



## **Impact of Some Socio-demographic Characteristics, Motivation and Attitudes towards Blood Donation of Hospital-based Blood Donors as Determinants of Safe Blood in Nigeria**

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### **Authors' contributions**

*This work was carried out in collaboration between all the authors. Author JAO conceptualized, carried out the research and produced the manuscript for scientific publication. Author SSG reviewed the work and provided statistical analysis. Author JOE reviewed the manuscript; author JHO analyzed the samples, and reviewed literature. Author AOE reviewed the methodology and analyzed the study for scientific publication author AMO analyzed the laboratory methods and revised the manuscript for a scientific publication. Authors RAV and JAN reviewed the methodology and analyzed the data. All the authors read and authorized the final manuscript for publication.*

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## ABSTRACT

**Background:** Voluntary non-remunerated blood donors (VNRBD) that provide safe blood needed to save lives and improve health or used as a necessary adjunct to emerging modern Medicare are scarce in Nigeria.

**Aim:** To assess the contribution of donor socio-demographics characteristics, motivation and attitudes towards blood donation as guide to safe donor identification, recruitment and retention as VNRBD in Nigeria.

**Materials and Methods:** A total of 440 blood donors who met the minimum criteria to donate blood in Nigeria were enrolled and their serum screened for HIV using a combined HIV antigen-antibody Enzyme Linked Immuno-sorbent Assay (GENSCREEN®PLUS HIV Ag- Ab ELISA). The relevant characteristics were assessed together with their HIV sero-status.

**Results:** The male/female blood donation and HIV sero-positivity ratio was 379:61 and 39:2 respectively. Blood donors aged 18-35 years donated 77.5% and were 90.2% HIV sero-positive when compared with those aged 36-55 years. Majority of blood donors were of single marital status 46.6% and this group were more unsafe (53.7%) when compared with those married divorced, separated and widowed. Blood donors self-employed or in a form of business, donated more blood (39.3%) and accounted for 51.2% of unsafe blood donations when compared with other categories of occupations. Majority of blood donors attained secondary education 45.7% and were more unsafe donors (48.8%) when compared with tertiary and those with primary or no formal education. Educational attainment showed a statistically significant association with blood safety but age, occupation and marital status did not. Majority of the blood donors were first time 93.2% compared to previous and repeat blood donors who were 6.8% and 6.1% respectively. The FBDs constituted 96.4% and accounted for 100% of unsafe blood when compared with other donors. Altruistic and voluntary blood donors were completely safe donors. Those motivated by pressures (family/friend/relative/peer) to donate their blood were in majority 93.6% and accounted for 95.1% of unsafe blood donors when compared with those motivated to donate for other non-financial reasons. Blood donors with altruistic and self-use motivations were 100% safe. However, the aim, motivation and attitude for blood donation were not statistically significant.

**Conclusion:** The educational attainment of a predominant youthful blood donor population at hospital-based blood banks in Nigeria is significantly associated with blood safety. There is a need for extensive educational campaign on blood donation at establishments and gatherings where this study group can be found including schools, community/age-group meetings, religious houses and social youth organizations. The medium of communication should be vernacular and languages best understood by these potential blood donors and may include radio, television and advertisements in different social media outlets. It is by these proactive measures that, Nigeria's target of achieving 100% VNRBD supply by 2020 will be achieved.

**Keywords:** Attitudes; blood banks; blood donors; blood safety; enzyme Linked immuno-sorbent assays; HIV sero-positivity; motivation; Nigeria.

## 1. INTRODUCTION

Blood transfusion is needed to save lives or improve health in emergency and as a necessary adjunct to emerging modern Medicare in different parts of the world. For these reasons, hospitals, clinics, blood donation-related governmental and non-governmental organizations (NGOs) are usually involved in efforts to provide blood supplies to meet ethical, moral, social or

professional responsibilities in a timely, responsible and cost effective manner. The recognition of Human Immunodeficiency Virus (HIV) as a fatal transfusion transmissible infection (TTI) in 1980s, made blood banks to develop more safety precautions to protect blood supplies by deferring blood donors at high risk of the infection, recruiting low-risk donors and testing all blood donors sero-negative for HIV before their blood is collected and transfused [1].

