

## Factors Affecting Acceptability of Blood Donation Exercises in Rural Areas Compared to Urban Centers in Mbarara District

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### Abstract

**Introduction:** The World Health Organization (WHO) estimates that blood donation by 1% of the total population is generally the minimum needed to meet a nation's most basic blood requirements. The study was about the factors affecting acceptability of blood donation exercises in rural compared to urban areas in Mbarara District. The objectives of the study were; to find out the individual factors, establish environmental factors, and investigate the cultural factors influencing the acceptability of blood donation in rural and urban areas in Mbarara district.

**Methods:** The study employed a cross-sectional study design, descriptive and analytical in nature involving both quantitative and qualitative approaches to data collection and analysis. The population of study were perceived blood donors in Mbarara district from which a sample size of 384 perceived blood donors were recruited. Of the 384 respondents, 192 were gotten from rural areas and 192 were from urban areas in Mbarara District. Simple and multiple logistic regression models were used to examine associations between acceptability of blood donations and the independent variables i.e., individual factors environmental and cultural factors.

**Results:** 384 participants recruited in this study. Of these, 192 were recruited from rural area and 192 recruited from urban centers. The study findings revealed that the individual factors affecting acceptability of blood donation exercise in rural and urban areas in Mbarara District were blood donation experience of 4-6 years (AOR = 0.17, 95% CI = 1.22 – 1.36, P = 0.004) and household decision making by the husband (AOR=0.15, 95% CI = 0.03 – 0.78, P = 0.024). Topography of place of residence (AOR=0.18, 95% CI = 0.03-0.94, P=0.043), mode/means of transport (AOR=0.48, 95% CI = 0.10-0.22, P<0.001), and distance to blood donation points (AOR = 0.157, 95% CI = 0.69 – 0.36, P < 0.001) were the environmental factors affecting blood donation exercises in both rural and urban areas. The results finally revealed no significant association between cultural factors (religion, culture, social norms) and acceptability of blood donation exercises in both rural and urban areas.

**Conclusions:** Blood donation experience of 4-6 years and household decision making by the husband are individual factors affecting acceptability of blood donation exercise in rural and urban areas in Mbarara District. Topography of place of residence, mode/means of transport, and distance to blood donation points the environmental factors affecting blood donation exercises in both rural and urban areas. No significant association between cultural factors (religion, culture, social norms) and acceptability of blood donation exercises in both rural and urban areas.

**Recommendations:** The ministry of health in collaboration with other stakeholders such as the Uganda Red Cross Society and Uganda Blood Transfusion Service should intensify blood donation sensitization campaigns so as to encourage more people to voluntarily donated blood from where they can acquire blood donation experience. Additionally, the sensitization campaigns of these stakeholders should also target husbands to allow their wives to make personal choices and decisions regarding blood donation. The ministry of health in collaboration with other stakeholders such as the Uganda Red Cross Society and

Uganda Blood Transfusion Service should set up more blood collection points in different areas so as to ease movement of potential blood donors to the nearest blood collection points. This would also help to minimize geographical barriers to acceptability of blood donation. Finally, blood transfusion services across Africa should consider designing additional culturally appropriate interventions to boost blood donation. Such interventions must take into account the languages spoken by the target audience and the types of myths about blood donation to be demystified.

**Key words:** blood donation, Blood Transfusion Service , rural areas, urban centers

## **Introduction**

The World Health Organization (WHO) estimates that blood donation by 1% of the total population is generally the minimum needed to meet a nation's most basic blood requirements (Fordham & Dhingra, 2010). As most of the population is eligible for blood donation, abundant availability of blood is possible and expected; yet a permanent shortage of blood remains because only a small proportion of eligible people donate in developed and even fewer in developing countries (WHO, 2010). Despite the fact that the need for safe blood is increasing at global level, only 1% donation rate is reported in 82 countries (WHO, 2017a).

While some countries have well-established systems of voluntary blood donation, the majority are still dependent to varying degrees on family/replacement donors and sometimes on paid donors (WHO, 2017a). Building a sustainable base of safe blood donors requires a long-term approach that requires not only the establishment of an effective voluntary blood donor programme but also improved public awareness and acceptance of the importance of blood donation as a social norm (WHO, 2017b). With the publication of this global framework for action, the World Health Organization (WHO) and the International Federation of Red Cross and Red Crescent Societies (IFRC) aim to support national blood donor programmes in building a stable base of the safest possible blood donors to ensure the safety, sufficiency and sustainability of national blood supplies (Katz et al., 2018).

The factors that influence blood donation acceptability are vast and can range from donor ineligibility, negative attitudes towards blood donation, lack of education, lack of awareness, perceived behavioural barriers, and other monetary compensating donation opportunities (Moore, Gitau, & Kerochi, 2020). The WHO recommends voluntary, non-remunerated blood donation (VNRBD) and has set a standard of 10 blood donations/1000 population as a baseline value for all countries to meet (WHO, 2017b). While on

average, High Income Countries (HICs) have 32.1 donations/1000 population while Low Income Countries (LICs) have only

4.6 donations/1000 population (WHO, 2017a).

It is estimated that blood donation by only 1% of a country's population is needed to meet the basic demand for blood (WHO, 2017b); to achieve this, the WHO advises that all activities related to blood donation, including collecting, testing, processing, and storage, be centralized at the national level. While many countries strive to achieve this, it can be more difficult for lower and middle income countries with poor infrastructure and lower healthcare funding (WHO, 2017b).

While developed countries with advanced healthcare systems collect blood equivalent to 5 to 10% of their urban populations, less than 0.6% of India's rural population donate blood (Jenny et al., 2017). The second largest country in the world, India in terms of population collects around 6 million units of blood in a year with over 40% of the donations being voluntary and largely from urban centers (Giri, Deshpande, Phalke, & Karle, 2012).

In Nigeria, blood donation acceptability varies between rural and urban populations with 89.7% of blood donations being from urban and semi-urban areas compared to 10.3% in the country side (Adesina, Abo-Briggs, & Fasola, 2018). In Tanzania, acceptance of blood donation is high in urban areas since they are dominated by schools, colleges and universities where students are the leading blood donors unlike in rural areas (Elias et al., 2016).

In Uganda, the Uganda Blood Transfusion Service is the National Blood Service responsible for all blood transfusion and safety activities for the entire country. The Uganda Blood Transfusion Service was established as an autonomous institution and commissioned in January 2003 by a Board of Directors. It operates within the framework of the National Health Policy (NHP) and the Health Sector Strategic Plan (HSSP). The Uganda Blood Transfusion Service is a centrally coordinated department in the Ministry of Health with efficient central coordination sufficiently decentralized to render service to all regions of the country. The headquarters at Nakasero Blood Bank acts as a reference center for the regional blood banks and other public and private hospitals. The blood collection depends on healthy volunteer donors with least risk for Transfusion Transmissible Infections (TTIs).

Reviewed records of voluntary blood donations from the nine districts of Bushenyi, Ibanda, Isingiro, Kabale Kiruhura, Mbarara, Ntungamo, Rukungiri and Shema showed higher blood donation acceptability

trends in urban areas (73%) compared to rural areas. Secondary school students came out to be the leading blood donors (Apecu, Mulogo, Bagenda, & Byamungu, 2016). These above trends show that acceptability of blood donation exercises is low rural areas compared to urban areas.

The World Health Organization (WHO) indicates that Uganda has an annual demand of about 340,000 units of blood but short by over 100,000 units (WHO, 2017a). In 2019, only 240,000 units were collected against a targeted 340,000 units in Uganda (UBTS, 2020). Uganda Red Cross Society (URCS) is responsible for educating the public, registering and caring for them as non-remunerated blood donors while Uganda Blood Transfusion Services (UBTS) is responsible for the technical aspects of collection, screening and distribution of the safe blood for transportation country wide.

