to one with a perception that it is indeed a 'high risk'. The likelihood was reduced to 1.46 [95% CI = 0.91 – 2.35] among those with a perception that it was 'medium risk'.

Similarly, a significantly higher proportion of respondents who thought that there was a 'small risk' of exposure to disease (50.0%; 90) when donating blood had ever donated blood in the past as compared to those that thought it was a 'high risk' (32.3%; 65). Respondents who thought that there was a 'small risk' of exposure to disease were 2.09 [95% CI = 1.38 – 3.17] times more likely to have ever donated blood compared to one with a perception that it was indeed 'high risk'. The likelihood was reduced to 1.56[95% CI = 0.90 – 2.68] among those with a perception that it was 'medium risk'.

Table 4.12: Distribution of responses on perceived risks of donating blood

	Ever donated blood (N=187)		**Never donated blood (N=269)**		**Total**		**95% CI**		**P**
Risk	**n**	**%**	**n**	**%**	**N (%)**	**OR**	**Lower**	**Upper**	**value**
Fainting									
Small risk	113	42.8	151	57.2	264(100)	1.64	0.93	2.90	0.090
Medium risk	53	42.4	72	57.6	125(100)	1.61	0.86	3.02	0.135
High risk	21	31.3	46	68.7	67(100)	Ref			
Feeling weak									
Small risk	81	50.0	81	50.0	162(100)	1.77	1.10	2.83	**0.018**
Medium risk	59	36.0	105	64.0	164(100)	0.99	0.61	1.60	0.975
High risk	47	36.2	83	63.8	130(100)	Ref			
Lots of pain due to the needle									
Small risk	128	44.9	157	55.1	285(100)	1.70	1.00	2.88	**0.050**
Medium risk	34	36.2	60	63.8	94(100)	1.18	0.62	2.23	0.612
High risk	25	32.5	52	67.5	77(100)	Ref			
Anaemia (withdrawal of too much blood)									
Small risk	70	52.2	64	47.8	134(100)	2.19	1.40	3.41	**0.001**
Medium risk	46	42.2	63	57.8	109(100)	1.46	0.91	2.35	0.118
High risk	71	33.3	142	66.7	213(100)	Ref			
Getting a disease when donating blood									
Small risk	90	50.0	90	50.0	180(100)	2.09	1.38	3.17	**<0.001**
Medium risk	32	42.7	43	57.3	75(100)	1.56	0.90	2.68	0.111
High risk	65	32.3	136	67.7	201(100)	Ref			

4.12 Multivariate analysis

Multivariate analysis was done to identify independent predictors of prior blood donation. Upon fitting seven factors which showed significant association at P<0.05 in bivariate analysis, and specifying 'backward conditional' as the method of analysis, three factors were retained in the final model as shown in Table 4.13.

Table 4.13: Predictors of ever donating blood

		95.0% CI		
Predictors	**AOR**	**Lower**	**Upper**	**P value**
Currently willing to donate blood				
Yes	4.33	2.68	6.99	<0.001
No	Ref			
Lack of time to go and donate blood				
No	2.17	1.08	4.35	0.030
Yes	Ref			
Getting a disease when donating blood				
Small risk	1.88	1.21	2.91	0.005
Medium risk	1.51	0.85	2.67	0.161
High risk	Ref			

AOR, Adjusted odds ratio; CI, Confidence interval

Adjusting for other factors and keeping them constant, the results revealed that respondents showing willingness to donate blood were 4.33 [95% CI = 2.68 – 699] times more likely to have ever donated blood as compared to those that did not show this willingness.

The analysis also revealed that respondents who disagreed with the statement that lack of time to go and donate blood hinders people from going to donate

blood were 2.17 [95% CI = 1.08 – 4.35] times more likely to have ever donated blood compared to those with a contrary opinion.

It was also noted that a respondent who rated exposure to disease as ‘small risk’ was 1.88 [95% CI = 1.21 – 2.91] times more likely to have ever donated blood compared to one with a perception that it is indeed ‘high risk’. The likelihood was reduced to 1.51 [95% CI = 0.85 – 2.67] among those with a perception that it is ‘medium risk’.

