Determinants of voluntary blood donation among adults in communities of north central region of Nigeria

***Salaudeen A.G.[1], Durowade K.A.[2], Durotoye I.A.[3], Ahmed A.[4], Sanni E.O.[5], Musa O.I.[1] Akande T.M.[1]**

Abstract

Objective: The collection of blood from voluntary, non-remunerated blood donors is an important measure for ensuring the safety, quality, availability and accessibility of blood. The study assessed factors affecting voluntary blood donation in North-central zone, Nigeria.

Methods: The study design was descriptive cross-sectional, data was collected using a pre-tested interviewer administered questionnaire from 3104 respondents using multistage sampling technique. Data was analyzed using EPI INFO computer software package (version 3.5.3). Level of significance was pre-determined at p-value < 0.05 at a confidence level of 95%.

Results: Respondents with good knowledge of voluntary blood donation had better practice of voluntary blood donation. Younger age groups were 8 times more likely to donate blood voluntarily than older respondents. Yoruba ethnic groups are 1.5 times more likely to donate blood than other ethnic groups.

Conclusion: For Nigeria and other developing countries at large to achieve 100% voluntary blood donation drive by year 2020, it is critical to change the blood donation culture from replacement to that of volunteerism through more effective communication and mobilization of donors. These efforts must be rendered more methodical and accomplished through a wider range of strategies.

Key words: Determinants, voluntary, blood, donation, Nigeria

***Correspondence author**
Dr. A. G. Salaudeen
http://orcid.org/0000-0001-8215-1782
Email: adekunlesalaudeen@yahoo.com

[1]Department of Epidemiology and Community Health, College of Health Sciences, University of Ilorin, Ilorin, Nigeria
[2]Department of Community Medicine, Federal Teaching Hospital, Iddo-Ekiti, Nigeria
[3]Department of Heamotology and Blood Transfusion, College of Health Sciences, University of Ilorin, Ilorin, Nigeria
[4]Department of Community Medicine and Primary Care, Federal Medical Centre, Abeokuta
[5]Department of Heamotology and Blood Transfusion, University of Ilorin Teaching Hospital, Ilorin, Nigeria

Received: April 17, 2019 *Accepted: May 29, 2019* *Published: June 30, 2019*

http://dx.doi.org/10.4314/rejhs.v7i2.9

Déterminants du don de sang volontaire chez les adultes dans les communautés de la région du centre-nord du Nigéria

***Salaudeen A.G.[1], Durowade K.A.[2], Durotoye I.A.[3], Ahmed A.[4], Sanni E.O.[5], Musa O.I.[1] Akande T.M.[1]**

Resume

Objectif: La collecte de sang de donneurs de sang volontaires et non rémunérés est une mesure importante pour assurer la sécurité, la qualité, la disponibilité et l'accessibilité du sang. L'étude a évalué les facteurs affectant le don de sang volontaire dans la zone centre-nord du Nigéria.

Méthodes: La conception de l'étude était transversale et descriptive. Les données ont été collectées à l'aide d'un questionnaire pré-testé administré par un enquêteur à 3104 répondants utilisant une technique d'échantillonnage en plusieurs étapes. Les données ont été analysées à l'aide du progiciel EPI INFO (version 3.5.3). Le niveau de signification a été prédéterminé à une valeur p <0,05 à un niveau de confiance de 95%.

Résultats: Les répondants connaissant bien le don de sang volontaire avaient de meilleures pratiques de don de sang volontaire. Les groupes d'âge plus jeunes étaient 8 fois plus susceptibles de donner du sang volontairement que les répondants plus âgés. Les groupes ethniques yoruba sont 1,5 fois plus susceptibles de donner du sang que les autres groupes ethniques.

Conclusion: pour que le Nigéria et les autres pays en développement réalisent une collecte de 100% de dons de sang volontaires d'ici 2020, il est essentiel de changer la culture du don de sang en remplaçant le volontariat par une communication et une mobilisation plus efficaces des donneurs. Ces efforts doivent être rendus plus méthodiques et accomplis à travers un plus large éventail de stratégies.