By the year 2018, Uganda Blood Transfusion Services (UBTS) was meeting 67.07% of the national blood demand. This implies that national blood demand is still higher than the actual collections (supply). UBTS' blood collections (supply) are still below the 100% of blood donation recommended by World Health Organization from young people and no remunerated voluntary basis (WHO, 2017b). All populations whether young or old, can play a fundamental role in blood donation to save lives of many people (Fordham & Dhingra, 2010).

In an effort to improve acceptability of blood donation exercises and increase blood donation, UBTS through partnerships with companies and banks across the country in their Corporate Social Responsibility activities carries out awareness campaigns in rural and urban areas (Apecu et al., 2016). However, few Ugandans turn up for blood donation and this has led to low blood collection by regional blood banks on behalf of UBTS across the country (KyeyuneByabazaire & Hume, 2019; Murphy et al., 2020). Even people who donate blood or who are willing to donate blood exhibit limited knowledge about blood donation and its importance (Checkley et al., 2019). In rural areas, the turn up is poor because blood collectors do not go deep into the country side, but rather target strategic locations and set up tents near markets, schools and trading centers (UBTS SWOT Analysis Report, 2015 – 2020). In urban areas, the turn up/acceptability for blood donation is fair but few people appreciate the importance of blood donation and are willing to donate blood (Checkley et al., 2019).

In order to improve blood donation in rural and urban areas, UBTS has doubled its sensitization efforts for more people to appreciate the importance of blood donation (UBTS Strategic Plan 2010 – 2015). Sensitization efforts in rural areas focus more in the deep remote parts so as to reach out for as many

potential blood donors as possible while in urban areas, sensitization efforts have been extended to more other categories of people such as students, boda boda riders, and more strategic places of potential blood donors have been mapped for example markets, taxi and bus parks, stadiums and recreation centers (UBTS SWOT Analysis Report, 2015 – 2020). Despite the above efforts, few people still appreciate the importance of blood donation (UBTS, 2020).

Whereas acceptability of blood donation is relatively high in urban areas than rural ones, the targets of overall blood collections are still low (still below the 100% of blood donation recommended by WHO; perhaps improvement in blood donation acceptability by rural populations would have increased over all blood donation. The factors that explain the variations/differences in blood donation between rural and urban populations remained unexplored. As such, this study sought to make a comparative assessment of acceptability of voluntary blood exercises in urban areas compared to rural areas in Mbarara district.

However, acceptability of blood donation exercises in rural areas compared to urban areas in Mbarara district remained unexplored although review of literature from related studies shows that acceptability of blood donation is high in urban areas compared to rural ones; hence there was need for this investigation.

## **Materials and Methods**

### *Study Design, Setting and Procedures*

The study employed a cross sectional study design, descriptive and analytical in nature involving both quantitative and qualitative approaches of data collection and analysis (Saunders et al. 2001). Cross sectional research design is a type of research design where data is collected at a specific point in time. In other words, the investigator measures the outcome and the exposures in the study at a particular time. With regard to this study, data was collected in the year 2021. Cross sectional research design was used because this study was time bound so as to fit in the time frame of the university.

### **3.2 Study Area**

A study population refers to a specific geographical location where the study is carried out (Asiamah, Mensah, & Oteng-Abayie, 2017). The study was carried out in rural and urban areas of Mbarara District. Specifically, the rural areas targeted were Kashari North and Kashari South while urban areas were Mbarara City North and Mbarara City South. These areas were pre-dominantly occupied by the Banyankole who spoke Runyankole and the Bahima who speak Runyankole and Runyarwanda. Other tribes in these areas are Bakiga, Batooro, Bafumbira and some Baganda. Agriculture is the main economic

activity in Kashari North and South while trade is the major economic activity in Mbarara City North and Mbarara City South. In terms of climate, Mbarara district receives heavy rainfall with peaks in months of April and October and a dry spell from mid-May to early October. Mbarara District lies within a range of latitudes 0.7072° South of the Equator and Longitude 30.6545° East of Greenwich Meridian.



Figure 3.1: Map of Mbarara District

### **Study Population**

Information was obtained from populations (perceived blood donors) in rural and urban areas in Mbarara district who filled a questionnaire and staff of Mbarara Regional blood Bank (Blood collectors) as key informants and because they oversee blood collection exercises in Mbarara district. Perceived blood donors were contacted because of the presumed factors that affect people from accepting or declining to donate blood while blood collectors (Staff of Mbarara Regional Blood Bank) were included in the study to give additional information on the factors they thought and experienced in the field that affect people from accepting or declining to donate blood.

## **Sampling Techniques**

Simple random sampling was used to select the general population in rural and urban areas in Mbarara district. Based on the total population of the district, not all people were selected to participate in the study, but rather a representative sample was selected randomly for participation. The study used simple random probability sampling technique using lottery method, where numbers ranging from 1 to 400 were written on different small pieces of paper, then placed in a box, and picked one by one without replacement till the required sample size of 384 participants was achieved. Simple random sampling method ensures that all the respondents have equal chances of selection to participate in the study. Probability proportion allocation method was used to arrive at number of respondents per Sub County in the District.

Purposive sampling technique was used to select key informants; that is the officials/staff of Mbarara Regional Blood Bank who were presumed to work hand in hand with the Uganda Red Cross and Uganda Blood Transfusion services in the mobilization of blood donors in both rural and urban areas. A purposive sample, also commonly called a judgmental sample, as one that is selected basing on the knowledge of a population and the purpose of the study (Palinkas et al., 2015). The researcher objectively chose Mbarara Regional Blood Bank officials because they were deemed knowledgeable in the subject matter.

## **Data Collection**

### **Questionnaire Surveys**

Structured questionnaires were used to collect data from blood donors. This study specifically used closed ended questions or statements guided by study objectives for respondents to tick what was appropriate. A survey is one of the tools used in the collection of research data (M.D. Gall, Borg, & Gall, 1996). A questionnaire is an instrument used for gathering data about variables of interest in a study, and consists of a number of questions or items that a respondent reads and answers (Malhotra, 2010). Questionnaire survey was used because it collects information with minimal errors but with high level of confidentiality since respondents are not bothered by the researcher's presence or absence.

### **In-depth Interviews**

In-depth interviewing is a qualitative research technique that involved conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program,

or situation (Jamshed, 2014). In-depth interviews are useful when one wants detailed information about a person's thoughts and behaviours or wants to explore new issues in depth. With this method, the researcher deeply interviewed key informants (Mbarara regional blood bank officials). In-depth interviews were used because they provide much more detailed information than what is available through other data collection methods, such as surveys (Showkat & Parveen, 2017).

## **Data collection tools**

### **Questionnaires**

A questionnaire is defined as a survey instrument intended to self-administered questions (Bourque & Fielder, 2003). Structured questionnaires were used to collect data from blood donors in rural and urban areas in Mbarara District. The questionnaires were self-administered where the respondents filled them in their own time and the researcher collected them at agreed upon schedules. Questionnaires were preferred because they give respondents freedom to answer sensitive but true questions and enough time to consult other documents for accurate and detailed information (Rowley, 2014).

### **Interview guides**

Interview guides were used to obtain data from blood collectors (officials of Mbarara Regional Blood Bank). This was because they were believed to possess key information about the factors that influence acceptability of blood donation exercises among blood donors. An interview guide is a list of topics or questions that the interviewer hopes to cover during the course of an interview (Brenner, 2006). The interviews lasted for between 30 minutes and One hour. Interview guides were used because they help interviewers to explain, better understand, and explore research subjects' opinions, behaviour and experiences about particular topics (Gill, Stewart, Treasure, & Chadwick, 2008). Interviewing the blood collectors helped to bring out more information about the factors influencing acceptability of blood donation exercises among blood donors in rural and urban areas in Mbarara district.