CHAPTER FIVE

5.0 DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Socio-demographic characteristics of Nairobi donors

Analyses to compare the socio-demographic characteristics of respondents who had ever donated blood showed that the youngest age group (18-28) had the highest proportion of blood donors. This was similar to studies done in China (Zaller *et al.*, 2006), Germany (Hinrichs *et al.*, 2008) and Senegal (Duboz *et al.*, 2010) but was contrary to findings in studies done in Norway (Misje *et al.*, 2005). The higher proportion could be due to the fact that blood donation exercises are carried out extensively by the KRCS in high schools and middle level colleges such that the younger age groups have more opportunities to donate blood. Furthermore, in sub-Saharan Africa, the mean age of donors is very low and individuals aged 18 to 20 represent a significant proportion of the donor population (Tagny *et al.*, 2010).

The proportion of male donors was higher than that of female donors which was similar to findings in China (Zaller *et al.*, 2006), Senegal (Duboz *et al.*, 2010), Sweden (Sojka and Sojka, 2008) and France ((Duboz and Cunéo, 2010). This was also similar to findings in other Kenyan studies (Kimani *et al.*, 2011; Basavaraju *et al.*, 2010). This could be due to the fact that males are often thought to have less exclusion criteria than females. For instance, males are usually heavier than females and are therefore more likely to weigh above 50 kg which is the cut-off weight for

donation. Also, females are more likely to be anaemic and hence are more likely to be turned away at donation centres.

In this study, it was found that majority of the respondents (79.0%; 360) were highly educated (tertiary and university) with majority being students (43.9%; 200). This is likely because one of the study sites was a university hence the overrepresentation. Further, the KNBTS specifically targets students in the blood donor recruitment exercises. The results are similar to those reported in Thailand where most voluntary blood donors are university students (Wiwanitkit, 2002).

Assessment of monthly incomes revealed that a high proportion of the respondents (69.1%) earned ksh.15, 000 or less and yet the proportion of those in white collar jobs (24.8%) was comparable to that of respondents in blue collar jobs (25.7%).

Most of the respondents were Christians (93.4%). This is because Kenya is a predominantly a Christian country. Also, one of the study sites was a faith-based university hence most of the respondents were likely to be Christian.

5.1.2. Motivations for blood donation

The results show that 41% of respondents had ever donated blood. These results are similar to those reported elsewhere. An example is Europe where, depending on the country, between 22 and 51% of individuals have given blood at least once in their life (European Opinion Research Group EEIG, 2003). However, this same figure was 59% in 2002 in the United States (Boulware *et al*., 2002).

The main motivation leading individuals to give blood in this study was altruism ('because it was the right thing to do'). This corresponded with studies done in North America (Edwards and Zeichner, 1985; Piliavin, 1990; Julius and Sytsam, 1993; Glynn *et al*., 2002; Hupfer *et al*., 2005). It is also in agreement with studies done in Europe (Sojka and Sojka, 2008), Iran (Javadzadeh *et al*., 2006) and Senegal (Duboz *et al*., 2010). However, it also found other reasons as being encouraged by friend/relative to donate (13.9%) and hearing appeal for blood in the media (11.8%). This was significant in that despite all the media campaigns and public awareness programs run by the KNBTS, only 11.8% of the respondents who had donated in the past did so as a direct result of hearing the appeal in the media.

The second commonest motivational factor for donation of blood was to help a relative or friend who needed blood. This is in keeping with studies done by Takpo *et al*. (2007) that showed that the Sub-Saharan blood donor was more often a family or replacement donor and accounted for over 70% of blood donor populations in most instances.

5.1.3. Barriers to blood donation

Despite a rigorous campaign by the KNBTS concerning HIV testing and blood donation, the fear of having one's HIV status checked was thought to be the biggest barrier to blood donation followed by ignorance/lack of knowledge about blood donation. Other fears also considered to be barriers included fear of anaemia, pain from needles and acquisition of disease while donating blood. This was similar to the observations reported in Thailand where 85% of non-donors quoted fear as the

prevailing reason for not donating blood (Wiwanitkit, 2002). It was also similar to observations amongst African Americans in the USA which revealed fear to be the predominant barrier to blood donation (Shaz *et al.*, 2010).

The results of this study showed that 46.7% of the respondents thought that there was high risk of anaemia after donation while 44.1% thought that there was high risk of getting a disease when donating blood. This was contrary to observations in Greece where none of the respondents rated any of these as high risk (Marantidou *et al.*, 2007). This clearly shows that the public does not understand the process of blood donation and more public awareness, specifically showing the steps involved in donation of blood, needs to be done. This was a view upheld by 68.9% of the respondents who thought that public education would encourage more people to donate blood.