Mots-clés: Déterminants, volontaire, sang, don, Nigeria

***Auteur principal**
Dr. A. G. Salaudeen
http://orcid.org/0000-0001-8215-1782
Email: adekunlesalaudeen@yahoo.com

[1]Department of Epidemiology and Community Health, College of Health Sciences, University of Ilorin, Ilorin, Nigeria
[2]Department of Community Medicine, Federal Teaching Hospital, Iddo-Ekiti, Nigeria
[3]Department of Heamotology and Blood Transfusion, College of Health Sciences, University of Ilorin, Ilorin, Nigeria
[4]Department of Community Medicine and Primary Care, Federal Medical Centre, Abeokuta
[5]Department of Heamotology and Blood Transfusion, University of Ilorin Teaching Hospital, Ilorin, Nigeria

Received: April 17, 2019 *Accepted: May 29, 2019* *Published: June 30, 2019*

http://dx.doi.org/10.4314/rejhs.v7i2.9

INTRODUCTION

The importance of voluntary blood donation has long been recognized on the global health agenda at the highest political level. As 1975, in resolution WHA 28.72, the World Health Assembly urged its Member States to promote the development of national blood services based on the voluntary non-remunerated donation of blood. It also called on them to enact effective legislation governing the operation of blood services and to take other actions necessary to promote and protect the health of blood donors and the recipients of blood and blood products (1).

WHO estimates that blood donation by 1% of the population is the minimum needed to meet a nation's most basic requirements for blood.The requirements are higher in countries with more advanced health care systems (**2**). However, the average donation rate is 15 times lower in developing countries than in developed countries (3). Globally, more than 70 countries had a blood donation rate of less than 1% in 2006. Millions of lives are saved each year through blood transfusion yet the quantity, quality and safety of blood transfusion is still a concern particularly in developing countries where voluntary blood donation is lower than in high income level countries (4). This is a concern as developing countries have greater need for sustained supply of safe blood because of conditions such as malaria related anaemia in children under 5 years and in pregnant women which still claim over one million lives yearly. However, in Nigeria, there are only 17 national blood transfusion services centres across the six geo-political zones which are not enough to meet the demands for safe blood. The myths, misconception, bias, poverty, ignorance, fear and malnutrition have posed serious barrier to blood donation. Although half of the population in the country is medically fit for donation, only four in a thousand are voluntary blood donors (1). The factors that influence an individual's decision to give blood consist of a collection of specific characteristics such as socio-demographic factors and unobservable characteristics such as the degree of altruism (5)

In order to facilitate the process of transition to non-remunerated donation, it is essential to examine and understand donor behavior. According to some research findings, blood donation correlates with donor gender, place of birth, occupation and knowledge about donation as well as such social attitudes as health related, structural and social-economic incentives (6).

A cross sectional study among students of College of Health Sciences and Medicine in Ethiopia, revealed that there was significant association of level of blood donation with year of study and department of respondents. Increased year of study and being students in the department of medicine and nursing increased the odds of level of knowledge of respondents on blood donation (7). In Greece, donor satisfaction with services at donation locations contributed significantly to previous donation experience (8). In the study it was reported that 97.0% were satisfied with the services and attitude of the staffs. They were, however, displeased by the waiting time (48.7%) and the unpleasantness of the physical environment (32.3%).

Ambaye reported in his research that socio-demographic factors such as sex were statistically and significantly associated with knowledge of blood donation (7). Being male was 1.75 times more knowledgeable than females [AOR (95%CI) 1.75(1.00, 3.07)]. The other statistically significant factor was marital status. Married health care workers were 3 times knowledgeable than single [AOR (95%CI) 3.24(1.65, 6.37)]. Only 3.3% of blood donor populations were female and majority of respondents belonged to 30-41 age group. A statistically significant association exists between age and repeat blood donation. Distance problem and non-availability on work days were the main de-motivational factors for donating blood among the respondents in the study carried out in Ethiopia (7). This study further pointed out the need to reformulate health policies and utilization of information technology to reach people at the urban and rural communities on the importance of voluntary blood donation (9).

David in his review of determinants of voluntary blood donation reported that in national surveys, higher educational status is the strongest and most consistent predictor of volunteer participation, as the dominant status model generally predicts. He also reported that higher income is consistent in predicting participation. (10). Sekoni et al in Lagos, South west, Nigeria reported that the main motivating factors for prospective donors are the altruistic feeling associated with awareness of the degree of need of patients requiring blood transfusion in combination with the presumption that one day they may also find themselves in need of such generosity from others (3). Other research findings support the claim that awareness of the need for blood transfusion and altruism although

important, are not strong motivation factors (11). This study therefore determined predictive factors of voluntary blood donation in North central Nigeria.