### **Data Management and Statistical Analysis**

Data collected from the questionnaires were inspected for errors and gaps. After inspection and editing, the collected data was entered in Epidata software version 3.1 and exported to Stata ver15 software. Stata Corporation, College Station, USA for analyses.

The data was analyzed at three different levels; univariate, bivariate and multivariate using the binary logistic regression model.

**Univariate analysis.** This was used for analyzing single variable and for numerical and continuous, summary statistics such as mean, median, variance and standard deviation were presented. The categorical variables (nominal or ordinal); proportions or percentages were presented.

**Bivariate analysis.** This was used for investigating the associations between independent variables and the dependent variable. Statistical significance of the relationships was determined for the P-value ( $P < 0.2$ ) and all significant variables at this level were considered at multivariate level of analysis.

**Multivariate analysis.** This was used for establishing which of the three independent variables (individual, environmental and cultural factors) influences the dependent/outcome variable (acceptability of blood donation) more than the other.

### **Qualitative Data Analysis**

Data from interviews were thematically analyzed. The recorded data was organized in themes and categories that emerged. Repetitive answers were grouped into themes and categories and were presented in line with the research objectives. Findings were presented into categories based on the different opinions from respondents. Categories were developed to present the specific individual experiences related to their interviews. Qualitative data was also presented using narrative analysis by “quoting” respondents’ direct words.

### **Ethical Considerations**

The research proposal was submitted to the department of public health of Bishop Stuart University for review. Then permission to collect data was granted by the Mbarara University Research Ethics Committee (MUST-2022-355) clearing the researcher to proceed with data collection. Written informed consent was sought from the study participants by providing them with consent forms. Detailed information about the purpose of the study, voluntary participation, benefits, freedom to withdraw from

the study at any time without any consequences, risks and discomforts were included on the consent forms. Measures to ensure confidentiality and privacy regarding participants’ identity protection and protection of information given were provided in the consent forms for the participants to make informed decisions regarding participation or exclusion from the study.

The confidentiality and privacy of respondents was further ensured by not revealing their names or identities at any stage of reporting the research findings.

**Results**

**Prevalence of acceptability of blood donation by study area**

At these study areas 384 participants considered for this study. Of these, 192 were recruited from rural area and 192 recruited from urban centers. Results in table 4.0 reveal that the overall prevalence of blood donation 45(11.7%). Stratified by the study areas, the prevalence of blood donation among participants from rural was 25(13.02%) while for participants from urban centers was 20(10.42%).

**Table 1: Prevalence of acceptability of blood donation by study areas**

Study area	Acceptability of blood donation		Total
	No n(%)	Yes n(%)	
Rural	167 (86.98)	25(13.02)	192(100.0)
Urban	172 (89.58)	20(10.42)	192(100.0)
Total	339 (88.3)	45(11.7)	384(100.0)

**Background information**

The majority of the respondents 267 (69.5%) were males and 117 (30.5%) were female. With respect to the age group; most of the respondents 127 (33.1%) were 24-33 years while the least 11 (2.9%) were below 18 years. Regarding the level of education, most of the respondents 174 (45.3%) had a tertiary level of education while the least 30 (7.8%) had no formal education. With respect to marital status, most of the respondents 204 (53.1%) were single while the least 22 (5.8%) were divorced. With respect to donating blood experience, most of the respondents 197 (51.3%) of the respondents indicated less than 3 years (Table 2).

**Table 2: Percent distribution of respondents’ demographic characteristics by rural / urban (n=384)**

Variables	Category	Rural	Urban	Total
		n(%)	n(%)	n(%)
Gender of parent	Male	128(33.3)	139(36.2)	267(69.5)
	Female	64 (16.7)	53 (13.8)	117(30.5)
Age group	Below 18 years	11 (2.9)	0.0	11 (2.9)
	19-23 years	76 (19.8)	27 (7.0)	103 (26.8)
	24-33 years	54 (14.1)	73 (19.0)	127 (33.1)
	34-43 years	33 (8.6)	46 (12.0)	79 (20.6)
	44-53 years	12 (3.1)	34 (8.9)	46 (12)
	54 and above	6 (1.6)	12 (3.1)	18 (4.7)
Level of education	No formal education	14 (3.6)	16 (4.2)	30 (7.8)
	Primary	9 (2.3)	10 (2.6)	19 (4.9)
	Secondary	89 (23.2)	72 (18.8)	161 (42)
	Tertiary	80 (20.8)	94 (24.5)	174 (45.3)
Marital status	Single	128 (33.3)	76 (19.8)	204 (53.1)
	Married	46 (12.0)	100 (26.0)	146 (38)
	Divorced	6 (1.6)	16 (4.2)	22 (5.8)
Experience	Less than 3 years	95 (24.7)	(26.6%)	197 (51.3)
	4-6 years	82 (21.4)	(14.15%)	136 (35.5)
	7 years and above	15 (3.9)	36 (9.4)	51 (13.3)

### **Individual factors influencing acceptability of blood donation in rural and urban areas in Mbarara District**

Most of the respondents 197 (51.3%) indicated that they have less than 3 years of blood donation experience, while the least 51 (13.3%) showed 7 years and above. The majority of the respondents 273 (71.1%) indicated that the husband makes decisions at home, while the least 9 (2.3%) mentioned children. The majority of the respondents 280 (72.9%) showed that they ask for permission to go to donate blood, while the least 104 (27.1%) indicated that they ask permission. Most of the respondents 203 (52.9%) were not employed while 181 (47.1%) were employed. With respect to the nature of employment, more than half of the respondents 246 (64.1%) mentioned self-employed, followed by 121 (31.5%) who mentioned civil servants while the least 17 (4.4%) mentioned non-government workers. Most of the respondents 168 (43.8%) had an average monthly income of 100,000 and below, while the least 83 (21.6%) had an average monthly income of 600,000 and above. The majority of the respondents 283 (73.7%) had no other source of income while only 101 (26.3%) had another source of income. The majority of the respondents 302 (78.6%) believed that donating blood is healthy while 82 (21.4%) believed that it's not healthy. Most of the respondents 245 (63.8%) mentioned that they don't have fears about donating blood, while the least 139 (36.2%) mentioned yes. The majority of the respondents 321 (83.6%) indicated that they would donate blood to help in emergency cases such as accidents. The majority of the respondents 286 (74.5%) thought that blood donors should be rewarded, while the least 98 (25.5%) mentioned no need for reward (Table 3).

Additionally, from interviews, it was observed that factors which contributed to poor acceptability of blood donation exercises in Rural Areas include; *“poor or low sensitization about blood donation exercises. Low income earning among the rural people since this can contribute poor feeding hence resulting into lack of enough blood to donate. Qualitative results also found that “rural people donate blood than urban people”*