5.1.4. Opinions concerning blood donation centers

Of the respondents who had donated blood in the past, majority were satisfied with the communication skills of the staff at the donation centres as they were able to understand the pre-donation questions and understood that all the questions were for the safety of the recipients of their blood. However, 29.4% of the respondents who had ever donated blood did not disclose all the facts during pre-donation screening which was a significantly higher finding than that of a Greek study which found that 5·3% of all donors concealed part of the truth when responding to background questions (Marantidou *et al.*, 2007).

In this study, the only drawback seemed to be that 32.8% of the previous donors thought that the waiting time was unreasonably long. However, majority of respondents agreed that the donation sites were clean (96.3%), warm and welcoming (94.3%) and that the attending staff was helpful and courteous (92%) which was contrary to a Greek study in which 32.3% of the respondents were displeased by the unpleasantness of the physical environment (Marantidou *et al.*, 2007).

Among the respondents who had donated before, only 53.5% had donated in the last 12 months and majority (54%) had only donated once in their lifetime. This shows that Nairobi donors are mostly one time donors and not repeat donors.

5.2 Conclusions

The study showed that most of the blood donors within the selected sites in Nairobi were young within the age group of 18-28 years with tertiary education. The main motivating factors to donate blood amongst previous blood donors were to help a friend or relative in need and because it was the right thing to do. The main reason for not donating blood amongst those who had never donated was lack of time to donate and fear of needles. Majority were of the opinion that fear of having one's HIV status checked and ignorance/lack of knowledge about blood donation were the biggest barriers to donation of blood. Most respondents suggested that public education through the media and barazas would encourage more people to donate blood.

5.3 Recommendations

i. There is need for more public awareness of the steps involved in blood donation so as to allay unfounded fears (fear of withdrawing too much blood, fear of getting a disease through contaminated needles, fear of getting one's HIV status checked). A high quality recruitment program offering regular blood donation education especially to the potential donor who is young and well-educated should be instituted by policy makers.

ii. There is need for regular studies on blood donation practices within Nairobi and other parts of the country so as to be able to formulate comprehensive policies as other regions may have differing reasons for donation or non-donation of blood.

iii. There is need for the KNBTS to target other groups of donors apart from students so as to enlarge the blood donor pool.

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APPENDICES

APPENDIX I a: ENGLISH QUESTIONNAIRE

A SURVEY OF FACTORS AFFECTING BLOOD DONATION IN NAIROBI AT SELECTED CENTERS

1. Date …….

2. Questionnaire number ……..…

   Site number ……

3. Sex:

   1. Male
   2. Female

4. Age (years)

   1. 18-28
   2. 29-38
   3. 39-48
   4. 49-58
   5. 59-65

5. Education level

   1. No formal education
   2. primary level (class 1-8)
   3. secondary level (form 1-6)
   4. tertiary level (college and polytechnic)
   5. university

6. Occupation

1. White collar job e.g. nurse, engineer, teacher, banker, salesperson, etc
2. Blue collar job e.g. jua kali, stone mason, casual labourer, etc.
3. Unemployed
4. Student
5. Other (specify)……

7. Average net income per month in Ksh.

1. 0-15,000
2. 16,000-30,000
3. 31,000-45,000
4. 46,000-60,000
5. 61,000-75,000
6. 76,000-90,000
7. 91,000-120,000
8. 120,000-150,000
9. >150,000

8. Religion

1. Christian
2. Muslim
3. Hindu
4. Traditional African beliefs
5. Atheist (no belief in any God/gods)
6. Other (specify)……..

9. Have you ever donated blood?

1. yes – ***if yes, go to question 10***
2. no – ***if no go to question 15***

10. What is the main reason you donated blood?

1. Friend/relative needed blood
2. Encouraged by friend or accompanied friend to donate blood.
3. To get biscuits and soda after the transfusion
4. Because it's the right thing to do
5. Heard appeal for blood in the news/radio
6. Other(specify)……..

11. How many times have you donated blood in the last 12 months?

1. None
2. once
3. two - three times

12. How many times have you donated blood in your lifetime?

1. Once
2. 2-5 times
3. More than 5 times

13. At the time of donation, certain questions were asked before you donated blood. Kindly answer as accurately as possible regarding these questions.