MATERIALS AND METHODS

Description of study area

Nigeria is Africa's most populous country with a population of about 190 million (NPC, 2006 projection). She has over 373 ethnic groups (Ajaegbu et al, 2000) spread around the country. The major indigenous languages are Yoruba, Igbo and Hausa/Fulani. For ease of administration and accelerated development, the states have been divided broadly into six geopolitical zones namely North East (NE), North Central (NC), North West (NW), South East (SE), South South (SS) and South West (SW).

The study was conducted in the North central zone of Nigeria which comprises Kwara, Kogi, Niger, Benue, Plateau, Nassarawa States and Federal Capital Teritorry. The challenges of blood donation and use in Nigeria led to the emergence of the National Blood Transfusion Service (NBTS).

Study design

The study design was descriptive cross sectional. It determined the motivations, inhibitions and practice of voluntary blood donation among the population in the North Central Nigeria.

Study population

The study population for this research work were males and females who were between 18 and 60 years living in the North Central Nigeria. People who could not give reliable information or visitors to the North Central Nigeria during the period of study were not considered. In addition, individuals within the study age group who had morbid conditions that could affect their responses were also excluded.

Sampling technique

A multistage sampling technique was used in this study. Two states were randomly selected among the states in the North Central zone of Nigeria. In each of the selected state, two Local Government Areas (LGAs) were selected using simple random sampling by balloting. One urban and one rural LGA were picked from each state. Two political wards were picked from each LGA. A total 8 political wards were involved in the study. The selections were done randomly by balloting without replacement. Two communities was randomly selected from each ward and a total of 16 communities were involved in the survey. Grid method was used to select the first house in the community and only one eligible respondent was selected in each household. Where they were more than one, the eligible respondent? or his designate in the household was used.

Data collection and Management?

The research tool was an interviewer administered questionnaire. The research tool was pretested in Osogbo, Osun State, Nigeria. The feedback obtained from the field was used to edit and modify some questions in the questionnaire. This improved the validity of the data tool. All completed questionnaires were checked for accuracy and completeness, the data generated from the study were entered into the computer and subjected to appropriate statistical analysis using EPI INFO computer software package (version 3.5.3). Pearson Chi square (χ^2) was used to test statistical significance in cross tabulation variable. Level of significance was set at $p < 0.05$. Ethical approval was obtained from the Ethical Review Committee of the University of Ilorin before the commencement of the study. Written consent from selected respondents was duly completed and signed by all respondents before questionnaire administration and their privacy guaranteed.

RESULTS

About half, 1380 (44.5%), of the respondents were in the age group, 20-29 years while the elderly (≥ 60 years) were the least among the respondents constituting 86 (2.8%). Two-thirds, 2096 (67.5%) of them were males. About half, 1376 (44.3%) had tertiary education, while more than half, 1767 (56.9%) were married. Almost two-thirds (63.3%) of the respondents were Muslims while more than a third (36.5%) of them were Christians. More than a quarter, 229 (28.1%), were Traders/Farmers while Civil servants/ Professionals made up less than a quarter, 186 (22.8%). Yoruba-speaking respondents were the highest constituting 1289 (41.5%). Igbo/Edo were the least common ethnic group constituting 85 (2.7%) of the total respondents (table 1).

Respondents with good knowledge of voluntary blood donation had better practice of voluntary blood donation. Respondents with poor knowledge of voluntary blood donation had worst practice of voluntary blood donation. This observed difference between knowledge and

practice of blood donation was found to be statistically significant with p value <0.001. See table 2.

Table 3 revealed that only one-third, 91 (30.6%), of those with primary education had good knowledge of practice of blood transfusion, while almost half of those with Quranic education demonstrated good knowledge of practice of blood transfusion. This observed difference between educational level and practice of blood transfusion was found to be statistically significant (p<0.001). More than a third of married respondents had good knowledge of practice of blood transfusion compared with almost two-thirds, 5 (62.5%) of those divorced. This difference between marital status and practice of blood transfusion was found to be statistically significant (p<0.001) More than one quarter of the artisans/drivers, 190 (29.1%) and the unemployed/retired, 83 (28.2%), demonstrated good knowledge of practice of blood transfusion compared with the students which constituted 151 (19.9%). This difference was also found to be statistically significant with p value of <0.001

Younger age groups are much more likely to donate blood voluntarily than older respondents. As shown above, respondents <20 years of age are 8 times more likely to donate blood than those who are ≥ 60 years. Yoruba ethnic groups are 1.5 times more likely to donate blood than other ethnic groups (table 4).

