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Original Research Article

Determinants of blood donation among selected tertiary college students in Homa Bay County Kenya

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ABSTRACT

Background: Globally blood donation rate is low. 31.5 donations per 1000 people in high income countries and 5.0 donations per 1000 people in low-income countries. Donors aged 16-25 years are ideal target for recruitment efforts. The study aimed to assess determinants of blood donation among students of selected tertiary institutions of Homa Bay County Kenya.
Methods: Cross-sectional study using both quantitative and qualitative methods was used to collect data from 424 study participants, three focused group discussions and three key informants between April 2021 and July 2021.Data collection tools included structured questionnaire and interview guide. Data analysed using statistical package for social sciences version 21.0, Pearson's correlation calculated for reliability. Percentage agreement calculated with values>75% being acceptable. Chi square (χ^2) test and logistic regression were used to determine association and strength, while qualitative data coded thematically.
Results: Most respondents were male 132 (67%) and 93 (47%) of respondents were of 19-21 years age group. Majority were blood donors 198 (54.50%). Reliability result was significant, r (39)=(0.82), p=(0.000) with simple percentage agreement of 78%. The study revealed that sex OR-0.493 p=0.013 and rare blood type, A-(OR) 8.597 p=0.009, and O+ (OR) 2.189 p=0.012 of the students were significant factors associated with blood donation
Conclusions: Sex and blood type were significant socio-demographic characteristics associated with blood donation.

Keywords: Blood donation, Blood donor, Barriers, Motivators

INTRODUCTION

Utilization of blood routinely alongside its components in health facilities especially in emergency circumstances contributes significantly in saving lives.[1] Most developing countries 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.[2] Globally, high income countries contribute nearly 50% of all donations with a donation rate 9 times greater than in low-income countries. Blood and blood components are only obtainable from altruistic individuals thus a precious resource. To meet the national requirement of 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.[3]

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.[4] Young people remain a significant and favorable group of possible blood donors and emphasis should be made to recruit them. African countries have been assisted to establish structures of low risk donor recruitment with the aim of achieving 80% voluntary non- remunerated blood donor (VNRBD) among donors by 2012 according to the WHO African Regional Strategy, adopted in 2001. It further estimates that a country can meet its basic needs if 1% of its population donates.

Globally, various types of donations are being practiced 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. Most of blood donation in developed countries depends on unpaid donors, contrary to developing countries where family replacement donations (FRDs), is common.[5] Conversely, 64 percent of donor in Kenya are unpaid donors while 36 percent are FRDs.[6]

Provision of safe blood to hospitals is the obligation of Kenya National Blood Transfusion Services. High school students contribute 60 percent of the blood collected by KNBTS while University and college students contribute 20 percent only. Kenya has an estimated population of 40million, to claim sufficiency; 400,000 units of blood need to be collected annually. In 2017, only 149,642 units were collected way below the target of 182,000 units.[7] 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. Therefore to enhance recruitment and retention of adequate regular voluntary non-remunerated blood donors, determinants of blood donation must be understood. The study assessed determinants of blood donation among tertiary college students with the goal of improving the current blood donation program and promotion in Homa Bay County.

METHODS

A descriptive cross-sectional study with mixed method approach (qualitative and quantitative) for triangulation purposes was adopted for this study. The study was carried out in Homa Bay County situated western part of Kenya bordering Lake Victoria from April 2021 to July 2021. A total of 424 participants were sampled from three public colleges and one private college comprising of 2627 students.

The formula by Fischer et al, (1998) was used to determine the sample size.

$n=Z^2pq/d^2$

Where;

n = desired 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)

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

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

Systematic random sampling on the spot without a population list was used to sample the students since getting a complete list of the students was a challenge. 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 K^{th} student was approached and issued with the questionnaire until the required number of students in each college is reached. The first student sampled corresponded to a random number between 1 and K. The subsequent student was that number plus the value of K and so on until the desired sample size is achieved. The number of students sampled in each institution was proportionately based on the total study population of 2627.

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 were also the same ones 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. Data was collected using structured questionnaires for quantitative data and interview guide for qualitative data from three focused group discussions and three key informants.

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

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.

