

Female Gender Participation in the Blood Donation Process in Resource Poor Settings: Case study of Sokoto in North Western Nigeria

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Abstract

Background: One of the biggest challenges to blood safety particularly in Sub-Saharan Africa is accessing safe and adequate quantities of blood and blood products.

Aims: The present study was designed to investigate the level of female gender participation in the blood donation process in Sokoto, North Western Nigeria.

Setting and Design: This is a retrospective study, which was carried out in Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria.

Materials and methods: In this present retrospective study, we investigated the level of female gender participation in the blood donation process by evaluating the blood donation records of 14,956 blood donors who visited the blood bank in Usmanu Danfodiyo University teaching hospital for blood donation purpose between 2010 and 2013 in Sokoto, North Western Nigeria.

Results: Subjects for this retrospective study included 14,965 blood donors. Mean age and age range of blood donors was 27.1 ± 8.18 and 18-50 years respectively. The total number of blood donors from January 2010 to July 2013 was 14,965. Donors included 14,871 males (99.4%) and 94 females (0.64%). The number of male donors was significantly higher than that of female donors ($P=0.0001$). The distribution of male and female donors yearly from 2010 to 2013 was (2,916, 4,787, 4687, 2,481) and (25, 28, 16 and 25) respectively. Of the total number of blood donors, a significant 14,891 (99.5%) were family replacement donors while 74 (0.50%) were voluntary non-remunerated blood donors (0.0001). Out of the 74 voluntary non-remunerated donors, 18 were females while 56 were males. There was a male gender bias in the probability of a donor being voluntary non-remunerated. Of the female donors, 18/94 (19.1%) were voluntarily non-remunerated compared to 56/14,871 (0.38%) $P=0.003$.

Conclusion: Female gender participation in the blood donation in North Western Nigeria is significantly lower compared to findings from developed countries. There is need to develop evidence-based educational, cultural and religious- focused intervention that encourages females to donate blood. There is need to educate the female population to address the negative perceptions against blood donation and the importance of blood donation.

Keywords: Female gender; Participation; Blood donation; Sokoto; Nigeria

Introduction

Globally, approximately 80 million units of blood are donated each year. Of this total, 2 million units are donated in SSA, where the need for blood transfusions is great because of maternal morbidity, malnutrition, and a heavy burden of infectious diseases such as malaria and HIV [1]. As a resource, allogenic blood has never been more in demand than it is today particularly in in Sub-Saharan Africa. Escalating elective surgery, shortages arising from a fall in supply, a lack of national blood transfusion services, policies, appropriate infrastructure, trained personnel, and financial resources to support the running of a voluntary non-remunerated donor transfusion service, and old and emerging threats of transfusion-transmissible infections have all conspired to ensure that allogenic blood remains very much a vital but limited asset to healthcare delivery in Nigeria.

Blood transfusion in Nigeria is plagued by several challenges. One major challenge associated with the Nigerian National Blood Transfusion Service (NBTS) is the fact that the service is not backed by legislation. The NBTS is struggling to meet its mandate of supplying safe and adequate number of blood and blood products due to absence of relevant legislative framework that will empower the NBTS and make it more independent and resourceful. Another challenge is the security situation particularly in some parts of the country. Blood banking and transfusion services in the country are fragmented, uncoordinated and unregulated. The safety and quality standards

are often compromised due to lack of effective control. Cultural and religious issues such as women's dependence on men, the erroneous belief that men are healthier than women, that women make monthly blood donations to nature through their menstrual cycle and other factors such as pregnancy and breastfeeding further restrict many women from donating blood in Nigeria [2]. Several national studies describe socio-demographic characteristics of blood donors including male gender, middle age and more educated donor predominance [3-10]. A previous report that investigated donor rates in Germany and Switzerland between 1994 and 2010 suggested the need to intensify efforts to motivate women and lower educated people to give blood [11]. There are many challenges associated with blood safety in Nigeria

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particularly with regards with accessing safe and adequate quantities of blood and blood products [12]. There is paucity of data on female gender participation in the blood donation process, the challenges associated with female gender participation in the blood donation process particularly in Nigeria is not known. Therefore, the aim of this case study was to investigate the level of female gender participation in the blood donation process in Sokoto, North Western, and Nigeria. Evidence-based data generated will help in the formulation of policy to improve female gender participation in the blood donation process.