**Table 3: Individual factors influencing acceptability of blood donation (n=384)**

Individual factors	Category	Rural	Urban	Total
		n(%)	n(%)	n(%)
Blood donation experience	Less than 3 years	95 (24.7)	102 (26.6)	197 (51.3)
	4-6 years	82 (21.4)	54 (14.1)	136 (35.5)
	7 years and above	15 (3.9)	36 (9.4)	51 (13.3)
Who makes decision to donate blood at home	Wife	44 (11.5)	27 (7.0)	71 (18.5)
	Husband	108 (28.1)	165 (43.0)	273 (71.1)
	Relatives	31 (8.1)	-	31 (8.1)
	Children	9 (2.3)	-	9 (2.3)
Asking for permission to go to donate	Yes	82 (21.4)	22 (5.7)	104 (27.1)
	No	110 (28.6)	170 (44.3)	280 (72.9)
Employed	Yes	66 (17.2)	115 (29.9)	181 (47.1)
	No	126 (32.8)	77 (20.1)	203 (52.9)
Nature of employment	Self-employed	106 (27.6)	140 (36.5)	246 (64.1)
	Civil servant	72 (18.8)	49 (12.8)	121 (31.5)
	Non-government worker	14 (3.76)	3 (0.8)	17 (4.4)
Blood donation experience	Less than 3 years	95 (24.7)	102 (26.6)	197 (51.3)
	4-6 years	82 (21.4)	54 (14.1)	136 (35.5)
	7 years and above	15 (3.9)	36 (9.4)	51 (13.3)
Who makes decision to donate blood at home	Wife	44 (11.5)	27 (7.0)	71 (18.5)
	Husband	108 (28.1)	165 (43.0)	273 (71.1)
	Relatives	31 (8.1)		31 (8.1)
	Children	9 (2.3)		9 (2.3)
Average monthly income	100,000 and below	89 (23.2)	79 (20.6)	168 (43.8)
	110,000-390,000	50 (13.0)	56 (14.6)	106 (27.6)
	410,000-590,000	15 (3.9)	12 (3.1)	27 (7.0)
	600,000 and above	38 (9.9)	45 (11.7)	83 (21.6)
Other source of income	Yes	67 (17.4)	34 (8.9)	101 (26.3)
	No	125 (32.6)	158 (41.1)	283 (73.7)

Whether donating is healthy	Yes	147 (38.3)	155 (40.3)	302 (78.6)
	No	45 (11.7)	37 (9.7)	82 (21.4)
Fears for donating blood	Yes	84 (21.9)	55 (14.3)	139 (36.2)
	No	108 (28.1)	137 (35.7)	245 (63.8)
Donating blood to help in emergency	Yes	158 (41.1)	163 (42.5)	321 (83.6)
	No	34 (8.9)	29 (7.5)	63 (16.4)
Awarding blood donors	Yes	116 (30.2)	170 (44.3)	286 (74.5)
	No	76 (19.8)	22 (5.7)	98 (25.5)

### **Bivariate and Multivariate analysis for individual factors influencing acceptability of blood donation exercises in rural areas**

At bivariate level, logistic regression was used to determine the single individual factors associated with the acceptability of blood donation in rural areas. The analysis revealed that 4-6 years of experience in donating blood (UOR=3.22, 95% CI = 1.41 – 7.34, P= 0.005); Husband as one who makes decision to donate blood at home (UOR = 6.75, 95% CI = 1.29 – 35.38, P = 0.024) were associated with the acceptability of blood donation in rural areas.

At a multivariate level, all factors that had a P-value less than 0.2 in the bivariate analysis were included in the model. From this analysis, the results revealed that participants who had 4-6 years of Blood donation experience were 83% less likely to accept to donate blood than those with less than 3 years of experience (AOR = 0.17, 95% CI = 1.22 – 1.36, P =0.004). In addition husband as one who makes decisions to donate blood at home were 85% less likely to accept blood donation exercise than whose decisions are made by wife (AOR=0.15, 95% CI = 0.03 – 0.78, P = 0.024) Other factors were not significantly associated with the acceptability of blood donation in rural areas (as demonstrated in table 4).

**Table 4: Bivariate and Multivariate analysis for individual factors influencing acceptability of blood donation exercises in rural areas**

Characteristics	category	Rural			
		UOR (95% CI)	p-value	AOR(95% CI)	P-value
Age group	Below 18 years	1			
	19-23 years	0.43 (0.08 – 2.31)	0.325		
	24-33 years	1.63 (0.31 – 8.43)	0.561		
	34-43 years	1.23 (0.24 – 6.26)	0.800		
	44-53 years	0.20 (0.25 – 1.65)	0.136		
Level of Education	Primary	1			
	Secondary	5.31 (0.96 – 29.24)	0.055		
	Tertiary				
Blood donation experience	Less than 3 years	1		1	
	4-6 years	3.22 (1.41 – 7.34)	0.005*	0.17 (1.22 – 1.36)	0.004**
	7 years and above	1.59 (0.42 – 6.07)	0.50	1.94 (0.38 – 9.96)	0.427
Who makes decisions at home	Wife	1		1	
	Husband	6.75 (1.29 – 35.38)	0.024*	0.15 (0.03 – 0.78)	0.024**
Asking for permission	Yes	0.80 (0.41 – 1.57)	0.518		
	No	1			
Employment status	Yes	1.13 (0.60 – 2.11)	0.70		
	No	1			
Nature of employment	Self employed	1			
	Civil servant	0.66 (0.13 – 3.36)	0.618		
	Non-governmental worker	1.81 (0.49 – 6.73)	0.374		

Average monthly income	100,000 and below	1			
	110,000-390,000	0.70 (0.14 – 3.59)	0.667		
	410,000-590,000	0.72 (0.20 – 2.55)	0.606		
	600,000 and above	0.61 (0.26 – 1.42)	0.251		
Other source of income	Yes	0.11 (1.43-12.76)	0.629		
	No	1			
Donate to help in emergency cases	Yes	1.79 (0.85-3.75)	0.125		
	No	1			
Blood donation experience	Less than 3 years	1			
	4-6 years	3.22 (1.41 – 7.34)	<b>0.005*</b>	0.17 (0.22 – 1.36)	<b>0.004**</b>
	7 years and above	1.59 (0.42 – 6.07)	0.50	1.94 (0.38 – 9.96)	0.427
Rewarding blood Donors	Yes	0.28 (0.09-0.80)	0.142		
	No	1			

\*Statistically significant (p<0.05) at bivariate analysis \*\*statistically significant (p<0.05) at multivariate analysis.

### Bivariate and Multivariate analysis for individual factors influencing acceptability of blood donation exercises in urban centers

At bivariate level, logistic regression was used to determine the single individual factors associated with the acceptability of blood donation in urban centers. The analysis revealed that blood donation was influenced by primary level of education (UOR=0.14, 95% CI=0.21-0.90, P=0.038); 4-6 years of blood donation experience (UOR=3.22, 95% CI = 1.41 – 7.34, P = 0.005); husband as one who makes decisions to donate at home (UOR=0.15, 95% CI = 0.4 – 0.51, P = 0.002); Asking for permission (UOR=0.39, 95% CI = 0.18 – 0.85, P = 0.018); Civil servant as nature of employment (UOR = 3.67, 95% CI = 1.51 – 8.9, P = 0.004); Shs. 600,000 and above as average monthly income (UOR = 3.51, 95% CI = 1.13 -3.83, P = 0.03); other source of income (UOR = 0.16 95% CI = 0.55 – 0.48, P = 0.001); and rewarding blood donors

(UOR = 5.89, 95% CI =2.19 -15.86, P =0.000) were associated with the acceptability of blood donation in urban centers.

At a multivariate level, all factors that had a P-value less than 0.05 in the bivariate analysis were included in the model. From this analysis, the results revealed that participants who had secondary level of education were 10.3 times more likely to accept blood donation exercises than those who had tertiary level of education (AOR = 10.31, 95% CI = 2.28 – 46.56, P=0.002). a husband as one who makes decisions to donate at home was 6.8 times more likely to accept blood donation exercises than wife making decision (AOR = 6.83, 95% CI = 1.98 – 23.58, P=0.002). In addition, participants who ask for permission were 2.6 times more likely to accept to donate blood than those who don't ask permission (AOR = 2.58, 95% CI = 1.17 – 5.66, P = 0.018). In addition, civil servants were 73% less likely to accept donating blood than those with self-employment (AOR = 0.27, 95% CI = 0.11 – 0.66, P = 0.004). Participants with other sources of income were 6.1 times more likely to accept donating blood than those with no other source of income (AOR = 6.125, 95% CI = 2.07 – 18.10, P = 0.001). In addition, participants who suggested that donors should be rewarded were 83% less likely to accept donating blood than those who did not suggest that blood donors should be rewarded (AOR = 0.17, 95% CI = 0.06 – 0.46, P =0.000). Other factors were not associated with acceptability of blood donation exercises in urban centers (Table 5).