DISCUSSION

This study found the youthful age of 20-29 years (44.5%) as the major age group of respondents. Other studies in Nigeria, Ethiopia and Sri Lanka also reported similar findings in the age of respondents (3, 7, 9, 13, 14). This perhaps could be due to the increasing population of youth in not only Nigeria but Africa in general. This age bracket also constitutes about15% of the nation's population (15).

Similarly, this study found the age group <20 years to be 8 times more likely to donate blood voluntarily compared with ≥ 60 years old respondents. The studies demonstrated that there was statistically significant association between age and blood donation. This was expected as most people within the age group are strong and healthy. The young population structure in Nigeria provides a window of opportunity as youths can serve as change agents in blood donation drive.

It is a known fact the world over, that some religious sects do not donate blood, The majority of respondents in this study were Muslims (63.3%). This could be due to the area of study and general composition of the study population in which Muslim constituted majority of the respondents. however the altruistic believe of providing blood donation for the purpose of saving lives also predominate (82.6%) in this study, which similarly supports the findings by Sekoni et al in Lagos, Southwest, Nigeria (3).

Males constituted 67.5% of the respondents studied with 56.9% of them married. In Israel research findings indicates that married native Israeli men, aged 26–45 years, who are highly educated and are familiar with someone who needs a blood donation, are more likely to donate blood than the rest of the population (16).

This current study revealed that only about a third of respondents had good knowledge of voluntary blood donation. This could be due to the fact that the majority of respondents (28.1%) in this study were traders/farmers compared to professionals in related studies. However, the awareness of blood donation exercise was quite impressive with more than two thirds of the respondents 85.8% affirmation. Majority (56.5%) of respondents in this study got their information on blood donation through health workers in the study area, however, more still needs to be done regarding the provision of continuous education for our health professionals at all strata towards retaining the voluntary blood donors.

A low level of knowledge on blood donation was also reported in another study in North-central, Nigeria similar to a study conducted in South Western Nigeria where 80% of the respondents had poor knowledge of blood donation (3, 12). This was contrary to an Indian study which revealed good knowledge (45.33%) about blood donation among the respondents; though, it did not find any significant relationship between age, ethnic group and literacy level with knowledge about blood donation (14, 17). It should be noted that the Indian study was carried out among health professional which could account for the good knowledge recorded. The observed gap on knowledge of blood donation in most developing countries is an important factor and a reflection of poor sensitization and inadequate provision of appropriate information on blood donation practices which can lead to positive attitudinal change; and may provide opportunity for informed decision on voluntary blood donation among the general public (12).

In spite of the good knowledge of blood

donation (45.33%) among respondents in the Indian study, this does not translate to good blood donation practices, as only 7.33% had voluntarily donated blood out of 37.33 % who had ever donated in the past (17). In addition, Sekoni, Salaudeen, Odeh, and Gunvantil reported (12.0%), (12.0%), (15.3%) and (35.7%) as proportions of respondents that truly practice voluntary blood donation respectively (3, 12, 13, 17)

This study obtained voluntary blood donation practice of (29.1%) among the respondents which is in line with most studies in the developing countries. Perhaps, this could be due to the fact that most blood donations were to save lives and help those in needs. Gender issues are significant considerations in voluntary blood donation drive. In Greece, (94.0%) and also in Ethiopia, (62.0%) of donors were males in line with findings in this study (15, 16**)**. In this study male gender was found to be statistically associated with practice of voluntary blood donation among the respondents. The dominance of males in these studies could be due to the low hemoglobin level and the monthly physiologic menstrual cycle in females which make them unfit for blood donation so that the chances of females donating more than four times in a year become less. Many women do not volunteer to donate because they think they are ineligible or have actually been rejected once because of low body weight and because they are prone to anemia, especially during their childbearing age due to their increased need for iron (9, 18, 19**)**. Education creates awareness and change in attitude.

