An Assessment of Knowledge, Practice and Barriers of Voluntary Blood Donation among Staff and Patients of a Tertiary Hospital in Nigeria

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ABSTRACT

Background: Blood and blood products are essential resources in the management of many health conditions. It has been tasking to achieve complete reliance on voluntary unpaid blood donors. Hence, assessing the knowledge, practices and barriers of voluntary blood donation can impact on improvement of the number of voluntary blood donors.

Aim: To assess the knowledge, practice, and barriers of voluntary blood donation among the participants.

Method: A cross sectional descriptive study was carried out using pre-tested interviewer administered questionnaire administered to 288 participants selected by systematic random sampling technique. The data was analysed using SPSS version 20.

Results: The mean age of the respondents was 38.81±11.67. Males were slightly more (51.70%) than females (n=149, 51.70%). Most were married (n=204, 70.80%), of the Tiv tribe (n=160, 55.60%) and were Christians (n=263, 91.30). Over half had tertiary education (n=113, 55.20%), were civil servants (n=159, 55.20%) and worked in non-health related disciplines (n=168, 58.30%) respectively. Over two-third reside in rural areas (n=206, 71.50%). 0nly 30.56% had good knowledge scores. Those who had ever voluntarily donated blood made up 11.1%. Females were less likely to donate blood (aOR=0.19, CI 0.08 – 0.48, p=0.00). Those with tertiary education were nearly six times more likely to have donated blood (aOR=5.92, CI 1.66 – 21.10, p=0.01). Those with non-health related jobs (aOR=0.00, CI 0.06 – 0.46, p=0.00) were less likely to donate blood. The most common reason for deferral was viral infections (37.50%) such as hepatitis B, hepatitis C and HIV infection. The commonest barriers of voluntary blood donation fear of blood being sold for rituals (22.6%), fear (22.9) fear of needle prick (16.7%).

Keywords: blood donation, barriers, knowledge, practices, voluntary.

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I. INTRODUCTION

Blood and blood products are essential resources in the management of many health conditions. The World Health Organization (WHO) has continually championed global awareness of the need for safe blood and blood products for transfusion and also recognizes the contribution of voluntary, unpaid blood donors [1]. Achieving total use of only voluntarily donated blood is the ideal but it has been a herculean task especially in developing countries such as Nigeria [2]-[4].

An effective blood donor program, characterized by wide and active participation of the population, is crucial in meeting the need of blood transfusion [1]. The World Blood Donor Day 2022, advocated for increased cognizance to the fact that giving blood is a life-saving act of solidarity and that services providing safe blood and blood products are an essential element of every health care system [1].

The knowledge and practices of different populations has been found to affect the success of efficient blood donation programs. Studies on knowledge score are mixed with some reporting high scores [5]-[7] while some report low scores [8]. In Senegal, the level of knowledge of individuals about blood donation was low at 91.8% and only 24.68% of the population surveyed had already donated blood with 80% of the donations being voluntary [8]. In Nigeria, Nwogoh *et al.* [9], found that healthcare workers were reasonably informed about blood donation but only few of them had donated blood. It brings to the fore the need to find out what could be posing barriers to translating such knowledge into practice.

In a cross-national comparison of the German and Swiss population between 1994 and 2010, individual characteristics were identified to impact on blood donation practice [10]. Donating was higher for men and increased with age and educational level in both countries. Gender differences and differences between educational levels, however, were more pronounced in Switzerland than in Germany [10]. Some barriers to blood donation found in literature include fear of needles in a study among Jamaicans [11], fear of getting infections like HIV (Togo) [12] and attitude of staff (Ghana) [13]. In Ebonyi State, Nigeria 'not being strong enough' and 'not having enough blood' were the two major reasons for declining blood donation, while loss of manhood/libido and exposure of blood to witchcraft were the other reasons given [14].

More assessments of the knowledge, practice and barriers to blood donation is important in shedding lighter on how they affect blood donation drive.

II. METHODOLOGY

A. Study Setting and Design

The study was conducted at the General Out-Patients' Clinic (GOPC) of the Federal Medical Centre, Makurdi, Benue State, North central Nigeria. It is a tertiary hospital.

This was a hospital based cross-sectional study. Single proportion formula was used to determine the minimum sample size for the study.

$$N = Z^2pq/\delta^2$$

where N = Minimum sample size, Z = constant at 95% confidence level =1.96, p = Proportion in the target population estimated to have a particular characteristic of interest (which is voluntary blood donation prevalence) in another study from Jos, Nigeria 78.2% [15].

$$q = 1- p \text{ (i.e. } 1 – 0.782) = 0.218$$
$$\delta = \text{desired precision at 5\%} = 0.05$$
$$N = (1.96)^2 \times (0.782 \times 0.218)/ (0.05)^2$$
$$N = 262$$

When 10% of the minimum sample size (262) for anticipated attrition, non-response, incompletely filled data and missing questionnaires was added (26), the sample size was 288 patients.