**Table 5: Bivariate and Multivariate analysis for individual factors influencing acceptability of blood donation exercises in urban centers**

Characteristics	Category	Rural			
		UOR(95% CI)	p-value	AOR(95% CI)	P-value
Age group	Below 18 years	<b>1</b>			
	14-23 years	1.31 (0.36 – 6.45)	0.566		
	24-33 years	1.31 (0.30 – 5.73)	0.718		
	34-43 years	1.69 (0.34 – 8.31)	0.520		
	44-53 years	1.13 (0.17 – 7.25)	0.901		
Level of Education	No formal education	<b>1</b>			<b>1</b>
	Primary	0.14 (0.21 – 0.90)	<b>0.038*</b>	7.33 (1.11 – 48.26)	<b>0.038**</b>
	Secondary	1.41 (0.34 – 5.75)	0.636	10.31 (2.28 – 46.56)	<b>0.002**</b>
	Tertiary	1.16 (0.29 – 4.60)	0.838	8.47 (1.92 – 37.33)	<b>0.005**</b>
Blood donation	Less than 3 years	<b>1</b>		<b>1</b>	

experience	4-6 years	3.22 (1.41 – 7.34)	0.005*	0.31 (0.14 – 0.71)	<b>0.005**</b>
	7 years and above	1.59 (0.42 – 6.07)	0.499	0.49 (0.12 – 2.09)	0.337
Who makes decisions at home	Wife	<b>1</b>		1	
	Husband	0.15 (0.4 – 0.51)	<b>0.002*</b>	6.83 (1.98 – 23.58)	<b>0.002**</b>
Asking for permission	Yes	0.39 (0.18 – 0.85)	<b>0.018*</b>	2.58 (1.17 – 5.66)	<b>0.018**</b>
	No	<b>1</b>		1	
Employment status	Yes	1.25 (0.60 – 2.59)	0.548		
	No	<b>1</b>			
Nature of employment	Self employed	<b>1</b>		1	
	Civil servant	3.67 (1.51 – 8.90)	<b>0.004*</b>	0.27 (0.11 – 0.66)	<b>0.004**</b>
	Non-governmental worker	2.37 (0.50 – 11.22)	0.277	0.645(0.12 – 3.49)	0.612
Average monthly income	100,000 and below	<b>1</b>		1	
	110,000-390,000	0.82 (0.80 – 4.42)	0.147	0.53 (0.23 – 1.25)	0.147
	410,000-590,000	<b>1</b>		1	
	600,000 and above	3.51 (1.13 – 3.83)	<b>0.030*</b>	1.87 (0.53 – 6.69)	0.333
Other source of income	<b>Yes</b>	0.16 (0.55 – 0.48)	<b>0.001*</b>	6.125 (2.07 – 18.10)	<b>0.001**</b>
	<b>No</b>	<b>1</b>		1	
Donate to help in emergency cases	<b>Yes</b>	1.78 (0.85-3.76)	0.126		
	<b>No</b>	<b>1</b>			
Blood donation experience	Less than 3 years	<b>1</b>			
	4-6 years	3.22 (1.41 – 7.34)	0.005*		
	7 years and above	1.59 (0.42 – 6.07)	0.499		
Rewarding blood Donors	<b>Yes</b>	5.89 (2.19 – 15.86)	<b>0.000*</b>	0.17 (0.06 – 0.46)	<b>0.000**</b>
	<b>No</b>	<b>1</b>		1	

\*Statistically significant (p<0.05) at bivariate analysis \*\*statistically significant (p<0.05) at multivariate analysis

### **Environmental factors influencing acceptability of blood donation in rural and urban areas in Mbarara District**

Most of the respondents 159 (41.4%) mentioned gently sloping as the topography of their places of residence, while the least 77 (20.1%) mentioned hilly topography. The majority of the respondents 354 (92.2%) indicated that the type of transport in their area is road and the least 30 (7.8%) indicated water transport. Regarding the mode of transport used to get to the nearest blood donation point, most of the respondents 124 (32.3%) indicated a motorcycle while the least 84 (21.9%) indicated a bicycle. Most of the respondents 177 (46.1%) indicated 2-4 km as the distance walked or traveled from their home to the nearest blood donation point and the least 98 (25.5%) indicated 5km and above. Most of the respondents 244 (63.5%) indicated that they have friends who donate blood, while the least don't have. Most of the respondents 218 (56.8%) showed that they don't have family members who donate blood, while the least 166 (43.2%) mentioned yes. Most of the respondents 220 (57.3%) showed that blood donation sensitization campaigns have been carried out in their areas for the last 5 years, while the least 164 (42.7%) mentioned no. Most of the respondents 171 (44.5%) showed that they last donated blood in 7-12 months ago while the least 61 (15.9%) mentioned it less than 6 months ago. The majority of the respondents 297 (77.3%) indicated 1 hr and below as the approximate waiting time at the blood donation point before they donated blood while the least 15 (3.9%) indicated 4-6 hrs. Most of the respondents 214 (55.7%) showed that the attitude of blood collectors towards blood donors was welcoming and comforting, while the least 170 (44.3%) mentioned a rude attitude (Table 6).

In addition, from interviews, it was observed that *“most rural areas are hilly which makes it hard for residents to reach blood donation points. In rural areas, most people come by foot and bicycle, and the roads are very poor with potholes, compared to urban areas where most people use vehicles and motorcycles which makes them reach donating points easier. The most visited areas in urban areas include town councils such as Rubindi, Bwizibwera, Rutoomma, among others, whereas in rural areas the most visited areas include Bubaare, Rubaya, Kashare, among others”*. Said one of the blood donor recruiters.

**Table 6: Descriptive statistics for environmental factors influencing acceptability of blood donation (n=384)**

Environmental factors	category	Rural	Urban	Total
		n(%)	n(%)	n(%)
Topography/landscape of place of residence	Flat	80 (20.8)	68 (17.7)	148 (38.5)
	Hilly	46 (12.0)	31 (8.1)	77 (20.1)
	Gently sloping	66 (17.2)	93 (24.2)	159 (41.4)
Types of transport in the area	Road	183 (47.7)	171 (44.5)	354 (92.2)
	Water	9 (2.3)	21 (5.5)	30 (7.8)
Mode of road transport	Bicycle	84 (21.9)		84 (21.9)
	Motorcycle	95 (24.7)	29 (7.6)	124 (32.3)
	Car	9 (2.6)	46 (12.0)	56 (14.6)
	Foot	3 (0.8)	117 (30.5)	120 (31.3)
Number of kilometers from home to the nearest blood donation point	Less than 1km	57 (14.8)	52 (13.6)	109 (28.4)
	2-4 km	89 (23.2)	88 (22.9)	177 (46.1)
	5km and above	46 (12.0)	52 (13.5)	98 (25.5)
Having friends who donate	Yes	122 (31.8)	122 (31.7)	244 (63.5)
	No	70 (18.2)	70 (18.3)	140 (36.5)
Having family members who donate	Yes	122 (31.8)	122 (31.7)	244 (63.5)
	No	70 (18.2)	70 (18.3)	140 (36.5)
Blood donation sensitization campaigns	Yes	67 (17.4)	153 (39.9)	220 (57.3)
	No	125 (32.6)	39 (10.1)	164 (42.7)
Last donate blood	<6 months ago	28 (7.3)	34 (8.6)	61 (15.9)
	7-12 months ago	80 (20.8)	91 (23.7)	171 (44.5)
	Over 1 year	84 (21.9)	68 (17.7)	152 (39.6)
Approximate waiting time at	1 hr and below	115 (29.9)	182 (47.4)	297 (77.3)

the blood donation point	1-3 hrs	62 (16.1)	10 (2.7)	72 (18.8)
	4-6 hrs	15 (3.9)		15 (3.9)
Attitude of the blood collectors	Welcoming and comforting	139 (36.2)	75 (19.5)	214 (55.7)
	Rude	50 (13.0)	120 (31.3)	170 (44.3)