Majority of the respondents in this study had tertiary education (44.3%); yet only 26.3% of the respondents had ever donated blood in the past with 58.8% of them only once. From the foregoing, this study revealed that Quranic education (p-value-0.001), Secondary education (p-value-0.040) and Tertiary education (p-value-0.008) were found to be statistically significantly association with voluntary blood donation. This is in line with an Indian study which reported that (86.0%) of donors had studied up to diploma and above (18). Surprisingly, a Sri Lankan study revealed only 8.1% of donor population that had higher educational qualification. This is because most of the study population were among the low socioeconomic class (9). This is different from the findings of study done in Lithuania where majority of voluntary blood donors had higher education level (20). In Malaysia, AdbHamid et al reported that 41.4% of the respondents had at least a diploma. Another 30.5% hold a minimum education background while the remaining 28.1% had a high qualification of master's degree and PhD (21).

Kedir in Ethiopia (22) revealed in their study that participants with college and above college educational status tended to have significantly higher positive attitude than subjects who were unable to read and write (AOR = 13.05, 95% CI: 4.12–41.29). The implication of educational level, employment status and income level cannot be over emphasized in improving knowledge of transfusion and voluntary blood donation among the general population in the developing country.

Education is a vital tool to changing the orientation and views of a society, improving the level of education in the population would to a large extent reduce the risk people see in presenting themselves for voluntary blood donation. Hence, a periodic awareness program on voluntary blood donation in all strata of society across Nigeria is needed in addition to health education in all tertiary health centers in the country to achieve a 100% Voluntary Blood Donation program (23). Many researchers, such as Daniel in Ethiopia, Perera in Sri Lanka and Salaudeen in Nigeria (5, 9, 12) observed that giving incentives like recognition with certificates and other prices and some reminders that they belong to a group of "life saviors" , giving health education, undergoing some medical examination (such as HIV testing, Hepatitis B and C testing) and investigations for voluntarily donors (such as genotyping) have also been suggested to enhance voluntary blood donation (5, 9, 24)). This tokenism had been found to encourage participation in voluntary blood donation and improve motivation of the population. However, some respondents in a Sri Lankan study opined that giving remuneration with money was seen to discourage voluntary non remunerated blood donors, evidenced by the higher proportion of subjects who said they were willing to donate blood voluntarily but were not willing to do so if they were paid.

Distance to health facility was observed in the Sri Lankan study as a significant factor determining voluntary blood donation among the respondents, 94.4% of mobile donors were within 10 km of distance from their living place. This indicates that distance/geographic accessibility is a significant factor in selecting blood donor programme (9). Although, this study did not assess distance as a factor influencing voluntary blood donation but the fact remains that

closeness of health facilities and blood banks to residential areas would stimulate voluntary blood donation drive among the general populace.

The Nigeria's National Blood Transfusion Service was reported to collect only 3% of the blood needed in Nigeria (25, 26). To be able to achieve 100% voluntary blood transfusion drive by 2020, basic facilities in the nation's blood banks must be improved. A study in Sri Lanka revealed that there is a correlation between voluntary blood donations and providing basic facilities for blood donors like availability of drinking water, toilet facilities safety and hygiene, and cleanliness. Maintaining of registers required for donor recruiting, recall and also to identify and trace the lapse donors should be available accordingly (9). One way to increase the frequency of donations is through more effective communication with donors. These efforts must be rendered more methodical and accomplished through a wider range of tools (e.g. telephonic or electronic reminders, via television, advertisements and letters).

Efforts in motivating and retaining voluntary blood donors must involve incentives such as free blood tests (blood group, hemoglobin genotype, HIV/Hepatitis) to donors, allowing the immediate family of volunteers to use blood without replacement and giving gift items such as certificates,T-shirts, haematinics, refreshments and badges (24).

For Nigeria and other developing countries at large to achieve 100% voluntary blood donation drive by year 2020 it is critical to change the blood donation culture from replacement to that of volunteerism through advocacy, sensitization and mobilization of relevant stakeholders.

Acknowledgement: This research is funded by National Research Fund Tetfund.

Conflict of interest: The authors declare no conflict of interest.