These measures have resulted in significant improvements in the safety of blood supplies. However, these stringent recruitment measures have result in a reduction in available blood donor population with feared threats of blood shortages. The increasing need for safe donors has necessitated increased research into donor recruitment and retention as a panacea to ensuring blood safety universally [2].

A safe blood donor is one who reported no behavioral risks in response to pre-donation survey and provided a blood donation that is negative on all laboratory screening tests for prevalent and emerging transfusion transmissible infections (TTIs) [3]. Such blood donors additionally, have an appropriate attitude for repeat donation. Quintessentially, safe blood donors are needed, especially in high HIV prevalence areas, to guarantee safe blood and to improve the quality health care delivery and avert medico-legal implications to blood transfusion practitioners [4]. In recognition of these, the World Health Organization (WHO) [5] recommended that voluntary non-remunerated blood donors (VNRBD) are a bane to adequacy and safety of blood supply worldwide encouraging member nations to develop centralized (nationally coordinated) blood services adequately funded and logistically positioned to recruit, retain and ensure adequate supply of blood from these donors. However, while most developed countries have cued into this act, many developing countries particularly in Africa are slow or reluctant at its implementation. A recent WHO report [6] indicate that, amongst the 75 member countries that collect fewer than 10 donations per 1000 population, 40 are in Africa. Consequently, the minimum blood donation by 1% of the population estimated to meet the basic blood requirements of most countries is hardly achievable in these settings. [7] Generally, the clamor by WHO for the elimination of FBD and a replacement with VNRBD has been greeted with divergent perceptions, apprehension and practices by different transfusion practitioners in Africa. Whereas others affirm on the need for its elimination, others see the act of giving to other family members as "African nature" and view family replacement donation as not being an exception. Yet others argue that, FBD provide blood at hospitals in an affordable manner when compared with the non-functional centralized transfusion centres in many countries, and believe that, if paid blood donors are eliminated from first time FRD, the prevalence of infections

in FRD and VNRBD will hardly differ [8-12]. Besides, others argue that, the WHO guidelines for transfusion services deal exclusively with voluntary donors and neglect the substantial contribution made by replacement donors especially in Africa [11]. There are also reports that, only few truly functional nationally coordinated blood transfusion services exist in Africa to provide VNRBD for transfusion, instead, 75-80 per cent of blood supplies come from hospital-based blood transfusion centres characterized by FBD and this has greatly compromised safe blood supply [13,14]. In Nigeria for instance, the national blood transfusion service (NBTS) is only able to collect 3% of blood needed for the country from VNRBD while the remainder is sourced from FRDs at hospital-based blood transfusion centres/blood banks [15]. Coupled with these, increasing costs of donor recruitment and retention are threatening the sustainability of centralized systems when compared to hospital-based blood services [11]. Many researchers have opined that, the continued adoption of FRD is responsible for the inadequacy of safe blood in sub-Saharan Africa (SSA) [11,16]. As Nigeria is challenged to improve donor recruitment and retention activities towards achieving 100% VNRBD by 2020, many proactive measures must be developed.

Undoubtedly, the technology of blood donation takes place in a fairly uniform manner, independent of the population served, but, the way blood banks are structured and promoted differ between countries [17]. Therefore, the way the blood donor reacts or behaves, either as a single event or as a lifelong, dedicated practice to blood donation, is expected to be influenced by different contributory factors [17]. The motivation to donate blood for instance, represents a compelling force to carry out this activity which is directed towards meeting personal needs or goals [18,19]. Some researchers [20,21] have reported on the importance of identifying socio-demographics associations with HIV infections and as a tool to deciding intentions on blood donation, while others [22,23] have recorded its importance in targeting first-time blood donors for recruitment and blood donor retention. Therefore, the attitudes and perception of blood donation by hospital-based blood donors could be influenced by individual experiences, cultural, social and socio-demographic complexes. Besides, in recent times, understanding and targeting safe blood donor population has evolved as a viable

WHO strategy towards fostering a culture of voluntary blood donation [6]. Therefore, we sought to identify the contribution of socio-demographic characteristics, attitude and motivation of hospital-based blood donors screened for TT-HIV as indicators of safe blood for donor recruitment and retention as VNRBD. To the best knowledge of the authors, such data is not available currently.