B. Study Population

The inclusion criteria were patients aged 16 years and above. Those who were very ill and required urgent attention and pregnant women were excluded from the study.

A systematic random sampling technique was used to select the participants. About 3,700 patients attended the GOPC on a monthly basis. An average of 185 patients are seen daily. This translated to 925 within a five-day working week and 11,100 over the three months of the study (December 2021 – February 2022). The sampling interval was determined by dividing the sample frame (11,100) by the number of participants to be recruited (288), which gave a sampling interval of 39. Every working day the first patient was selected by ballot from the first 39 patients listed in the daily GOPC register. Subsequently, every 39th eligible patient was selected until the 288 participants were recruited over three months.

C. Study Protocol

A pilot study was conducted at the National Health Insurance Clinic. The purpose of the study was made known to the patients and those who consented appended their signature or their thumb print if they could not read or write below the consent form. The interviewer administered questionnaire was used to obtained information from 28 patients selected by simple random technique. The clarity of the questions was assessed.

D. Data Collection

An interviewer administered questionnaire was used to obtain information on socio-demographic characteristics, knowledge of blood donation and barriers to blood donation. Knowledge of blood donation was classified as good and poor knowledge. There were eight knowledge assessment questions. Those who scored four and above were classified as having good knowledge while those with score of three or below were classified as having poor knowledge. A 'yes' answer was scored 1 and a 'no' or 'I don't know' answer was scored 0.

Data were analyzed using SPSS version 20 (Chicago IL USA). Descriptive statistics were generated for each study variable; and were summarized by frequencies and percentages. Chi-square was used to test associations between knowledge status (good/poor knowledge) and each independent variable. Multiple logistic regression analysis was done for independent variables that were significant at 0.1% on bivariate analysis. The level of statistical significance was set at p<0.05. Odds ratio (OR) and 95% CI for the predictor variable (knowledge) were calculated.

E. Ethical Considerations

Ethical approval was obtained from the Health and Research Ethics Committee of Federal Medical Centre Makurdi. Informed consent was also obtained from the respondents before their enrollment in the study.

III. RESULTS

Table I shows the socio-demographic characteristics and self-reported blood of the respondents. The mean age of the respondents was 38.81±11.67. Those aged 19-32 (n=88, 30.56%) and 33-46 (n=116, 40.27%) years made up majority of the respondents. Males were slightly more (51.70%) than females (n=149, 51.70%). Most were married (n=204, 70.80%), of the Tiv tribe (n=160, 55.60%) and were Christians (n=263, 91.30). Over half had tertiary education (n=113, 55.20%), were civil servants (n=159, 55.20%) and worked in non-health related disciplines (n=168, 58.30%). Over two-thirds resided in rural areas (n=206, 71.50%).

Table II shows responses to the knowledge questions. Each correct answer was scored 1 making a total of 8. The mean knowledge score was 1.69±0.46.

Fig. 1 shows a pie chart of the knowledge score of the respondents. Majority had poor knowledge scores (69.44%) while only 30.56% had good knowledge.

TABLE I: Socio-Demographic Characteristics and Self-Reported
Blood of the Respondents

Variables	Frequency (n=288)	Percentage
Age category (in years)		
<= 18.00	9	3.13
19.00–32.00	88	30.56
33.00–46.00	116	40.27
47.00–60.00	75	26.04
Gender		
Male	149	51.70
Female	139	48.30
Marital Status		
Presently married	204	70.80
Presently not married	84	29.20
Ethnic group		
Tiv	160	55.55
Idoma	57	19.79
Igede	23	8.00
Others*	48	16.66
Religion		
Christianity	263	91.30
Islam	14	4.90
Traditional religion	11	3.80
Education		
Informal	8	2.80
Primary	8	2.80
Secondary	113	39.20
Tertiary	159	55.20
Occupation		
Student	32	11.10
Farming	41	14.20
Business	56	19.40
Civil servant	159	55.20
Discipline		
Health related	120	41.70
Not health related	168	58.30
Average monthly income		
< 18000 naira	70	24.30
18000 to 49999 naira	133	46.20
50000 to 99999 naira	36	12.50
100000 naira and above	49	17.00
Residence		
Rural	82	28.50
Urban	206	71.50
Do you know your blood group?		
No	252	87.5
Yes	36	12.5

*Others include Igbo, Hausa, Yoruba etc.