Statistical package for social sciences 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 analyses (arithmetic average and standard deviation) and Chi square (χ^2) test for association was conducted for quantitative analysis. 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 associations. Transcripts were coded thematically and similarities identified for qualitative analyses. A six-step process was followed to generate themes; familiarization, coding, reviewing themes, defining themes and write up for qualitative data.

RESULTS

Pilot study results

Systematic random sampling on the spot was used to recruit a 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)=(0.82), 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 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 pilot 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 (Table 1).

Table 1: Percentage agreement between scores.

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

Socio-demographic characteristics of student blood donors

Most of the donors were male 132 (67%) compared to female 66 (33%). Majority of the respondents were single 161 (81%) with a small proportion being married 31 (16%). A higher proportion of respondents 93 (47%) belonged to the 19-21 years age group. In terms of blood type, a huge proportion of the respondents 151 (41.4%) did not know their blood group while the most recurrent blood type was O+ which accounted for 82 (22.5%). With regards to religion, Christians constituted a larger proportion 174 (87.9%) followed by Muslims 23(11.6%) while Pagan (0.5%). Results from this study reveal that only sex (p=0.013), and blood type (p=0.067) were significantly associated with blood donation.

There were more blood donors among the respondents 198 (54.50%) while the rest were non-donors 167 (45.50%) (Figure 1).

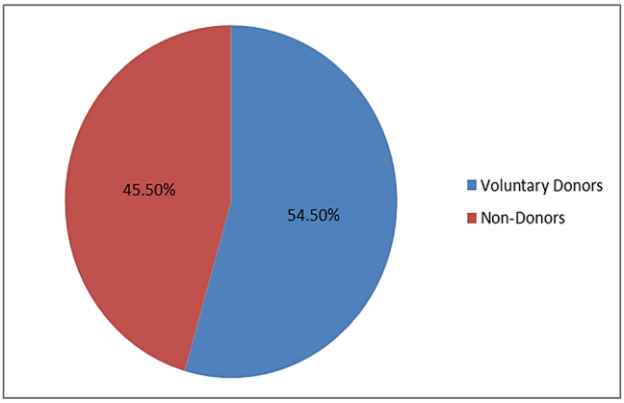

Figure 1: Blood donors among respondents.

Motivators for blood donation among the students

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 voluntary 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 and 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 and 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 (Figure 2).

The figure below shows the motivators to donate blood by students.