## 2. MATERIALS AND METHODS

This cross-sectional study was carried out at the hospital-based blood bank of Jos University Teaching Hospital (JUTH) in North-central Nigeria between May and August 2008 to access relevant socio-demographic characteristics, motivation and attitudes towards blood donation of 440 blood donors screened for transfusion transmissible HIV (TT-HIV) using a combined HIV antigen-antibody ELISA (GENSCREEN®PLUS HIV Ag- Ab ELISA). All included blood donors fulfilled the conditions to donate blood in Nigeria [24] and gave an informed written consent. Those who did not meet the minimum criteria to donate blood and or declined to give an informed consent were excluded from the study. Ethical approval for the study was obtained from the ethical committee of Jos University Teaching Hospital (JUTH) and all ethical standards were adhered to. A questionnaire validated by the ethical committee of JUTH was administered by trained research assistants to the included blood donors at the time of counselling and enrolment into the study which provided their socio-demographics, aim / type and motivation for blood donation as well as their relevant attitudinal characteristics. The process of serum extraction, storage, testing and interpretation of results was carried out using standard recommended methods and as stipulated by the reagent manufacturers where applicable. GENSCREEN®PLUS HIV Ag- Ab ELISA was sourced from BIO-RAD laboratories, 3 Bd Raymond Poincaré, Marnes La Couquette-France.

### 2.1 Statistical Analysis

Analysis of the socio-demographics, motivation for blood donation, attitudes to blood donation and HIV sero-status as indices for safe blood was compared using the Graph Pad Prism 5.0 Statistical Package. A comparison of variables was done using chi square and a P-value  $\leq 0.05$  was taken as level of significance for interpretation of data.

## 3. DISCUSSION

The apparent scare of worsening blood shortages and unsafe blood supplies is becoming a public health concern necessitating concerted researches. The current concept of the WHO is to target appropriate blood donors in particular settings in order to increase blood availability and safety [7]. Therefore, employing socio-demographic characteristics, motivation and attitudes for safe blood donor identification, recruitment and retention as repeat VNRBD at hospital-based blood banks in Nigeria is apt.

In this study, more males donated blood than females (379:61) and a higher male HIV prevalence of 95.1% compared with females 4.9%. However, this association was not statistically significant. This finding is similar to Nato et al. [25] and Lyamuya et al. [26] who also reported a higher prevalence amongst males. This predominant male blood donation is similar to the findings by Ekwere et al. [27], Erhabor et al. [28] and Busari et al. [29] but different from Nato et al. [25]. Generally, many studies in Africa and Nigeria in particular, record a high deferral of female blood donors with consequent low female recruitment as blood donors [27,28]. Many reasons have been adduced including pre-donation temporary deferral due to anemia resulting from menstruation, uncompensated blood losses as a result of child birth and lactation. Also, a high packed cell volume requirement of  $\geq 38\%$  set for all blood donors in the absence of haemoglobin screening methods for blood donors, is hardly met by pre-menopausal women and this seems to encourage temporal deferral of some female donors. Yet, in some settings and cultures, low information and education, socio-cultural beliefs, barriers and restrictions of women contributes significantly to low female participation in blood donation processes [30,31].