TABLE II: Questions on Knowledge of Blood Donation among the
Respondents

Variables	Frequency N=288	Percentage
What is the minimum age for eligibility as blood donor?		
<18	7	2.4
≥ 18 (correct answer)	99	34.4
I don't know	182	63.2
What is the minimum weight of a donor?		
50 kg	13	4.5
60 kg (correct answer)	48	16.7
I don't know	227	78.8
How many times in a year can one donate?		
Once	7	2.4
Two to three times (correct answer)	82	28.5
I don't know	199	69.1
Only men are eligible to donate.		
Yes	14	4.9
No (correct answer)	274	95.1
Pregnant and breastfeeding women are not eligible.		
Yes (correct answer)	168	58.3
No	23	8.0
I don't know	97	33.7
Fever and hypertension make one ineligible.		
Yes (correct answer)	165	57.3
No	15	5.2
I don't know	108	37.5
Donating blood is important to the management of many diseases.		
Yes (correct answer)	271	94.1
No	17	5.9
Donated blood is screened for HIV, hepatitis and syphilis.		
Yes (correct answer)	223	77.4
No	2	0.7
I don't know	63	21.7

Fig. 2 shows a pie chart of the recalled blood groups of the respondents. Fig. 2 is a pie chart showing that the most recalled blood groups of the respondents was blood group O (35.07%).
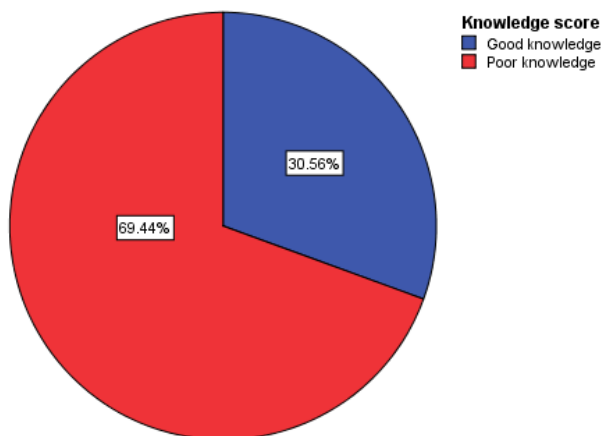

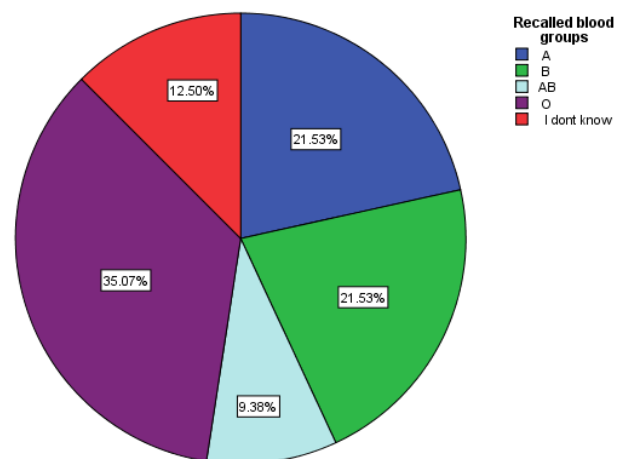
Fig. 1. Knowledge score of the respondents.

Fig. 2. Recalled blood groups of the respondents.

Table III shows practice of blood donation among the respondents. Table III shows that, thirty-two (11.1%) had ever voluntarily donated blood. Out of these 32, 11.1% had donated only once, 8.3% had donated 2-5 times and 1.4% had donated 6-12 times. The range for number of times respondents had donated was 1-12 times and the mean of number of times they donated. was 0.44±1.28. Some (n=23, 8.0%) had volunteered but were found unfit to donate blood. Seventy-five (26.0%) had been transfused or had their loved one transfused and slightly above half (n=145, 50.3%) liked incentives in order to donate blood.

TABLE III: PRACTICE OF BLOOD DONATION AMONG THE RESPONDENTS

Variables	Frequency	Percentage
Have you or your loved one been transfused before?		
Yes	75	26.0
No	213	74.0
Have you voluntarily donated blood? (blood donation status)		
Yes	60	20.8
No	228	79.2
Have you volunteered but found unfit?		
Yes	32	11.1
No	256	88.9
How many times have you donated blood? (mean= 0.44±1.28)		
Never donated	228	79.2
Once	32	11.1
2-5 times	24	8.3
6-12 times	4	1.4
Would you like incentives to donate blood?		
Yes	145	50.3
No	143	49.7

Table IV shows sociodemographic factors predicting blood donation status (have you voluntarily donated blood?) of the participants. Factors seen were those that were significant on bivariate analysis (not included in the result). Females were less likely to have donated blood (aOR=0.19, CI 0.08–0.48, p=0.00). Those with tertiary education were nearly six times more likely to have donated blood (aOR =5.92, CI 1.66–21.10, p=0.01). Those with non-health related jobs (aOR =0.00, CI 0.06–0.46, p=0.00).