**Bivariate and Multivariate analysis for environmental factors influencing acceptability of blood donation in rural areas**

At bivariate level, logistic regression was used to determine environmental factors associated with the acceptability of blood donation in rural areas. The analysis revealed that environmental factors; topography of place of residence UOR=0.43, 95% CI = 1.1-4.5, P=0.029; Mode of transport (Motorcycle: UOR=0.40, 95% CI = 0.19 – 1.0, P=0.82; Car: UOR = 0.67, 95% CI =0.25 – 1.73, P=0.005) were statistically significant to acceptability of blood donation in rural areas. At multivariate analysis, findings from the model indicate that topography of place of residence- participants who stayed in hilly areas were 72% less likely to donate blood compared to those who stayed in flat areas (AOR=0.18, 95% CI = 0.03-0.94, P=0.043, mode of transport -Motorcycle ( AOR=0.48, 95% CI = 0.10-0.22, P<0.001), respondents who travelled using cars were 77% less likely to donate blood compared to those who used bicycle as mode of transport (AOR=0.23, 95% CI = 0.42-0.94, P=0.0087) and respondents who used Foot as mode of transport were more than 2 fold to donate blood compared to those who used bicycle (AOR=2.10, 95% CI = 2.2-5.50, P=0.005) and were statistically significant to blood donation. Other factors were not statistically significant as portrayed in table 7

**Table7: Bivariate and Multivariate analysis for environmental factors influencing acceptability of blood donation in rural areas**

Environmental factors	Category	Rural			
		UOR(95% CI)	p-value	AOR(95% CI)	P-value
Topography of place of residence	Flat	<b>1</b>		<b>1</b>	
	Hilly	0.43 (1.1-4.5)	<b>0.029*</b>	0.18(0.03-0.94)	<b>0.043**</b>
	Gently sloping	0.86 (0.42-1.78)	0.688	0.27(0.06-1.12)	0.072
Type of transport	Road	0.39 (0.15-2.84)	0.569		
	Water	1.86 (0.20-17.01)	0.588		
	Air	<b>1</b>			
Mode of transport	Bicycle	<b>1</b>		<b>1</b>	
	Motorcycle	0.40 (1.9 – 2.6)	<b>0.000*</b>	0.48 (0.10 – 0.22)	<b>0.000**</b>
	Car	0.67 (1.5 – 4.73)	<b>0.005*</b>	0.23 (0.42 – 0.94)	<b>0.0087**</b>
	Foot	0.91 (0.23 – 1.16)	0.085	2.10(2.2-5.50)	<b>0.005**</b>
Distance to nearest blood donation point	Less than 1 km	<b>1</b>			
	2-4 km	0.89 (0.42 – 1.79)	0.995		
	5 km and above	0.75 (0.38 – 2.06)	0.884		
Friends who donate	Yes	0.56 (0.11 – 2.87)	0.489		
	No	<b>1</b>			
Blood donation sensitization campaigns	Yes	0.24 (0.47 – 1.24)	0.088		
	No	<b>1</b>			
Last donate blood	< 6 months	<b>1</b>			
	7 – 12 months	1.16 (0.92 – 8.89)	0.069		
	Over 1 year	1.35 (0.26 – 6.92)	0.716		
Approximate waiting time at the blood donation point	1 hr and below	<b>1</b>			
	1-3 hrs	1.21 (0.57 – 2.57)	0.625		
Attitude of the blood collectors	Welcoming and comforting	1.01 (0.53 – 2.54)	0.781		

	Rude	<b>1</b>			
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\*Statistically significant (p<0.05) at bivariate analysis \*\*statistically significant (p<0.05) at multivariate analysis

**Bivariate and Multivariate analysis for environmental factors influencing acceptability of blood donation in urban centers**

At bivariate level, logistic regression was used to determine the single environmental factors associated with the acceptability of blood donation in urban centers. The analysis revealed that hill topography of place residence (UOR= 4.16, 95% CI = 1.15 – 15.01, P <0.001); Mode of transport- Motorcycle ( AOR=21; 95% CI = 0.10-0.22, P<0.001), Car- ( UOR=0.4.78, 95% CI = 1.60-95.8, P=0.005) , Distance to nearest blood donation point (UOR=2-4 km: OR = 0.21, 95% CI = 0.46 – 0.98, P = 0.047; 5 km and above: UOR =0.33, 95% CI = 0.07 – 0.15, P<0.001); Family members who donate blood (UOR = 0.45, 95% CI = 0.21 – 0.98, P=0.003); Blood donation sensitization campaigns (OR = 0.12, 95% CI = 0.34 – 0.39, P =0.001); donating blood in last 7-12 months (UOR = 0.38, 95% CI = 1.92 – 1.00, P = 0.009); and 1-3 hours of approximate waiting time (UOR = 2.49, 95% CI = 1.07 – 5.83, P=0.035) were statistically associated with acceptability of blood donation in urban areas.

At a multivariate level, all factors that had a P-value equal to 0.2 in the bivariate analysis were included in the model. From this analysis, the results revealed that participants living in hill residences were 76% less likely to accept donating blood than those living flat residence (AOR=0.24, 95% CI = 0.67 – 0.87, P =0.001). In addition, participants who use mode of transport as a car were 77% less likely to accept to donate blood than those using bicycle (AOR = 0.23, 95% CI = 1.42 – 7.24, P = 0.049). Also, participants who use mode of transport as motorcycle were 52% less likely to accept to donate blood than those using bicycle (AOR = 0.48, 95% CI = 0.10 – 0.22, P <0.001). Similarly, participants who use mode of transport as foot were 4 fold more likely to accept to donate blood than those using bicycle (AOR = 4.10, 95% CI = 0.42 – 0.89, P <0.005). In addition, participants who travel 5 km and above to donation point were approximately 16% less likely to accept donating blood than those who travel less than 1 km (AOR = 0.157, 95% CI = 0.69 – 0.36, P < 0.001). Also participants who travel 2-4 km to donation point were approximately 5 times more likely to accept donating blood than those who travel less than 1 km (AOR = 4.7, 95% CI = 0.05– 21.69, P =0.047). Multivariable analysis further revealed that respondents whose family members donate blood were 2.2 times more likely denote compared to participants whose family

members had never denoted blood (AOR=2.2; 95%CI (1.02-4.74); p=0.026). Furthermore, Participants who had blood donation sensitization campaigns were 9-fold more likely to denote blood compared to those who had never heard of the blood donation sensitization campaign ((AOR=8.63; 95%CI (2.55-29.25); p=0.001). Lastly, the multivariate analysis further revealed that participants who last donate blood 7-12 months ago were 62% less likely to donate blood compared to those who last blood in less than 6 months ago (AOR=0.38; 95% CI (1.92-6.02); p<0.001). Participants whose approximate waiting time at was 1-3 hours were 60% less likely to donate blood compared to those whose waiting time was ≤ 1 hour (AOR=0.40; 95% CI ((0.17 – 0.94); p=0.025). Other factors were not significantly associated with donation of blood as demonstrated in (table8).