Materials and Methods

Study area and population

This present study was carried out at the Haematology and Blood Transfusion Department of Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria in collaboration with the Haematology and Transfusion Medicine Department in the Faculty of Medical Laboratory Science in Usmanu Danfodiyo University, Sokoto, Nigeria. Sokoto state had a population of 4.2 million as at the 2006 census [13]. Subjects for this retrospective case study included 14,956 voluntary and family replacement blood donors who visited the blood banks in Sokoto, North western Nigeria for blood donation purpose between January 2010 to July 2013. The blood donors population was made up of 14,871 males (99.4%) and 94 females (0.64%). The standard procedure in use in blood banks in Sokoto recommend the collection of socio demographic data and determination of height and weight as well as the completion of pre-donation health questionnaire. They also carry out pre-donation screening to include, Packed Cell Volume (PCV) and screening for HIV, Hepatitis B, C and Syphilis. Donors are also tested to determine their ABO and Rhesus blood groups. Alloantibody testing, testing for high titer haemolysins and other clinically significant red cell antigens as well as cytomegalovirus testing are not done routinely. Donors are offered pre and post test counselling. Verbal inform consent is obtained from all fit donor before blood is collected. Whole blood is collected. Component therapy is not routinely practiced just yet.

Study design

This retrospective study was carried out among 14,956 voluntary and family replacement blood donors who visited the blood bank in Usmanu Danfodiyo University Teaching Hospital for blood donation purpose between 2010 and 2013. The aim of this present study was to investigate the level of female gender participation in the blood donation process. Ethical clearance was obtained from the ethical committee of the Usmanu Danfodiyo University Teaching Hospital in Sokoto, North Western Nigeria.

Statistical analysis

Data was collected using excel spread sheet and entered into a statistical software; SPSS (version 11; SPSS Inc., Chicago, IL). Data were expressed as mean \pm standard deviation. Comparisons between male and female blood donors were made using the Student's t-test

for parametric data and the Mann-Whitney test for non-parametric data. Descriptive analyses of percentages of categorical variables were reported. A p-value of <0.05 denoted a statistically significant difference in all statistical comparisons.

Result

Subjects for this retrospective case study included 14,965 blood donors. Mean age and age range of blood donors was 27.1 ± 8.18 and 18-50 years respectively. The total number of blood donors from January 2010 to July 2013 was 14,965 made up of 14,871 males (99.4%) and 94 females (0.64%). The number of male donors was significantly higher than that of female donors ($p=0.0001$). The distribution of male and female donors yearly from 2010 to 2013 was (2,916, 4,787, 4,687, 2,481) and (25, 28, 16 and 25) respectively. Table 1 show the gender distribution of blood donors from January 2010 to July 2013. Of the total number of blood donors, a significant 14,891 (99.5%) were family replacement donors while 74 (0.50%) were voluntary non-remunerated blood donors (0.0001). Out of the 74 voluntary non-remunerated donors, 18 were females while 56 were males. There was a male gender bias in the probability of a donor being voluntary non-remunerated. Of the female donors, 18/94 (19.1%) were voluntarily non-remunerated compared to 56/14,871 (0.38%) $p=0.003$. Table 2 show the gender distribution of blood donors based of donor types.

Discussion

There are insufficient voluntary donations particularly in countries in Sub-Saharan Africa and there is need to find ways of maintaining sufficient blood supply from a better involvement of the female gender in the blood donation process. In this present study we observed male gender dominance in the blood donor process. Most studies in Africa reported a male dominance in blood donation programs (61% in Togo), (71.2% in Burkina Faso) and (90% in Ghana) [14-16]. In a recent survey in Central, Western, and Eastern Franco- phone African regions, all 7 countries surveyed reported less than 30% females in their donor population [17]. Reports from Anglophone East and Southern African countries have also shown a male dominance in their blood donation programs [18]. Our finding is in agreement with previous report among blood donors in India which indicated that female gender is less disposed to blood donation [19]. Interestingly, our observed pattern of a significantly low prevalence of female donors in Sokoto, North western Nigeria is significantly different from findings in some

Year	Male Donors Number + (%)	Female Donors Number (%)	Total Number Number (%)	P-value
2010	2,916	25	2941	0.0001
2011	4,787	28	4,815	
2012	4,687	16	4,703	
2013	2,481	25	2,506	
Total (%)	14,871	94	14,965	

Table 1: Gender distribution of blood donors from January 2010 to July 2013.