Fig. 3 shows that the most common reason for being found unfit to donate (n=24) was viral infections (37.50%) such as hepatitis B, hepatitis C and HIV infection. For the other reasons, low blood level and menstruating had equal (20.83%) proportion, underweight was (12.50%) while tattoo was (0.33%).
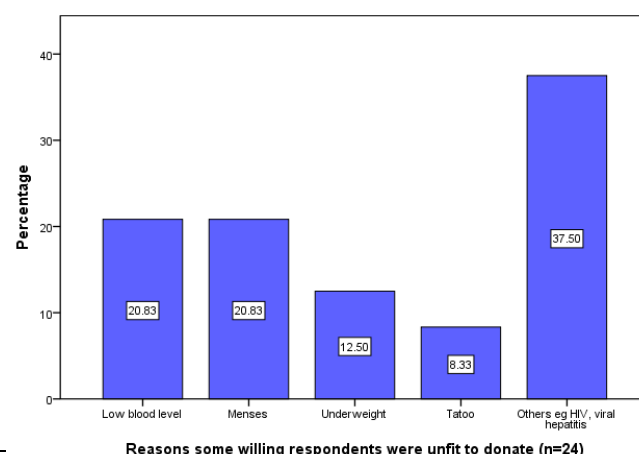

Fig. 3. Reasons why some respondents were found unfit to donate blood.

TABLE IV: LOGISTIC REGRESSION ANALYSIS BLOOD DONATION STATUS (HAVE YOU VOLUNTARILY DONATED BLOOD?) AND SOCIO-DEMOGRAPHICS OF THE PARTICIPANTS

Variables	Adjusted odds ratio (aOR)	95% confidence interval (CI)	P-value
Age category (in years)			
<= 18.00	Reference	0.000	0.99
19.00–32.00	10972530613.00	0.000	1.00
33.00–46.00	2709786471.37	0.000	1.00
47.00–60.00	4800666588		
Gender			
Male	Reference		
Female	0.19	0.08–0.48	0.00
Ethnic group			
Tiv	Reference		
Idoma	0.64	0.22–1.83	0.40
Igede	2.02	0.52–7.79	0.31
Others	1.43	0.00	0.99
Educational level			
Informal	Reference		
Primary	0.44	0.05–4.09	0.47
Secondary	0.36	0.03–4.65	0.43
Tertiary	5.92	1.66–21.10	0.01
Discipline			
Health related	Reference		
Not health related	0.00	0.065–0.46	0.00
Average monthly income			
< 18000 naira	Reference		
18000 to 49999 naira	0.39	0.08–1.86	0.24
50000 to 99999 naira	0.33	0.11–0.99	0.05
100000 naira and above	0.51	0.14–1.78	0.29
Residence			
Rural	Reference		
Urban	2.63	0.87–7.93	0.085

Table V shows the barriers of voluntary blood donation. Poor attitude of staff (15.3%), religious reason (4.9%), lack of privacy (7.9%), fear of being infected (1.4) and fear of dizziness/low blood volume (22.6%) were some of the reasons. Other reasons were, fear of blood being sold for rituals (22.6%), fear (22.9) fear of needle prick (16.7%), far distance of donation site (4.9%) and perceived lack of personal benefit (6.6%).

Table VI shows the relationship between socio-demographic characteristics and knowledge score of blood donation.

Those aged 33–46 years (n= 47, 40.5%) had the highest prevalence of knowledge scores and followed by those aged 47 -60 years (n= 24, 37.5%) while those younger than these ($\leq$ 18.00 and 19-32 years) made up (29.3%). There was statistically significant relationship between age and knowledge scores. The prevalence of good knowledge scores was more among males (n=58, 45.5%), married (n=65, 31.9%), Idoma tribe (n= 27, 47.4%) and Christians (n= 83, 31.6%). It was also higher and had a statistically significant relationship among those with tertiary education (n=72, 45.3%, p=0.000), civil servants (n=73, 45.9%, p=0.000), those in health related jobs (n=52, 43.3%, p= 0.000) those earning $\geq$ 100000 Naira (n=33, 67.3%, p=0.000) and urban residents (n=74, 35.9%, p=0.002).

TABLE V: PERCEIVED BARRIERS TO BLOOD DONATION

Variables	Responses	
	Yes [n (%)]	No [n (%)]
Poor attitude of staff	44 (15.3)	244 (84.7)
My religion does not permit me	14 (4.9)	274 (95.1)
Lack of privacy	22 (7.6)	266 (92.4)
Fear of being infected	30 (1.4)	258 (89.6)
Fear of dizziness/low blood volume	65 (22.6)	223 (77.4)
Fear of blood being sold for rituals	66 (22.9)	222 (77.1)
Fear of needle prick	48 (16.7)	240 (83.3)
Blood donation sites are too far	17 (5.9)	271 (94.1)
Donation process takes a long time	14 (4.9)	274 (95.1)
I don't see any personal benefit	19 (6.6)	269 (93.4)

Table VII shows relationship between practice of blood donation and knowledge score of blood donation.