1. All the questions asked before donation are important for my safety and that of the receivers of my blood Yes ( ) No ( )
2. The questions asked before donation are clear and easy to understand. Yes ( ) No ( )

3. I always tell the whole truth when answering these questions. Yes( )
   No ( )
4. I did not disclose all the facts regarding the questions asked at the time.
   Yes ( ) No ( )

14. Kindly tick the most accurate regarding the donation site that you had visited in the past:

	Strongly agree(1)	Agree (2)	Disagree (3)	Strongly disagree (4)
1.It was clean and presentable				
2. It was warm and welcoming				
3. The attending staff was helpful and courteous				
4.The waiting time was reasonably short				

(Go to question 16)

15. What was your reason for not donating blood in the past?

1. No time to go and donate
2. Fear of being tested for illness e.g. HIV
3. Fear of fainting
4. Fear of looking at blood

5. Fear of needles

6. Poor health

7. Turned down at donation centre

8. Religious beliefs

9.Other (specify) ……

16. Currently, would you donate blood?

    1. Yes
    2. No

17. In your opinion, what hinders individuals from donating blood?.....

    .....

    .....

    .....

    .....

    .....

    .....

18. In your opinion, what can be done to encourage more people to donate blood?.....

    .....

    .....

    .....

    .....

.....

.....

19. The following are some of the perceived risk to donating blood. Kindly fill in the responses 1, 2 or 3 depending on how you see the risk to yourself as guided below

1=small risk 2=medium risk 3= high risk

- Fainting ( )
- Feeling weak ( )
- Lots of pain due to the needle ( )
- Anaemia (withdrawal of too much blood) ( )
- Getting a disease when donating blood ( )

APPENDIX I b: SWAHILI QUESTIONNAIRE

MASWALI KUHUSU MAMBO YANAYOHUSU UTOAJI WA DAMU KATIKA JIJI LA NAIROBI

1. Tarehe …….

2. Nambari ya musururu wa maswali ……..…

   Nambari ya kituo ……

3. Jinsia:

   1. Mume
   2. Mke

4. Umri (miaka)

   1. 18-28
   2. 29-38
   3. 39-48
   4. 49-58
   5. 59-65

5. Kiwango cha elimu

   1. Bila elimu rasmi
   2. Elimu ya msingi (darasa 1-8)
   3. Elimu ya sekondari (kidato 1-6)
   4. Chuo cha ufundi
   5. Chuo kikuu

6. Kazi

   1. Umeajiriwa kwa mfano mwalimu, muuguzi, n.k.
   2. Unajifanyia kazi ya mkono kwa mfano mwashi, jua kali, n.k.

3. Huja ajiriwa
4. Mwanafunzi
5. Nyingine (elezea)……

7. Kiwango cha mapato kwa mwezi (kwa shilingi)
    1. 0-15,000
    2. 16,000-30,000
    3. 31,000-45,000
    4. 46,000-60,000
    5. 61,000-75,000
    6. 76,000-90,000
    7. 91,000-120,000
    8. 120,000-150,000
    9. >150,000
8. Dini
    1. Mkristo
    2. Muislamu
    3. Muhindu
    4. Imani ya kiasili ya kiafrika
    5. Kafiri
    6. Nyingine (eleza)……..

9. Je, umewahi kutoa damu?
    1. ndio – ***kama ndio enda kwa swali la kumi***
    2. la – ***kama la end kwa swali la kumi na tano***

10. Ni sababu gani haswa ulitoa damu?

    1. Rafiki/mtu wa ukoo alihitaji damu
    2. Nilishawishiwa na rafiki au niliandamana na rafiki kutoa damu
    3. Kupata biskuti na soda baada ya kutoa damu
    4. Kwa sababu ilikuwa kitu kizuri kufanya
    5. Nilisikia maombi ya damu kwa habari/redio
    6. Nyengine (eleza)……..

11. Je, Umetoa damu mara ngapi katika miezi kumi na miwili iliyopita?

    1. Sijatoa
    2. Mara moja
    3. Mara mbili au tatu

12. Je, Umetoa damu mara ngapi maishani mwako?

    1. Mara moja
    2. Mara mbili – mara tano
    3. Zaidi ya mara tano

13. Wakati wa kutoa damu kuna maswali ambayo uliulizwa kabla damu kutolewa.

    Tafadhali jibu kwa uhakika maswali yafuatayo.