**Table8: Bivariate and Multivariate analysis for environmental factors influencing acceptability of blood donation in urban centers**

Environmental factors	category	Urban			
		UOR(95% CI)	p-value	AOR(95% CI)	P-value
Topography of place of residence	Flat	1		1	
	Hilly	4.16 (1.15 – 15.01)	<b>0.000*</b>	0.24 (0.67 – 0.87)	<b>0.001**</b>
	Gently sloping	0.77 (0.36 – 1.65)	0.506	0.19 (0.05 – 0.68)	<b>0.039**</b>
Type of transport	Road	0.49 (0.15-2.84)	0.563		
	Water	1.86 (0.20-17.01)	0.584		
	Air	1			
Mode of transport	Bicycle	1		1	
	Motorcycle	21 (4.61 – 95.77)	<b>0.000*</b>	0.48 (0.10 – 0.22)	<b>0.000**</b>
	Car	4.78 (1.60 – 95.76)	<b>0.005*</b>	0.23 (1.42 – 7.24)	<b>0.049**</b>
	Foot	2.17 (0.90 – 5.26)	0.085	4.10 (0.42 – 0.89)	<b>0.005**</b>
Distance to nearest blood donation point	Less than 1 km	1			
	2-4 km	0.21 (0.46 – 0.98)	<b>0.047*</b>	4.70 (0.05 – 21.69)	<b>0.047**</b>
	5 km and above	0.33 (0.07 – 0.15)	<b>0.000*</b>	0.157 (0.69 – 0.36)	<b>0.000**</b>
Friends who donate	Yes	1.87 (0.85 – 4.12)	0.119		
	No	1			
Family members who donate	Yes	2.45 (0.21 – 0.98)	<b>0.003*</b>	2.2 (1.02 – 4.74)	<b>0.026**</b>
	No	1			
Blood donation	Yes	4.12 (0.34 – 0.39)	<b>0.001*</b>	8.63 (2.55 – 9.25)	<b>0.001**</b>

sensitization campaigns	No	1			
Last donate blood	< 6 months	1		1	
	7 – 12 months	1.16 (0.92 – 8.89)	<b>0.009*</b>	0.38 (1.92 – 6.02)	<b>0.000**</b>
	Over 1 year	1.35 (0.26 – 6.92)	0.716	2.60 (0.74 – 9.16)	0.138
Approximate waiting time at the blood donation point	1 hr and below	1		1	
	1-3 hrs	2.49 (1.07 – 5.83)	<b>0.035*</b>	0.40 (0.17 – 0.94)	<b>0.025**</b>
Attitude of the blood collectors	Welcoming and comforting	1.21 (0.53 – 2.39)	0.757		
	Rude	1			

**Cultural factors influencing acceptability of blood donation in rural and urban areas in Mbarara District**

Most of the respondents 113 (29.4%) were Anglicans while the least 44 (11.5%) were seventh day Adventists. The majority of the respondents 328 (85.4%) indicated that the religion does not preach against blood donation, while the least 56 (14.6%) said yes. The majority of the respondents 322 (83.9%) indicated that their culture doesn't preach against blood donation, while the least 62 (16.1%) mentioned yes. The majority of the respondents 333 (86.7%) mentioned don't believe that donating blood is against their cultural practices. The majority of the respondents 351 (91.4%) showed that their culture doesn't believe that donating blood causes disease (s), while the least 33 (8.6%) said yes. The majority of the respondents 351 (91.4%) showed that their culture doesn't believe that donating blood is against God, while the least 33 (8.6%) said yes. The majority of the respondents 356 (92.7%) indicated that their culture doesn't have social norms against blood donation and the least indicated yes (Table 9).

**Table 9: Percent distributions of the cultural factors influencing acceptability of blood donation**

Cultural factors	Category	Rural	Urban	Total
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		n(%)	n(%)	n(%)
Religious affiliation	Anglican	59 (15.4)	54 (14.0)	113 (29.4)
	Catholic	72 (18.8)	62 (16.2)	134 (34.9)
	Moslem	44 (11.5)	49 (12.7)	93 (24.2)
	Seventh day Adventist	17 (4.4)	27 (7.1)	44 (11.5)
Whether Religious preach against blood donation	Yes	56 (14.6)		56 (14.6)
	No	136 (35.4)	192 (50.0)	328 (85.4)
Whether culture preach against blood donation	Yes	58 (15.1)	4 (1.0)	62 (16.1)
	No	134 (34.9)	188 (49.0)	322 (83.9)
Believe in donating blood is against cultural practices	Yes	47 (12.2)	4 (1.1)	51 (13.3)
	No	145 (37.8)	188 (48.9)	333 (86.7)
Culture believe that donating blood causes disease (s)	Yes	29 (7.6)	4 (1.0)	33 (8.6)
	No	163 (42.4)	188 (49.0)	351 (91.4)
Culture believe that donating blood is against God	Yes	33 (8.6%)		33 (8.6)
	No	159 (41.4)	192 (50.0)	351 (91.4)
Culture had social norms against blood donation.	Yes	28 (7.3)		28 (7.3)
	No	164 (42.7)	192 (50.0)	356 (92.7)

**Bivariate and Multivariate analysis for cultural factors influencing acceptability of blood donation in rural areas in Mbarara District**

At bivariate level, logistic regression was used to determine the single cultural factors associated with the acceptability of blood donation in rural areas. The analysis revealed that Religious Affiliation (Catholic: UOR = 0.64, 95% CI = 0.28 – 1.48, P = 0.296; Moslem: UOR = 2.29, 95% CI = 0.68 – 7.75, P = 0.182; Seventh day Adventist: UOR = 0.55, 95% CI = 0.160 – 1.19, P = 0.342); Religion preach against blood donation (UOR = 0.64, 95% CI = 0.29 – 1.82, P = 0.276); Culture preach against blood donation (UOR = 0.74, 95% CI = 0.34 – 1.98, P = 0.466); Donating blood is against culture practices (UOR = 0.67, 95% CI = 0.29 – 1.54, P = 0.54); Donating blood causes diseases (UOR = 0.63, 95% CI = 0.18 – 1.25, P = 0.841); Donating blood is against God (UOR = 0.56, 95% CI = 0.22 – 1.45, P = 0.233); Culture have social norms against blood donation (UOR = 0.62, 95% CI = 0.31 – 1.82, P = 0.35) were not associated with the acceptability of blood donation in rural areas (Table 10).

**Table 10: Bivariate and Multivariate analysis for cultural factors influencing acceptability of blood donation in rural areas in Mbarara District.**

Cultural factors	category	Rural			
		UOR(95% CI)	p-value	AOR(95% CI)	P-value
Religious Affiliation	Anglican	<b>1</b>			
	Catholic	0.64 (0.28 – 1.48)	0.296		
	Moslem	2.29 (0.68 – 7.75)	0.182		
	Seventh day Adventist	0.55 (0.160 – 1.19)	0.342		
	Jehovah				
Religion preaches against blood donation	Yes	0.64 (0.29 – 1.82)	0.276		
	No	<b>1</b>			
Culture preaches against blood donation	Yes	0.74 (0.34 – 1.98)	0.466		
	No	<b>1</b>			
Donating blood is against culture practices	Yes	0.67 (0.29 – 1.54)	0.54		
	No	<b>1</b>			
Donating blood causes diseases	Yes	0.63 (0.18 – 1.25)	0.841		

	No	<b>1</b>			
Donating blood is against God	Yes	0.56 (0.22 – 1.45)	0.233		
	No	<b>1</b>			
Culture have social norms against blood donation	Yes	0.62 (0.31 – 1.82)	0.35		
	No	<b>1</b>			

At bivariate level, logistic regression was used to determine the single cultural factors associated with the acceptability of blood donation in urban centers. The analysis revealed that Religious Affiliation (Catholic: UOR = 0.93, 95% CI = 0.42 – 2.06, P = 0.836; Moslem: UOR = 0.90, 95% CI = 0.39 – 2.10, P = 0.770; Seventh day Adventist: UOR = 0.34, 95% CI = 0.08 – 1.51, P = 0.149); Religion preach against blood donation (UOR = 0.66, 95% CI = 0.31 – 1.44, P = 0.278); Culture preach against blood donation (UOR = 0.76, 95% CI = 0.36 – 1.65, P = 0.458); Donating blood is against culture practices (UOR = 0.69, 95% CI = 0.31 – 1.56, P = 0.349); Donating blood causes diseases (UOR = 0.47, 95% CI = 0.20 – 1.13, P = 0.457); Donating blood is against God (UOR = 0.58, 95% CI = 0.24 – 1.47, P = 0.235); Culture have social norms against blood donation (UOR = 0.60, 95% CI = 0.24 – 1.64, P = 0.210) were not statistically significant (Table 4.11).