REFERENCES

1. Usman W., Muneeba A., Hasan A. Z. Knowledge, Attitude, and Practices towards Blood Donation in Pakistan: A Nationwide Survey. Hematology and Transfusion International Journal2015; 1 (4): 1-4
2. Elionora E., Wilhellmuss M., Rune N.P., Damian J.D., Michael J.M., Sia E. M. Knowledge, Attitude, Practice and factors Associated with Voluntary Blood Donation among University Students in Kilimanjaro, Tanzania. Journal of Blood Transfusion 2016: 1-8http://dx.doi.org/10.1155/2016/8546803
3. Sekoni AO., Balogun MR., Odukoya OO., Inem V., Onigbogi OO. Blood Donation Practices and Willingness to Donate among Residents of an Urban Slum in Lagos, Nigeria. Nigerian Postgraduate Medical Journal 2014; 21(1): 21-27
4. World Health Organization. Blood Transfusion Safety. E2008. Available from: http://www.who.int/bloodsafety/voluntarydonation/en/
5. Daniel N. Willingness to Voluntarily Donate Blood among High School Students in Addis Ababa: Assessment of determinants using the theory of planned behavior. Thesis submitted to the school of public health, Addis Ababa University in partial fulfillment of the requirements for the degree of master of public health 2008: 1-43
6. Armitage CJ., Conner M. Social cognitive determinants of blood donation. Journal of Applied Social Psychol 2001; 31:1431-57.
7. Ambaye D. Knowledge, Attitude, Practice and Associated factors of Blood Donation among Healthcare Workers in Tikur Anbessa Specialized Hospital. Addis Ababa, Ethiopia. A thesis submitted to department of Emergency Medicine, College of Health Sciences, Addis Ababa University 2015: 1-47
8. Marantidon O., Loukoponlou L., Zervon E., Martinis G. Factors that Motivate and Hinder Blood Donation in Greece. Transfusion Medicine 2007; 17: 443-450
9. Perera DAK., Dharmaratne SK., Kendangamuwa KWCUK., Gamini LPS. Determine the Factor Affecting the Blood Donors of Selecting Blood Donor Program me in Western Province, Sri Lanka. International Journal of Scientific and Technology Research 2015; 4(11): 148-157
10. David HS. Determinants of Voluntary Association Participation and Volunteering. A Literature Review. Nonprofit and Voluntary Sector Quarterly 1991; 23 (3): 243-263
11. Fernández MA., López-Berrio A., Luna del Castillo JD. How Some Attitudes, Beliefs and Motivations of Spanish Blood Donors Evolve over Time. *Vox Sanguinis 1998; 74:140-147*
12. Salaudeen AG., Musa OI., Awoyemi AO., Bolarinwa AO., Adegboye AO., Samuel SO. Community Survey on Blood Donation Practices in a Northern State of Nigeria. Journal of Preventive Medicine and Hygiene 2011; 52: 21-25
13. Salaudeen AG, Odeh E. Knowledge and Behaviour towards Voluntary Blood Transfusion among Students of a Tertiary Institution in Nigeria. Nigerian Journal of Clinical Practice 2011; 14(3):303-307
14. Nwogoh B., Aigberadion U., Nwannadi IA., Aigbe I. Knowledge, Attitude and Practice of Voluntary Blood Donation among Physicians in a Tertiary Health Facility of a Developing Country.