Those who they or their loved ones had never been transfused (n=158, 74.2%) and those who had never voluntarily donated blood (n=173, 72.1%) had higher proportion of poor knowledge scores and was statistically significant (p=0.003 and p= 0.03 respectively). Those who had volunteered but were found unfit also had a higher proportion of poor knowledge score (n=15, 65.2%) but it was not statistically significant (p=0.646). Those who had never donated had higher proportion of knowledge score (n=59, 25.9%) and it was statistically significant (p= 0.004).

TABLE VI: RELATIONSHIP BETWEEN SOCIO-DEMOGRAPHIC CHARACTERISTICS AND KNOWLEDGE SCORE OF BLOOD DONATION

Variables	Knowledge status n=288		Test statistics	Df	P-value
	Good n (%)	Poor n (%)			
Age category					
$\leq$ 18.00	1 (11.1)	8 (88.9)			
19.00–32.00	16 (18.2)	72 (81.8)	19.673	3	0.001
33.00–46.00	47 (40.5)	69 (59.5)			
47.00–60.00	24 (36.4)	42 (63.6)			
Gender					
Male	58 (45.5)	91 (61.1)	10.194	1	0.001
Female	30 (21.6)	109 (78.4)			
Marital status					
Presently married	65 (31.9)	139 (68.1)	0.563	1	0.453
Not presently married	23 (27.4)	61 (72.6)			
Ethnic group					
Tiv	39 (24.4)	121 (75.6)			
Idoma	27 (47.4)	30 (52.6)	15.641	3	0.001
Igede	3 (13.0)	20 (87.0)			
Others	19 (39.6)	29 (60.4)			
Religion					
Christianity	83 (31.6)	180 (68.4)			
Islam	3 (21.4)	11 (78.6)	1.468	2	0.480
Traditional	2 (18.2)	9 (81.8)			
Educational level					
Informal	2 (25.0)	6 (75.0)			
Primary	0 (0.0)	8 (100.0)	37.463	3	0.000
Secondary	14 (12.4)	99 (87.6)			
Tertiary	72 (45.3)	87 (54.7)			
Occupation					
Student	5 (15.6)	27 (84.4)			
Farming	3 (7.3)	38 (92.7)	40.070	3	0.000
Business	7 (12.5)	49 (87.5)			
Civil servant	73 (45.9)	86 (54.1)			
Discipline					
Health related	52 (43.3)	68 (56.7)	15.829	1	0.000
Not health related	36 (21.4)	132 (78.6)			
Average monthly income					
< 18000 Naira	7 (10.0)	63 (90.0)			
18000–49999 Naira	30 (22.6)	103 (77.4)	55.622	3	0.000
50000–99999 Naira	18 (50.0)	18 (50.0)			
$\geq$ 100000 Naira	33 (67.3)	16 (32.7)			
Residence					
Rural	14 (17.1)	68 (82.9)	9.821	1	0.002
Urban	74 (35.9)	132 (64.1)			

TABLE VI: Relationship between Practice of Blood Donation and Knowledge Score of Blood Donation

Variables	Knowledge status		Test statistic	Df	P-value
	Good n=288 n (%)	Poor n=288 n (%)			
Have you or loved one been transfused before?					
Yes	33 (44.0)	42 (56.0)	8.638	1	0.003
No	55 (25.8)	158 (74.2)			
Have you voluntarily donated blood?					
Yes	21 (36.0)	38 (64.40)	4.726	1	0.030
No	67 (27.9)	173 (72.1)			
Have you volunteered but found unfit to donate?					
Yes	8 (34.8)	15 (65.2)	0.210	1	0.646
No	80 (30.2)	185 (69.8)			
How many times have you voluntarily donated blood?					
Never	59 (25.9)	169 (74.1)	13.174	3	0.004
Once	16 (50.0)	16 (50.0)			
2-5 times	10 (41.7)	14 (58.3)			
6-12 times	3 (75.0)	1 (58.3)			

TABLE VII: Logistic Regression Model of Independent Variables Predicting Knowledge of Blood Donation