Blood donors groups aged 18-25 and 26-35 years presented majority of blood donations constituting 77.5% compared with those aged 36-55 years that accounted for 22.5% of the blood donors. (Table 1) Also, HIV infection was more prevalent in those aged 26-35 years (63.4%) of the blood donors. In all, blood donors aged 18-35 years represented the highest prevalence of HIV infection of 90.2% when compared with those aged 36-55 years respectively as shown in Table 1. However the association between age and blood safety was not statistically significant. Our finding is similar

to Nato et al. [25] who also reported a higher HIV prevalence for both gender between 18-25 years. A high proportion of unsafe blood in this youthful and economically viable age group in a country with low life expectancy portrays grave consequences for blood transfusion practice and the economy. Considering that, this is the sexually active and reproductive age group and that, there is a predominant heterosexual mode of HIV transmission amidst predominant HIV antibody screening of blood supplies at predominant hospital-based blood banks, window period HIV transmissions scare the future of the blood supplies and economic viability of the nation. Besides, transfusion-transmissible HIV may further reduce life expectancy for the nation.

Majority of the blood donors were single (46.6%) followed by those married (45.9%) while divorced, separated and widowed cumulatively were 7.5%. Those single blood donors

contributed 53.7% of HIV infectious group when compared with married 34.1%, divorced, separated and widowed respectively (Table 1). The finding in this study were however, not statistically significant. The predominance of single blood donors in this study agree with Nato et al. [25] but it differs from it in reporting a higher HIV prevalence amongst married than single blood donors. Nato et al. [25] had opined that, in considering the risk of HIV acquisition, the marital factor itself cannot be considered a protective or an exposure factor. But, this may be different in our setting in Nigeria with varying cultures and ways of life. Poverty, predominant heterosexual HIV transmission and youthful exuberance and low education makes the single blood donors acquire HIV more easily than does their married counterparts who seem to be more careful in protecting their families. This may have accounted for our finding in this study.

**Table 1. Socio-demographics and HIV infection amongst blood donors**

Age	HIV positive	HIV negative	Total	Percent (%)	p	Statistical significance
<b>Age</b>					0.1299	No
18-25	11	112	123	27.95		
26-35	26	192	218	49.55		
36-45	4	71	75	17.05		
46-55	0	24	24	5.45		
Total	41	399	440	100		
<b>Sex</b>					0.0964	No
Male	39	340	379	95.12		
Female	2	59	61	4.88		
Total	41	399	440	100		
<b>Marrital status</b>					0.1730	No
Single	22	183	205	46.59		
Married	14	188	202	45.91		
Divorced	1	6	7	1.59		
Separated	1	14	15	3.41		
Widowed	3	8	11	2.50		
Total	41	399	440	100		
<b>Occupation</b>					0.1791	No
Self- employed	21	152	173	39.32		
Students	9	98	107	24.32		
Applicants	3	16	19	4.32		
Professionals	0	29	29	6.59		
Civil/public servants	8	104	112	25.45		
Total	41	399	440	100		
<b>Education</b>					0.0004	Yes
None	3	4	7	1.59		
Primary	8	55	63	14.32		
Secondary	20	181	201	45.68		
Tertiary	10	159	169	38.41		
Total	41	399	440	100		

Blood donors who were self-employed or in a form of business or trading, donated more 39.3% when compared with students 24.3% and applicants, professionals like medical/health workers, lecturers, lawyers, religious and clergy as well as civil/public servants that cumulatively accounted for 36.4% blood donors. Self-employed donors accounted for 51.2% of unsafe blood (Table 1). However, occupation was not statistically significant in blood safety.

Blood donors with secondary education accounted for 45.7% blood donors when compared with tertiary 38.4% as well as primary and those with no formal education who summed up to 15.9%. The highest prevalence rate of HIV infection was found amongst secondary school attained 48.8% when compared with tertiary 24.4%, primary 19.5% and no formal education 7.3% respectively (Table 1). The level of educational attainment and blood safety was statistically significant to influence donor recruitment and retention. Education and socio-cultural barriers to voluntary blood donation exist in predominantly illiterate rural communities of Nigeria and the remote causes include misconception, misinformation and ignorance about the effect and safety of blood donation. [31]

Blood donors who had ever donated blood some time ago but not in the last 2 years (previous donor) accounted for 6.8% while those who were donating within the last two years as repeat donors accounted for 6.1% of blood donors when compared with first time blood donors who had never previously donated (93.2%) as shown in Table 2. The prevalence of HIV infection was 100% first time non-repeat blood donors. However, previous blood donation and repeat blood donation were not statistically significant. Several WHO reports and publications on blood safety have identified repeat blood donors as being safer than first time blood donors.