Year	VD	FRD	Female VD N (%)	Male VD N (%)	Female FRD N (%)	Male FRD N (%)
2010	14 (0.48)	2,927 (99.5)	4 (28.6)	10 (71.4)	21 (0.70)	2,906 (99.3)
2011	12 (0.250)	4803 (99.7)	6 (50.0)	6 (50.0)	22 (0.46)	4,781 (99.5)
2012	29 (0.62)	4674 (99.4)	6 (20.7)	23 (79.3)	10 (0.21)	4,664 (99.8)
2013	19 (0.80)	2487 (99.2)	2 (10.5)	17 (89.5)	23 (0.93)	2,464 (99.1)
Total	74 (0.49)	14,891(99.5)	18(24.3)	56(75.7)	76(0.51)	14,815 (99.5)

N = Number of blood donors; VD =Voluntary non-remunerated Donors; FRD = Family Replacement Donors

Table 2: Gender based distribution based of donor types.

developed countries. In 2003 female blood donors represented 40% of the blood donor population in Austria, 49.7% in France, 50% in Norway and 55% in Great Britain [20]. Similarly, Greece and Italy seems the only European countries in which the percentage of female donors is about 33% [21]. In Spain, 46% of the blood donors are women, [22] in Portugal 43%, [23] in Belgium 45.4%, [24] in the Netherlands 50%, [25] in France 50%, [26] and in Finland 55%. [27] The reason for this male gender predominance in the blood donation process in Sokoto may be based on a number of factors which include erroneous beliefs that bothers on religion and culture and challenges associated with donor education.

Sokoto is located in the North Western part of Nigeria and has a predominantly Muslim population. Sokoto long history of contact with Islam has shaped its socio-economic and political framework long before colonisation by the British. Islamic religion is deeply rooted in Sokoto and the entire Northern part of Nigeria. Religion can be a major motivating factor in highly religious communities. There are several religious ideologies concerning blood donation. A previous report in Saudi Arabia an Islamic nation indicated that about 91% of the donors believed that blood donation is a religious duty [28]. This high rate of Islamic religion-related duty to blood donation may, in part, be based on the religious ruling ["fatwa"] from the most respected religious cleric, the late Sheikh Abdul Aziz Bin Baz, who advised that it is the duty of a Muslim to donate blood to save the life of a needy patient. Pamphlets carrying his "fatwa" are placed in most donor centers in Saudi Arabia. In contrast, a Nigerian study, [29] found that 20.3% of their study population would not donate blood, and curiously enough, will not accept blood transfusion due mainly to religious beliefs. Similarly member of some religious groups such as the Jehovah's witnesses frown against donation of blood [30,31]. Religious beliefs can have either a positive or negative motivating effect on blood donation. An active role of religion in improving the safety of donated blood has recently been shown as blood donations collected at places of worship has greater chance of attracting donors free from transmitting HIV infection [32]. Islamic religion recommends the donation of human blood to save life. Saving human life and helping others against affliction are always enjoined [33]. In the holy Quran, Allah says, "Whoever kills a soul unless for a soul or for corruption [done] in the land-it is as if he had slain mankind entirely? And whoever saves one-it is as if he had saved mankind entirely [34]. Evidence from Iran, an Islamic country which has the largest Shiite population in the world indicated that after altruism; Islamic religious beliefs are the most frequent positive motivation for blood donation among Iranians [35]. In a cultural and religious conscious environment like it is in Sokoto, North Western Nigeria, developing a culturally and religiously focused intervention that educates the donor on negative perceptions is essential, can allay fears about donating blood and can be an important motivating factor [36,37].

In Northern Nigeria girl child education is a big problem. Poverty is the key problem to girls' education. Several other factors including; young female adult lack of access to education, employment opportunities and personal income, lack of awareness compounded by religious misinterpretation concerning girl child education, poor supply of teachers, especially female teachers or girl-friendly learning environment, socio and economic factors and lack of essential facilities and materials all militate against girl child education in the region. There are several reasons for the low female gender participation in the blood donation process in developing compared to developed economies. Low level of education particularly among women in the Northern part of Nigeria may be a key factor. Better educated people

have greater access to information than those who are illiterate or uneducated and they are more likely to make well informed decisions and act on information received. Better educated women generally have better jobs and greater access to money and other resources which can help them support healthier lives. Cultural traditions such as forced marriage, domestic violence against women, erroneous belief that women's role is essentially to look after the home and the children, women poor access to education and financial resources and women's economic dependence on men, older men preference for younger women and female gender mutilation all contribute to women lack of power [38].