Variables	Adjusted odds ratio (aOR)	95% confidence interval (CI)	P-value
Age category (in years)			
<= 18.00	Reference		
19.00–32.00	3.77	0.21–69.15	0.37
33.00–46.00	1.27	0.64–25.25	0.88
47.00–60.00	2.25	0.09–51.68	0.61
Gender			
Male	Reference		
Female	3.12	1.25–8.15	0.02
Ethnic group			
Tiv	2.97	0.99–8.87	0.05
Idoma	1.07	0.31–3.68	0.91
Igede	3.88	0.64–23.61	0.14
Others	Reference		
Educational level			
Informal	Reference		
Primary	3.16	0.08–130.22	0.54
Secondary	4.78	0.03–6.95	0.99
Tertiary	5.38	1.72–16.61	0.00
Occupation			
Student	Reference		
Farming	1.56	0.23–10.87	0.65
Business	3.78	0.56–25.41	0.17
Civil servant	15.91	1.46–173.67	0.02
Discipline			
Health related	Reference		
Not health related	0.175	0.065–0.45	0.00
Average monthly income			
< 18000 naira	Reference		
18000 to 49999 naira	0.87	0.21–3.55	0.84
50000 to 99999 naira	0.69	0.11–4.36	0.69
100000 naira and above	0.23	0.03–1.52	0.13
Residence			
Rural	0.95	0.33–2.78	0.93
Urban	Reference		
Have you or your loved one been transfused before?			
Yes	Reference		
No	1.67	0.63–4.47	0.30
Have you voluntarily donated blood?			
Yes	Reference		
No	2.33	0.47–11.59	0.30
How many times have you voluntarily donated blood?			
Never	Reference		
Once	8.59	1.88–84.22	0.024
2–5 times	3.00	0.28–31.99	0.363
6–12 times	4.2	0.38–46.50	0.065

Table VIII shows logistic regression model of independent variables predicting knowledge of blood donation.

Those aged 19–32 years had nearly four times more knowledge scores (aOR 3.77, CI 0.21-69.15), but it was not statistically significant (p=0.37). Females had three times more knowledge scores (aOR 3.12, CI 1.25–8.15) than males and it was statistically significant (p=0.02). Those with tertiary education were likely about five times more knowledgeable (aOR 5.38, CI 1.72–16.61) compared to those with informal education and civil servants had 15 times more knowledge than students (aOR 15.91, CI 1.46–173.67). Those who had non-health-related jobs had likely less knowledge score (aOR 0.175, CI 0.065–0.47) compared to those in health-related jobs and it was statistically significant. Those residing in urban area and being transfused/loved one being transfused in the past were more likely knowledgeable, but it was not statistically significant. Those who had voluntarily donated were two times more likely knowledgeable (aOR 2.33, CI 0.47–11.59) but it was not statistically significant (p=0.30). Those who donated once had more knowledge (aOR 8.59, CI 0.88–84.22) compared to those who had never donated but it was not statistically significant (p=0.242).

IV. Discussion

This was a cross-sectional study assessing the knowledge and practice of blood donation among the participants. The mean age of the respondents was 38.81±11.67. Those aged 19-32 (n=88, 30.56%) and 33-46 (n=116, 40.27%) years made up majority of the respondents. The predominant ages are obviously younger persons and may be a reflection of the demographics of Nigeria and the workforce of the civil servants working in the hospital. The median age of hospital workers who participated in a similar study in Benin, Nigeria was 32 years [3] while that done among residents of an urban slum in Lagos, Nigeria was 37.6 years [16]. Males were slightly more (n=149, 51.70%) than females (n=139, 48.30%). Most were married (n=204, 70.80%), of the Tiv tribe (n=160, 55.55%) and were Christians (n=263, 91.30%). Over half had tertiary education (n=159, 55.20%), were civil servants (n=159, 55.20%) and worked in non-health related disciplines (n=168, 58.30%). Over two-third resided in rural areas (n=206, 71.50%).

Assessing people's knowledge about blood donation has been noted to help in encouraging people to donate blood and also debunking wrong impressions about blood donation [17]. In this study mean knowledge score (total was 8) was 1.69 ± 0.46. Those with good knowledge scores were (30.56%) which is lower than 56.8% and 60.2% obtained from Ethiopia [5] and Saudi Arabia [18] respectively but higher than 28.6% from Jordan [19]. In Ebonyi state Nigeria, 69.3% had good knowledge of blood donation [14]. In a systematic review of literature from sub-Saharan Africa, it was observed that the surveys collectively show that knowledge about the specifics of blood donation such as eligibility requirements, the location of blood donation facilities and the importance of donation is lacking to some extent in all populations in developing countries [17]. Donors were better informed than non-donors [17]. This is in consonance with this study, as those who donated at least once had eight times more knowledge (aOR 8.59, CI 1.88–84.22) compared to those who had never donated it was statistically significant (p=0.024).