    1. Je, maswali yote uliyoulizwa yalikuwa ya umuhimu kwa usalama wako na wa mwenye kupokea damu yako? Ndio ( ) La ( )
    2. Je, mwaswali uliyoulizwa kabla ya kutoa damu yalikuwa sawa na rahisi kueleweka? Ndio ( ) La ( )
    3. Nilikuwa daima na nilisema ukweli mtupu wakati nilipojibu maswali hayo. Ndio( ) La ( )

4. Sikueleza ukweli wote kuhusiana na maswali yaliyoulizwa kwa wakati huo. Ndio ( ) La ( )

14. Tafadhali weka alama kuhusiana na kituo cha kutolea damu ulichowahi kutembelea hapo mbeleni:

	Nakubali kabisa(1)	Nakubali (2)	Nakataa (3)	Nakataa kabisa(4)
1. Palikuwa pasafi na pa kupendezaa				
2. Palikuwa karimu na pa kukaribisha				
3. Wafanyikazi wahudumu walikuwa wasaidizi na wapole				
4. Muda wa kusubiri ulikuwa mfupi na wa kuridhisha				

(Enda kwa swali la 16)

15. Je, ni sababu gani ilikufanya usitoe damu hapo mbeleni?

1. Kukosa muda wa kwenda kutoa damu
2. Woga wa kwenda kupimwa magonjwa kama HIV
3. Woga wa kuzirai
4. Woga wa kuangalia damu
5. Woga wa sindano

6. Udhaifu wa afya

7. Kufukuzwa kwa kituo cha kutolea damu

8. Misingi ya kidini

9.Nyengine (eleza) ……

16. Kwa sasa ungependa kutoa damu?

    1. Ndio
    2. La

17. Kwa maoni yako, ni kitu gani kinachozuia watu kutoa damu?.....

    .....

    .....

    .....

    .....

18. Kwa maoni yako, ni kitu gani kinachoweza kufanywa kushawishi watu wengi watoe

    damu?.....

    .....

    .....

    .....

    .....

19. Zifuatazo ni mbaina ya athari zinazodhaniwa kuambatana na utoaji damu. Tafadhali jaza majibu yako 1, 2 na 3 kulingana na vile unavyoona athari hizo kwako mwenyewe kama vile ulivyoongozwa hapo chini.

1=athari kidogo 2=athari kiasi 3= athari kubwa

- Kuzirai ( )
- Kujihisi mnyonge ( )
- Uchungu mwingi kwa sababu ya sindano ( )
- Kupungua kwa damu (damu kutolewa kwa wingi) ( )
- Unaweza kupata ugonjwa wakati unapotoa damu ( )

APPENDIX 2: CONSENT FORM

FACTORS AFFECTING BLOOD DONATION IN NAIROBI, KENYA

INTRODUCTION

This is a study on factors affecting blood donation in Nairobi, Kenya done to by a student of the Jomo Kenyatta University of Agriculture and Technology (JKUAT) / Kenya Medical Research Institute (KEMRI). This is a form designed to inform you (the participant) about the study. I will now give you some details about the study.

1. Why is this study being done?

The study is to find out what factors both negative and positive affect your decision to donate blood.

2. How many people will take part in this study?

We hope to involve about 400 people within Nairobi.

3. Why have I been chosen for this study?

You have been randomly chosen as an adult aged between 18 and 65 years who reside in Nairobi. You are considered as a representation of prospective blood donors in Nairobi.

4. What will happen to me if I decide to take part in this study?

If you agree to take part in this study, you will be asked to sign this form after this explanation about the study. This is to show that you fully understand what the study is about and that you agree to participate in it. You will then be taken to a quiet area where you will be given a questionnaire to fill in with the help of the study investigator. The questionnaire takes about 10 minutes to complete.

5. Can I withdraw from the study?

You can stop being in the study at any time you wish.

6. What risks are involved?

There will not be any foreseen risks in taking part in the study.

7. Are there any benefits to me from being in the study?

There is no direct benefit to you at this moment. However, by taking part in the study, you will provide important information about what motivates or deters people from donating blood and hence help to shape how more blood donors are recruited in future.

8. What other choices do I have if I do not take part in the study?

If you choose not to take part in this study, you will go on about your daily business as usual. Not taking part in the study will not affect you in any way.

9. Will the information I give in this study be kept confidential?

Everything you tell the interviewer will be kept private. Your name will not be on any questionnaire document as you will not be required to fill in your name. You will be given a unique number instead. Only those people involved in the study will be allowed to handle the information you give us.

10. Who can answer my questions about the study?

In case you have any questions, you will be given the name and telephone number of the person heading the study. You will also be given the name and number of a person on the ethics board whose job it is to make sure the study does not harm you in any way.