**Table 11: Bivariate and Multivariate analysis for cultural factors influencing acceptability of blood donation in urban centers in Mbarara District**

Cultural factors	Category	Urban			
		UOR(95% CI)	p-value	AOR(95% CI)	P-value
Religious Affiliation	Anglican	1			
	Catholic	0.93 (0.42 – 2.06)	0.836		
	Moslem	0.90 (0.39 – 2.10)	0.770		
	Seventh day Adventist	0.34 (0.08 – 1.51)	0.149		

Religion preach against blood donation	Yes	0.66 (0.31 – 1.44)	0.278		
	No	1			
Culture preach against blood donation	Yes	0.76 (0.36 – 1.65)	0.458		
	No	1			
Donating blood is against culture practices	Yes	0.69 (0.31 – 1.56)	0.349		
	No	1			
Donating blood causes diseases	Yes	0.47 (0.20 – 1.13)	0.457		
	No	1			
Donating blood is against God	Yes	0.58 (0.24 – 1.47)	0.235		
	No	1			
Culture have social norms against blood donation	Yes	0.60 (0.24 – 1.64)	0.210		
	No	1			

In addition, from interviews, some of the blood bank officials were quoted to have said; “*Culture has no influence on acceptability of blood donation in rural and urban areas in Mbarara District*”. Another official said; “*I am a Catholic by Religion and for the years I have gone to church, no religious leader or preacher has ever condemned blood donating*”. Another blood bank official said “*As far as I know, donating blood is a voluntary choice with no cultural attachments to it*”. However, only one religion (Jehovah Witnesses) was found to discourage its believers to accept blood donations both in rural and urban areas in Mbarara District. In fact, one of the blood bank officials said; “*We have registered a few incidents where people reject our requests to donate blood because they subscribe to Jehovah Witnesses*”.

### **Discussion**

The study findings from both rural and urban areas revealed that blood donation experience influences acceptability of blood donation as participants who had 4-6 years of blood donation experience were influenced to accept blood donation. This finding is in line with Namuli (2016) whose study among university students of Uganda Christian University (UCU) and Makerere University in Mukono and Kampala respectively, Namuli (2016) found out that 60.9% of students continued with blood donation having ever donated blood before.

The above finding also agrees with supported by Ajzen (1985) who, in his theory of Planned Behaviour stated that attitude, subject norms, and perceived behavioural control, together shape an individual’s

behavioural intentions and behaviours. Ajzen (1985) observed that an individual's past experience of an exercise determines his/her acceptability to repeat that exercise, and in this sense, individuals with blood donation experience can accept to donate blood since they will have donated it in the past.

Findings of the study also revealed that household decision making in both rural and urban areas also influence acceptability of blood donation as participants whose husbands make decisions to donate blood at home were 85% less likely to accept blood donation exercises than those whose decisions are made by wives.

The study findings from both rural and urban centers revealed topology of the area, mode of transport, distance to the blood donation point influences the acceptability of blood donation, these results are in congruent with the study carried out by Behnampour et al. (2022) whose study about using social marketing to persuade Iranians to donate blood found out that mountainous roads were one of the barriers to acceptability of blood donation in Iran.

The above study findings are in disagreement with Mustafa, Abdelfattah, & Al Rukban, (2015) who noted that psychological, social factors and other reasons limit university students (from both rural and urban universities) from actively participating in blood donation in routine and emergency situations. Factors which hinder the student from accepting to donate blood health reasons, social factors and religious reasons.

The above findings are further in disagreement with research conducted among urban college students in the US, Nigeria, India and Iran, indicates that the level of knowledge regarding blood donation was inadequate, incomplete or low. Their attitude towards blood donation was positive (Shaz et al., 2009).

The above study findings also differ from Arora, Arora, and Kotwal (2017) who studied the awareness, attitudes and level of blood donation practice of adults towards voluntary blood donation in a semi-urban area of Delhi, India. The perceptions put forward were that blood donation saves lives and blood should be donated by healthy persons regularly. The authors concluded that people of the semi-urban area of Delhi were willing to accept blood donation based on these perceptions.

The study findings found that all single cultural factors (religion, culture and social norms) in rural and urban centers were not associated with acceptability of blood donation in rural and urban areas. The above study findings differ from Godin et al., (2012) who noted that negative perceptions of blood and

blood donation is often passed on from generation to generation. Misinformation and negative perceptions about blood donation have been discovered in some studies carried out in African countries.

The findings are also in disagreement with Lownik, Riley, Konstenius, Riley, and McCullough (2012) who observed that blood is a symbol often portrayed in African culture as unique to families, and thus to donate one's blood in rural areas to an unfamiliar person is often frowned upon by strong adherents to African culture.

The above study finding agrees with a study carried out in most rural areas of Europe and Australia concerning blood donation in the 1980s and 1990s unlike that in 1960s and 1970s which reported that living in a world where the pace of changes in social, technical, cultural, philosophical, political and moral influences on the individual is increasing and the subject's, opinions, beliefs, attitudes and behaviour are consequently subject to significant alterations (Sojka & Sojka, 2008).

### **Conclusion and Recommendations**

Blood donation experience and household decision making by the husband significantly influence acceptability of blood donation exercises in both rural and urban rural areas.

Topology of the area, mode of transport, distance to blood donation points in both rural and urban areas influence the acceptability of blood donation exercises.

None of the cultural factors that is religion, culture and social norms influence acceptability of blood donation as per the findings of this study.

The ministry of health in collaboration with other stakeholders such as the Uganda Red Cross Society and Uganda Blood Transfusion Service should intensify blood donation sensitization campaigns so as to encourage more people to voluntarily donated blood from where they can acquire blood donation experience. Additionally, the sensitization campaigns of these stakeholders should also target husbands to allow their wives to make personal choices and decisions regarding blood donation.

The ministry of health in collaboration with other stakeholders such as the Uganda Red Cross Society and Uganda Blood Transfusion Service should set up more blood collection points in different areas so as to ease movement of potential blood donors to the nearest blood collection points. This would also help to minimize geographical barriers to acceptability of blood donation.

Blood transfusion services across Africa should consider designing additional culturally appropriate interventions to boost blood donation. Such interventions must take into account the languages spoken by the target audience and the types of myths about blood donation to be demystified.

### **Authors' abbreviations**

**EA: Ellon Agaba; WBL: Waswa Bright Laban, GA: Gershom Atukunda**

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### **Authors' contributions**

The authors of this manuscript made the following contributions to this manuscript Concept: EA, conceived the concept, Data collection; EA, WBL; Data analysis: First draft: EA, WBL GA, Final revision: EA, WBL,GA Read and approved final manuscript: EA, WBL,GA .

### **Competing interests**

The authors declare that they have no competing interests.

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