Blood donors whose aim of donating was for a family member's use or a replacement for blood already used by a family member "family replacements" constituted 96.4% of blood donors when compared with voluntary 3.2% and autologous 0.5%. Those family replacement donors were 100% unsafe when compared with the other groups. However, the aim of blood donation was not statistically significant in blood safety and would not influence donor retention for VNRBD. It is reported that, some of the family replacement blood donors are paid blood donors who conceal their aims and financial motivation from the blood bank [32].

**Table 2. Some attitudinal factors, motivation and HIV infection among blood donors**

	HIV positive	HIV negative	Total	Percent (%)	p	Statistical significance
<b>Previous donation</b>					0.752	No
Yes	3	27	30	6.82		
No	38	372	410	93.18		
Total	41	399	440	100		
<b>Repeat donation</b>					0.1598	No
Yes	0	27	27	6.14		
No	41	372	413	93.86		
Total	41	399	440	100		
<b>Aim of donation</b>					0.4261	No
Family/Replacement	41	383	424	96.36		
Voluntary	0	14	14	3.18		
Autologous	0	2	2	0.45		
Payments	0	0	0	0		
Total	41	399	440	100		
<b>Motivation for donation</b>					0.6520	No
Altruistic	0	11	11	2.50		
Knowing HIV status	2	13	15	3.41		
Family pressures	39	373	412	93.64		
Self-use	0	2	2	0.45		
Gift/financial reward	0	0	0	0		
Total	41	399	440	100		

It is therefore likely that, a high proportion of those disguising as FBDs are in fact, paid blood donors and this may have contributed to unsafe blood in this study.

Blood donors motivated by family / friend/ relative / peer pressures to donate blood were 93.6% when compared with those donating for altruistic 2.5%, knowing HIV status 3.4% and self-use 0.45%. However, unsafe blood donation was more amongst those who donated under pressures 95.1% and those interested in knowing their HIV status 4.9% when compared with altruistic and self-use motives for blood donation (Table 2). However, motivation for blood donation was not statistically significant in blood safety and may not significantly influence VNRBD retention. The predominance of family/replacement blood donors in this study is similar to many other studies in Africa. However, different figures are reported in different areas that reflect the level of awareness, socio-demographic characteristics and attitudinal factors prevalent in different cultures. Some workers have suggested that, at the first donation, external factors such as social pressures by peers or friends or family members are important factors but these become less important in repeat donation; instead, internal factors such as the desire to help, service to humanity, social responsibility, sense of duty etc. (altruism) become more important [18,19].

Generally, researchers have reported that, Nigerians would willing donate blood freely, if given sufficient education and information on safe blood donation and transfusion practices [33,34]. Therefore, there is a need for more education targeted at prospective blood donor population to be retained as VNRBD. The predominantly young donors identified in this study who were motivated by extrinsic factors could be educated to embrace intrinsic factors necessary to maintain repeat blood donation culture and be retained as VNRBD. These findings and the success story of 100% voluntary blood donation in a low income country like Sri Lanka [35] through novel approaches like integrating moon light donations in religious temples and schools in their blood drive is an attestation that, attaining self-sufficiency in safe blood supply in Africa from VNRBD is achievable if inherent cultural, social and psychological peculiarities of the continent are carefully explored. Giving acceptable incentives to blood donors is necessary for effective blood donor recruitment and therefore, some non-monetary