International Journal of Blood Transfusion and Immunology 2012; 2: 4-10
15. World Health Organization Regional Office for Africa. Current Status on Blood Safety Available in the WHO African Region: Report of the 2013 Survey. Brazzaville. WHO Regional office for Africa.
16. Ben NM., Govkov L. Investigating the Factors Affecting Blood Donation among Israelis. International Emergency Nursing 2010: 1-7
17. Gunvanti B.R., Pragnesh P. Comparison regarding Knowledge, Attitude and Practice of Blood Donation between Health Professionals and General Population. International Journal Res. Rev. 2012; 04 (21): 120-129
18. Bhalodia JN., Patel KA., Hiren V. Psychosocial Variables of highly Motivated Voluntary Blood Donors at Blood Bank of a Medical College. National Journal of Medical Research 2012; 2(1): 39-41
19. Birhanu D., Nagasa D., Tamiru T., and Bikila L. Voluntary Blood Donation Practices and Associated factors among Regular Undergraduate Madawalabu University Students, Southeast Ethiopia: A facility-based Cross-sectional study. Journal of Blood Disorders and Transfusion 2015; S5: 1-7
20. Bueiuiene I., Blazeviciene A., Stoniene L., Kazlaus KR., and Skudine V. Blood Donation Motivation and Attitude to Non-remunerated Blood Donation in Lithuania. BMC Public Health 2011; 2: 1-8
21. Nur ZAH., Rohaida B. and Narehan H. The Intention to Donate Blood. An Analysis of Socio-Demographic Determinants. International Journal of Social Science and Humanity 2013; 3(6): 503-507
22. Kedir U., Nejat H., Ayichew S. Knowledge, Attitude, and Practice Regarding Voluntary Blood Donation among Residents of Harar town, Eastern Ethiopia: a Community-based study. Journal of Blood Medicine 2017; 8: 13-20
23. Manikandau S., Srikumar R., Ruvanthika PN. A Study on Knowledge, Attitude and Practice on Blood Donation among Health Professional Students in Chennai, Tamil Nadu, South India. International Journal of Scientific and Research Publications2013; 3(3): 1-4
24. Amatya DM. Study on Knowledge, Attitude and Practice of Blood Donation among Students of Different College of Kathmandu, Nepal. International Journal of Pharmaceutical & Biological Archives 2013; 4(3):424-8.
25. World Health Organization. Towards 100% Voluntary Blood Donation. A Global Framework for Action. 2010. www.who.int/bloodsafety/voluntary_donation/en/
26. Nwabueze SA., Nnebue CC., Azuike EC. Perception of Blood Donation among Medical and Pharmaceutical Science Students of Nnamdi Azikiwe University, Awka. Open Journal of Preventive Medicine 2014; 4: 515-522

Table 1: Socio-demographic variables of respondents

Socio-demographic variable	Frequency (N = 3104)	Percent
Age group (years)		
< 20	187	6.0
20 – 29	1380	44.5
30 – 39	827	26.6
40 – 49	445	14.3
50 – 59	179	5.8
= 60	86	2.8
Sex		
Male	2096	67.5
Female	1008	32.5
Educational level		
Primary	297	9.6
Secondary	1094	35.2
Tertiary	1376	44.3
Quranic	104	3.4
None	233	7.5
Marital status		
Married	1767	56.9
Single	1299	41.8
Widowed	20	0.6
Divorce	8	0.3
Separated	10	0.3
Religion		
Islam	1966	63.3
Christian	1134	36.5
Others	4	0.1
Occupation		
Student	142	17.4
Artisan/ Driver	172	21.1
Trader/ Farmer	229	28.1
Civil servants/ Professionals	186	22.8
Unemployed/ Retired	70	8.6
Others	16	2.0
Ethnic group		
Yoruba	1289	41.5
Igbo/ Edo	85	2.7
Hausa/ Fulani	190	6.1
Ebira/ Bokobaru	679	21.9
Gbayi/ Bassa	160	5.2
Nupe/ Igala	318	10.2
Others	383	12.3

Table 2: Relationship between respondents' knowledge and their practice of voluntary blood donation

	Practice			
Knowledge	**Good n (%)**	**Poor n (%)**	**χ^2**	***p* value**
Poor	40 (12.9)	271 (87.1)	58.981	<0.001*
Fair	462 (28.2)	1178 (71.8)		
Good	402 (34.9)	751 (65.1)		

χ^2: Chi square; *: p value <0.05 (i.e. statistically significant)

Table 3: Relationship between socio-demographic variables and practice of blood transfusion

Socio-demographic variable	Practice Good n (%)	Poor n (%)	χ^2	*p* value
Age group (years)				
< 20	16 (8.6)	171 (91.4)	124.960	<0.001*
20 – 29	324 (23.5)	1056 (76.5)		
30 – 39	265 (32.0)	562 (68.0)		
40 – 49	182 (40.9)	263 (59.1)		
50 – 59	73 (40.8)	106 (59.2)		
= 60	44 (51.2)	42 (48.8)		
Sex				
Male	710 (33.9)	1386 (66.1)	70.559	<0.001*
Female	194 (19.2)	814 (80.8)		
Educational level				
Primary	91 (30.6)	206 (69.4)	21.681	<0.001*
Secondary	287 (26.2)	807 (73.8)		
Tertiary	412 (29.9)	964 (70.1)		
Quranic	49 (47.1)	55 (52.9)		
None	65 (27.9)	168 (72.1)		
Marital status				
Married	606 (34.3)	1161 (65.7)	62.344	<0.001*
Single	290 (22.3)	1009 (77.7)		
Widowed	1 (5.0)	19 (95.0)		
Divorce	5 (62.5)	3 (37.5)		
Separated	2 (20.0)	8 (80.0)		
Occupation				
Student	151 (19.9)	606 (80.1)	56.839	<0.001*
Artisan/ Driver	190 (29.1)	462 (70.9)		
Trader/ Farmer	257 (35.9)	459 (64.1)		
Civil servants/ Professionals	206 (31.6)	446 (68.4)		
Unemployed/ Retired	83 (28.2)	211 (71.8)		
Others	17 (51.5)	16 (48.5)		
Ethnic group				
Yoruba	321 (24.9)	968 (75.1)	24.296	<0.001*
Igbo/ Edo	29 (34.1)	56 (65.9)		
Hausa/ Fulani	64 (33.7)	126 (66.3)		
Ebira/ Bokobaru	224 (33.0)	455 (67.0)		
Gbayi/ Bassa	47 (29.4)	113 (70.6)		
Nupe/ Igala	111 (34.9)	207 (65.1)		
Other	108 (28.2)	275 (71.8)		