Blood donation rates vary according to social factors such as ethnicity, gender, education, income, occupation, religion, and age [39,40]. Several factors including donation status, age, gender and level of educational attainment play a significant role in the decision to donate blood. Fear about blood donation is more common in non-donors than lapsed and current donors, youngest compared to older adults and women than men and less in those with higher income [41]. Similarly, previous report among female college students indicates that female college students are willing to donate blood if given convenience and support from their institution and that educational campaigns can potentially increase knowledge regarding the safety of the blood donation process and the ongoing needs of an adequate blood supply [42]. A previous report indicates that education, knowledge and awareness of issues associated with blood donation are important with regards to blood donation decisions [43]. In most settings in Africa there are erroneous belief that facilitate male gender dominance in the blood donation process including that men are healthier than women coupled with the general belief that women make monthly blood donations to nature through their menstrual cycle [20,44].

There are other physiological factors that can also play a role in female gender participation in the blood donation process. Female gender has been found to be associated with various deterrents to blood donation. Indeed, women more frequently indicated medical reasons, ailments or difficult veins as important barriers to giving blood [45]. Among premenopausal female blood donors, 31.7% had depleted iron reserves and 3.3% iron deficiency anaemia [46]. Previous report indicates that whole blood donation can potentially harm menstruating females [47]. Other factors such as pregnancy and breastfeeding further restrict many women from donating blood in Sub-Saharan Africa. Previous report has indicated that women were more likely to be declared temporary ineligible to donate blood for medical reasons; predominantly due to low levels of iron or low body weight. Iron deficiency is frequent, particularly in female donors and frequent donors. A fail on initial haemoglobin testing followed by a pass on repeat testing is likely to be due to iron deficiency and borderline anaemia [48-50]. There is need for female donors to be monitored more carefully and they should be encouraged to return following temporary deferrals, emphasising that the deferral is not a permanent rejection but a temporary situation. Previous report has recommended that iron supplementation may be indicated for female donors particularly those with low levels of iron [51-54]. A previous report among Japanese donors indicates that low haemoglobin was the major contributor for female donor's deferral [55].

In this study, we observed that blood donation was essentially family replacement based rather than being voluntary non-remunerated. Voluntary, non-remunerated blood donation is the cornerstone of a safe and adequate national blood supply that meets the transfusion

requirements of all patients. The collection of blood only from voluntary, non-remunerated blood donors is an important measure for ensuring the safety, quality, availability, and accessibility of blood transfusion [56]. Several prejudices and misconceptions affect the principle of altruism in Sub-Saharan Africa, including cultural differences and lack of information. Studies conducted in Burkina Faso, South Africa, Togo and Nigeria indicate that blood donors have unfounded fears: fear of knowing one's HIV serologic status, fear of being infected with diseases, and the erroneous belief that donating blood can decrease one's libido, cause weight loss, cause high blood pressure, or even lead to death [57,58]. More effort is required in the drive for education, motivation, and recruitment of regular donors. In brief, the reason why replacement donors remain the main source of blood in Sub-Saharan Africa is that it costs less to procure and fits well with the African culture of extended family support. The mentality of altruism through the voluntary donation of blood is not as accepted in Sub-Saharan Africa as in most developed countries. Only an insignificant number of eligible donors actually donate blood in most Sub-Saharan African countries. There is no feeling of optimistic altruism in most African settings. Developing countries face considerable obstacles to ensuring a safe blood supply and safe blood transfusions because they tend to have inadequate available blood supplies and they depend on family replacement blood donors [59]. A family replacement donor is one who gives blood when it is required by a member of the donor's family or community. One disadvantage of this method of blood donation is that patients or their relatives are under intense strain when their patient is admitted to hospital. Being expected to provide replacement donors puts additional responsibility and stress on relatives, and there is undue pressure on family members to give blood, even when they know that donating blood may affect their own health or that they may be potentially at risk of transmitting TTIs [60,61]. A country's transfusion needs cannot easily be met by relying solely on family replacement donations [62]. The World Health Assembly recommended that reliance on replacement donations should be phased out due to their association with an increased risk of TTIs [63]. Meeting the transfusion needs of recipients is challenging because donated blood may not necessarily be replaced in type or quantity [64]. This leaves relatives who cannot find suitable donors with no other option than to seek commercially remunerated, high-risk blood donors. Blood donated by certain relatives, particularly spouses of women of child-bearing age, can put their wives/partners potentially at risk of producing antibodies to clinically significant antigens that the husband and the developing foetus may have but which the wife lacks.

Conclusion

This present study has shown that the rate of female gender participation in the blood donation in Sokoto North Western Nigeria is significantly lower compared to findings from developed countries. We observed male gender dominance in the blood donor process. There is need to develop an evidence-based educational, cultural and religious-focused and friendly interventions that encourages females to donate blood. There is need to educate the female population to address the negative perceptions against blood donation and the importance of blood donation. There is also the need to launch appropriate motivational campaign targeting female donors by engaging the community leaders, religious leaders and scholars.

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