Those aged 33–46 years (n= 47, 40.5%) had the highest prevalence of knowledge scores and followed by those aged 47–60 years (n=24, 37.5%). Age had a statistically significant relationship with knowledge scores. The reason may be because they are older and may have more knowledge. Females had three times more knowledge scores (aOR=3.12, CI 1.25–8.15) than males and it was statistically significant (p=0.02) though this did not translate to more practice of blood donation by females. The reason for more knowledge scores among females is unclear, hence more studies may unravel the reason. Those with tertiary education were likely about five times more knowledgeable (aOR=5.38, CI 1.72–16.61, p=0.000). This concurs with an Ethiopian study where secondary and higher educational status were independent predictors of adequate knowledge [20]. Higher education can make people more knowledgeable about blood donation.

Those who had non-health-related jobs had a likelihood of lesser knowledge score (aOR= 0.175, CI 0.065–0.47) compared to those in health-related jobs and it was statistically significant. This is expected as their profession may have exposed them to facts about blood donation. Civil servants had 15 times more knowledge than students (aOR=15.91, CI 1.46–173.67). This may be because the civil servants are older. A significant relationship between occupation and level of knowledge has also been reported in Ethiopia [20]. Those residing in urban area had more odds of being knowledgeable, but it was not statistically significant. The most recalled blood group of the respondents was blood group O Rhesus D positive (35.07%) and this is in keeping with known fact [21].

Being transfused/loved one being transfused in the past showed more likelihood of having knowledge and was statistically significant (p=0.003). This may be because their past experience may give them the impetus to donate for others. There was statistically significant relationship between having voluntarily donated blood and knowledge scores (p=0.030). Likewise, a study in Saudi Arabia reported same [22].

Only 32 (11.1%) had ever voluntarily donated blood. This is quite low and can hardly measure up to some other observations like 100 % in Thailand [17], 78.2% in Jos, Nigeria [15] and 30.1% in Saudi Arabia [18]. Comparatively low findings on practice of donating blood reported in a systematic review are 3.8% in Tanzania [23] and 6.1 % in Haiti [17]. In this study, 32 (11.1%) had donated only once, 24 (8.3%) had donated 2-5 times and 4 (1.4%) had donated 6-12 times. Higher proportion was seen in Ghana where 54.9% were first-time blood donors while 45.1% were repeat donors [13]. In addition in Senegal, only 24.68% had already donated blood and 26.09% had repeated it.[8] Retaining previous blood donors and recruiting new donors on a volunteer basis is continually advocated for [8], [13].

Some of the respondents (n=23, 8.0%) had volunteered but were found temporarily or permanently unfit to donate blood and this is close to a deferral rate of 8.69% obtained in a study in Calabar, Nigeria [24]. This finding is however higher than 4.5% in Iran [25] and lower than 13.6% in United States of America [26]. Despite the need for more persons to donate blood it is important to ensure that both the recipient and donor do not encounter any harm, hence sometimes temporary or permanent deferral can occur [24], [27]. In this study, the most common reason for being found unfit to donate was viral infections (37.50%) such as hepatitis B, hepatitis C and HIV infection. Other reasons were low blood level (20.83%) and menstruating (20.83%), underweight was (12.50%) while having tattoo was (0.33%). Analogous to these present finding, transfusion transmissible infections in the donor were a leading cause of referral in other studies [24], [28], [29].

This study revealed that most of the respondents (50.3%) liked incentives in order to donate blood. In Greece, days off work due to blood donation and the right to conduct free medical examinations were desired as incentives. In contrast, in a study in Togo most were against remuneration [12]. The World Health Organization recommends voluntary non-remunerated donors [1], [2].

Females were less likely to have donated blood (aOR 0.19, CI 0.08–0.48, p=0.00). This has been reported in most studies [17], [20], [30], [31]. although a rare finding was reported from Moldova where females donated more [32]. Those with tertiary education were nearly six times more likely to have donated blood (aOR 5.92, CI 1.66–21.10, p=0.01). Males, who had tertiary education and were between the ages of 41–50 years had greater odds of donating blood as seen in a study in Lagos Nigeria [33]. Furthermore, factors that could influence the practice of blood donation were age, male sex, high level of education and good knowledge in a Senegalese study [8]. Those with non-health related jobs were less likely to donate blood (aOR 0.00, CI 0.06–0.46, p=0.00), probably due to poor knowledge.