χ^2: Chi square; *: p value <0.05 (i.e. statistically significant)

Table 4: Predictors of practice of voluntary blood donation

	B	p value	Odds ratio
Age group (years)			
< 20	2.115	<0.001*	8.288
20 – 29	0.975	<0.001*	2.652
30 – 39	0.685	0.005*	1.985
40 – 49	0.297	0.234	1.346
50 – 59	0.312	0.262	1.366
= 60[REF]			
Sex (Male)	-0.702	<0.001*	0.496
Educational level			
Primary	-0.164	0.427	0.849
Secondary	-0.369	0.040*	0.691
Tertiary	-0.480	0.008*	0.619
Quranic	-0.826	0.001*	0.438
None[REF]			
Marital status			
Married	-1.129	0.180	0.323
Single	-0.984	0.246	0.374
Widowed	1.187	0.374	3.276
Divorce	-2.200	0.055	0.111
Separated[REF]			
Religion			
Islam	1.703	0.248	5.493
Christian	2.118	0.151	8.310
Others[REF]			S
Occupation			
Student	0.933	0.020*	2.543
Artisan/ Driver	0.763	0.052	2.144
Trader/ Farmer	0.602	0.122	1.826
Civil servants/ Professionals	0.846	0.032*	2.329
Unemployed/ Retired	0.709	0.081	2.033
Others[REF]			
Ethnic group			
Yoruba	0.371	0.011*	1.449
Igbo/ Edo	-0.571	0.037*	0.565
Hausa/ Fulani	0.189	0.369	1.208
Ebira/ Bokobaru	0.041	0.790	1.042
Gbayi/ Bassa	-0.135	0.540	0.874
Nupe/ Igala	-0.250	0.151	0.778
Other[REF]			

REF: Reference category; Percent of cases correctly classified: 71.6 %

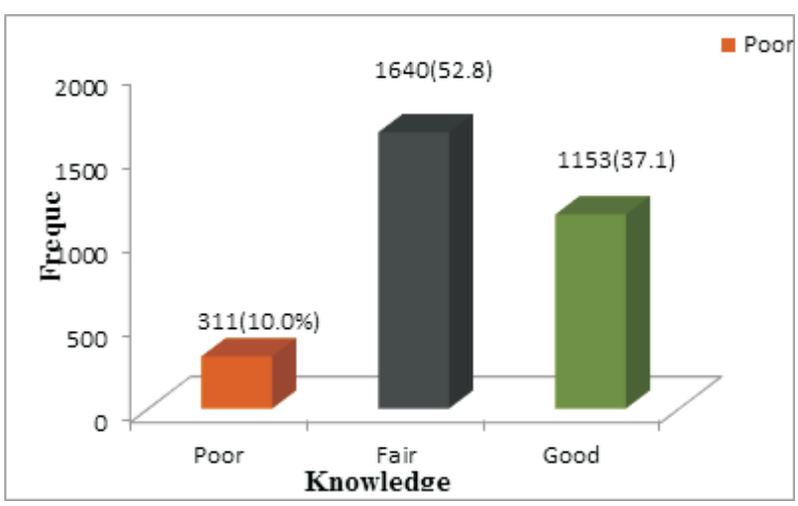

Figure 1: Knowledge of Voluntary Blood Donation in North Central Nigeria