incentives are currently recommended [18]. In our hospital-based setting with predominant FBD appropriate incentives like the provision of T-shirts and refreshments after blood donation, reimbursement of return of their minimum transport fares to cover their transport to and from the hospital blood bank, et cetera, could encourage blood donors to be retained as VNRBD without compromising altruistic motivation. Blood donors who donated in order to know their HIV status were found to be unsafe in this study. Other workers have also reported that, some blood donors report for blood donation in order to get tested for HIV infection [36]. In a Brazilian study some volunteer, community-recruited donors were shown to have an unexpectedly higher prevalence of HIV infection than replacement donors because they were seeking HIV testing [37]. With the development of voluntary counselling and testing centres made more universally available, this group of blood donors could reduce and it is probable that, those found sero-negative could be potentially educated to become VNRBD. Also, the autologous blood donors though few, showed no infectivity (zero percent) like voluntary non remunerated blood donors. Their expanded study, education, recruitment and retention as VNRBD at hospital-based blood banks in Nigeria could also be explored.

Generally, some of the educational programmes that may promote voluntary blood donation will include the use blood donor information materials targeted at susceptible blood donor population (youths) who are mostly the lay public in the language best understood by these blood donors. This may include posters, brochures, jingles and advertisements, advertorials on television stations, radios and newspapers (national, local or community newspapers) in the language best understood by these expected prospective blood donors. There may be a need to sponsor adverts or create blood donation educational groups in the social media including Facebook, twitter, LinkedIn, Instagram etc. that are handy to this targeted youthful age group within which potential blood donors could be recruited and retained as repeat VNRBD. As a long term initiative, the culture of blood donation as an intrinsic motivation should be introduced, nurtured and supported right from primary to tertiary institutions. This can be extended to age group, village and community meetings where educational programmes / materials could be brought closer to this targeted blood donors. Activities like pledge 25/club 25 pioneered in

Zimbabwe [5] (which encourages that those between 18 and 25 years to donate at least 20 times in their life time and maintain risk free life styles to remain repeat voluntary non-remunerated blood donors) should be promoted in Nigerian schools at such identified gatherings.

Given the peculiar strengths of hospital-based blood banking in Nigeria where most blood donors reside within traceable contacts to the facility, an inventory of blood donors especially those with rare blood groups is traditionally maintained to be contacted in dire emergency. Unfortunately, lean budgets and finances limit the provision of acceptable non-financial incentives crucial for maintaining VNRBD flow to their organization. Hospital-based blood banks are usually a “stand-alone” when it comes to financing blood safety at hospitals. Yet, the hospital-based blood bank is part of any nation's national blood supplies and implications of compromises to blood safety here goes beyond the immediate hospital.

The financial constraints of these hospitals for instance, often make blood donor information materials available to centralized blood centres like the Nigerian National Blood Transfusion Service (NBTS) while the hospital-based blood banks where majority of blood donations take place lack such relevant information materials. Much of these drawbacks are attributable to poor funding and lack of cooperation by stakeholders and practitioners. To this end, political will, community and regional partnership of hospitals, governments, NGOs, philanthropists community leaders to ensure an improved funding of hospital-based blood banks to reduce cost and improve blood safety is desirable and crucial in order to guarantee donor recruitment and retention as Nigeria strives to achieve the target of 100% voluntary blood donor supply by 2020.

Finally, open-mindedness to innovative ways to improve supply and safety of blood from all types of donors including family/replacement donors at hospital-based blood banks are quintessential to promoting safe blood donor recruitment and retention in Nigeria.

#### 4. CONCLUSION

In order to change FBDs who donate under pressure to become VNRB who donate their blood as a benevolent, selfless act or a mark of social responsibility or a national calling, the educational attainment of blood donors has been

shown to be significantly associated with blood safety. However, other socio-demographic characteristics like occupation, age and gender have considerable contributions to unsafe blood but are not statistically significant. Also those motivated by family / friends / peer / relative pressures and those donating to know HIV status have high unsafe blood donations but are not statistically significant. Autologous blood donors have low infectivity and may be educated, recruited and retained as VNRBD.

It is recommended that, extensive educational campaigns in schools, media houses, community and village meetings or gatherings in vernacular and languages best understood by potential blood donors in the youthful age group is important for donor recruitment and retention.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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