In case of any enquiries/concerns, you can contact:-

The primary investigator Tel. no. 0738983001

The secretary, KEMRI/National Ethical Review Committee Tel no. 2722541

If you have understood all the above explanation and would like to take part in the study, please sign the statement below:

I _____ do agree to take part in this study as explained to me above. I have fully understood what the study is about and my role in it. I also understand that if I change my mind, I can withdraw from the study at any time.

Signed _____

Date _____

Witnessed by _____

Signature _____

Date _____

APPENDIX 3: UNIVERSITIES WITH CAMPUSES IN NAIROBI THAT HAVE BLOOD DONOR PROGRAMS

1. Daystar University
2. Strathmore University
3. University of Nairobi
4. Catholic University
5. African Nazarene University
6. Kenya Polytechnic University College
7. KCA University
8. Kenya Methodist University (Nairobi Campus)
9. Egerton University (Nairobi Campus)
10. Mt. Kenya University (Nairobi Campus)
11. United States International University
12. Multi Media University College

APPENDIX 4: CORPORATE ORGANISATIONS IN NAIROBI WITH BLOOD DONOR PROGRAMS

1. African Braille Center
2. Agricultural Development Corporation
3. AON Minet
4. Barclays Bank
5. Bidco Oil Refineries
6. Blow Plast Ltd
7. British American Insurance
8. Centres for Disease Control
9. CFC Stanbic Bank
10. CMC Motors
11. Communication Commission of Kenya
12. Compassion International
13. Cooperative Bank
24. GlaxoSmithKline
25. Haco Industries
26. HELB
27. Homeboyz Radio
28. Housing Finance
29. ICRAF
30. Incentive Travel
31. Intercontinental Hotel
32. Jacaranda Hotel
33. Jim Cab Services
34. Kenya Airports Authority
35. Kenya Airways
36. Kenya Broadcasting Corporation
37. Kenya Commercial Bank
38. Kenya Pipeline Corporation
39. Kenya Power &
49. National Bank
50. National Cereals and Produce Board
51. National Hospital Insurance Fund
52. NIC Bank
53. Peace Corps
54. Phillips Pharmaceuticals
55. Post Bank
56. Private Safaris
57. Resolution Health
58. Safaricom Ltd
59. Sameer Africa
60. Sarova Panafric Hotel
61. Serena Hotel
62. Stanbic Bank
63. Standard

14. Consolidated Bank
15. Diamond Trust Bank
16. East Africa Malting Company
17. East African Cables
18. Eco Bank
19. European Union
20. General Motors
21. UAP Insurance
22. UNICEF
23. Unga Limited
Lighting Company
40. Kenya Railways
41. Kenya Revenue Authority
42. Kenya Shell
43. KISS 100
44. Llyod Masika
45. Nairobi Club
46. Nakumatt Holdings
47. Nation Media Group
48. Unilever kenya
Chartered Bank
64. Standard Group
65. Steadman Research
66. Swift Global
67. Telkom Kenya
68. The Tea Board of Kenya
69. Toyota East Africa
70. World Vision

APPENDIX 5: STREETS IN NAIROBI WHERE BLOOD DONATION EXERCISES ARE CARRIED OUT.

1. Outside Ambassador Hotel on Moi Avenue
2. Outside the Bazaar building on Moi Avenue
3. Outside the fire station on Ronald Ngala Street
4. Kencom bus stage on Moi Avenue
5. Outside Bomb-blast memorial park on Moi Avenue
6. Mama Ngina Street
7. Outside Anniversary Towers on University way

APPENDIX 6: SCIENTIFIC STEERING COMMITTEE APPROVAL LETTER

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ESACIPAC/SSC/6783 **12th August, 2010**

Njambi Njuguna

Thro'
Director, CPHR
NAIROBI

forwarded 17/8/10

REF: SSC No.1850 (Revised) – Factors influencing blood donation in Nairobi, Kenya.

I am pleased to inform you that the above-mentioned proposal, in which you are the PI, was discussed by the KEMRI Scientific Steering Committee (SSC), during its **170th meeting** held on **3rdAugust, 2010** and has since been approved for implementation by the SSC.

The SSC however, advises that work on this project can only start when ERC approval is received.

for

Sammy Njenga, PhD
SECRETARY, SSC

APPENDIX 7: ETHICAL REVIEW COMMITTEE APPROVAL LETTER