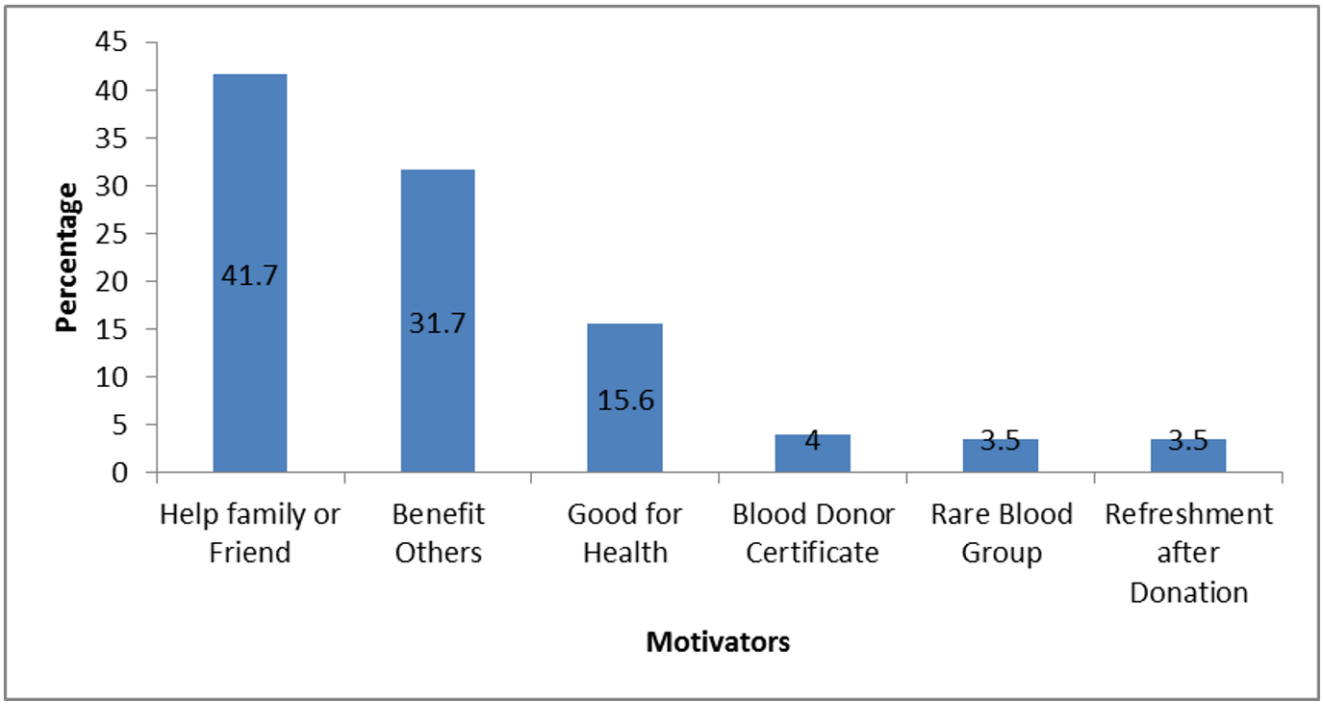

Figure 2: Donor motivations.

Barriers to blood donation by the students

The leading hindrance was selling of blood by blood banks 43 (25.9%) followed by fear of feeling unwell 37 (22.3%), ineligibility (medical reasons) 34 (20.5%). 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 (Table 2).

Table 2: Non- donor barriers.

Barriers	Frequency	%
Blood banks sell blood	43	25.9
Afraid of feeling unwell (fainting)	37	22.3
Ineligible (medical reasons)	34	20.5
Insufficient information regarding blood donation	33	19.9
Lack of time due to studies	15	9.0
Lengthy donation period	4	2.4
Total	166	100

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 3 below.

The sex OR of 0.493 suggested 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 χ^2 (13, n=365) 57.524, $p\leq0.001$, 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.

Table 3: Logistic regression results.

Variables		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	0.310	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

DISCUSSION

Motivators of blood donation among the students

Application of the theory of planned behavior shows that attitudes towards behavior (motivators) have positive and high value towards intention to donate blood.[8] 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%). Other studies also found similar findings that the leading causes of motivation to donate were family or friends in need of blood -collectivism (86.9%) and altruism (7.3%).[9,10] 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.

Other factors such as health benefits, non-monetary incentives, persuasion and peer pressure were also cited as motivators to donate. In this study non-monetary incentives was frequently mentioned as a motivator among the participants in focus group discussions and by key informants and therefore equally important. One of the participants said "In college budgeting is a challenge so the bread and soda come in handy" FGDI. Health benefits, incentives and persuasion and peer pressure are important motivators.[11]

Barriers to blood donation by the students

Regarding deterrents against blood donation, selling of blood was the most frequently cited 43 (25.9%) followed by fear of feeling unwell 37 (22.3%) and ineligibility (medical reasons) 34 (20.5%). 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 other studies in which selling of blood was a barrier but not the major barrier as in our study.[12,13]

In the recent past, incidents of selling blood have been on the rise. A health worker in Kisumu was convicted in 2019 for receiving Ksh 28,000/= to arrange blood transfusion for a patient and in some public hospitals blood is being sold at a cost of Ksh 3000/= while very sick patients are asked for bribes to access blood.[14]

In 2020 KNBTS was on the spotlight for selling the scarce commodity to Somalia and investigations initiated by directorate of criminal investigation.[15] 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.[16] "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 (22.3%) and ineligibility (medical reasons) 34 (20.5%) have been highlighted in other studies as important barriers to voluntary blood donation. Insufficient information, lack of time, negative service experience, were also 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 analysed 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. Another study also established that 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 blood donation.[17]

This study has yielded valuable insight into determinants of blood donation among tertiary college students in Homa Bay County.

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 (41.4%) 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%).

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.

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.

These findings will help the county department of health and national blood transfusion services establish effective strategies to inspire blood donors, retain them and significantly expand the existing donor pool.

CONCLUSION

The study revealed that sex OR-0.493 p=0.013 and rare blood type, A-(OR) 8.597 p=0.009, and blood type O+ (OR) 2.189 p=0.012 were significant factors associated with blood donation. The sex odds ratio suggested 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.

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