Barriers of voluntary blood donation identified in this study included fear of blood being sold for rituals (22.9%), fear of dizziness/low blood volume (22.6%), fear of needle prick (16.7%) and poor attitude of staff (15.3%). Other reasons were, far distance of donation site (4.9%), religious reason (4.9%), lack of privacy (7.9%), fear of being infected (1.4%) and perceived lack of personal benefit (6.6%). In Ghana 54.6% were concerned about the level of privacy provided during pre-donation screening and 50.9% worried that donated blood may be sold [13]. Fear of getting infections (31.71%) especially the HIV (9.76%), the lack of information (25.37%), religious beliefs (19.51%) and the fear

of knowing the result of one's HIV test have been reported as deterrents in Togo [12.] Fear of blood being used for rituals has also been reported in another study in Ghana [34]. In addition, in a United States study, barriers included not having a convenient place, not knowing where to donate blood, fear of needles, pain and feeling faint [35]. Permission of a parent or spouse was required for 50.43% of people who wanted to donate in a Senegal study [8]. The findings of this study can be used here at the study site to counter the identified barriers to blood donation practice. Misconceptions and genuine concerns that have been found can be further explored for more understanding of issues bordering on blood donation in order to increase blood donation practices in different communities.

V. Conclusion

The participants knowledge of blood donation was poor. Those who donated was far below 100% expected by WHO. Some identified barriers were clearly misconceptions. Efforts to increase knowledge and practice of blood donation among the populace and hospital workers need to be improved on.

Conflict of Interest

The authors declare that they do not have any conflict of interest.

References

[1] World Health Organization. World Blood Donor Day 2022_ Donating blood is an act of solidarity. Available from: https://www.who.int/news-room/events/detail/2022/06/14/default-calendar/world-blood-donor-day-2022. Accessed from 2/6/2022.

[2] World Health Organization. Towards 100% voluntary blood donation [Internet]. Available from: https://www.who.int/bloodsafety/publications/9789241599696_eng.pdf.

[3] Benedict N, Aigberadion U, Nwannadi AI. Knowledge, attitude, and practice of voluntary blood donation among healthcare workers at the University of Benin Teaching Hospital, Benin City, Nigeria Benedict. *J Blood Transfus*. 2013;2013:1–6.

[4] Osaro E, Charles AT. The challenges of meeting the blood transfusion requirements in sub-Saharan Africa: the need for the development of alternatives to allogenic blood. J Blood Med. 2011;2:7.

[5] Melku M, Terefe B, Asrie F, Enawgaw B, Melak T, Tsegay YG, et al. Knowledge, attitude, and practice of adult population towards blood donation in Gondar Town, Northwest Ethiopia: a community based cross-sectional study. *J Blood Transfus*. 2016;2016:1–10.

[6] Al-aaragi ANH. Knowledge , attitudes and practices regarding blood donation among a sample of volunteers in the Holy Karbala City / Iraq. 2017;7(18):56–64.

[7] Bilal M, Haseeb A, Zahid I, Lashkerwala SS, Saeeduddin F, Saad M, et al. Knowledge, attitudes and perceptions among non blood donor female health care professionals. *Glob J Health Sci*. 2015;8(4):203–11.

[8] Diongue FB, Bassoum O, Tine JAD, Sall A, Niang K, Leye MMM, et al. Knowledge attitudes, practices and factors associated with blood donation in the Fatick Health District in 2019 (Senegal). *Open J Prev Med*. 2021;11(04):132–46.

[9] Nwogoh B, Aigberadion U, Nwannadi AI. Knowledge, attitude, and practice of voluntary blood donation among healthcare workers at the University of Benin Teaching Hospital, Benin City, Nigeria. *J Blood Transfus*. 2013 Oct 9;2013:1–6.

[10] Volken T, Weidmann C, Bart T, Fischer Y, Klüter H, Rüesch P. Individual characteristics associated with blood donation: a cross-national comparison of the German and Swiss population between 1994 and 2010. *Transfus Med Hemotherapy*. 2013;40(2):133.

[11] Duncan WW, Mcgrowder D, Bourne PA, Lisa R, Lindo A. Assessment of the blood donation process at four major centres in Jamaica Nitric oxide signalling and diabetes mellitus View project Leptospira and Leptospirosis in Jamaica and the Caribbean View project. Available from: https://www.researchgate.net/publication/286122667. Accessed on 2/6/2022.

[12] Agbovi KK, Kolou M, Fétéké L, Haudrechy D, North ML, Ségbéna AY. Knowledge, attitudes and practices about blood donation. A sociological study among the population of Lome in Togo. *Transfus Clin Biol*. 2006;13(4):260–5.

[13] Mohammed S, Essel HB. Motivational factors for blood donation, potential barriers, and knowledge about blood donation in first-time and repeat blood donors. *BMC Hematol*. 2018;18(36):1-9.

[14] Umeora OU, Onuh SO, Umeora MC. Socio-cultural barriers to voluntary blood donation for obstetric use in a rural Nigerian village. *Afr J Reprod Health*. 2005;9(3):72–6.

[15] Damulak OD, Bolorunduro S O, Boman F, Bako L. Pattern of blood donors in Jos. *Jos J Med*. 2011;5:44–6.

[16] Seconi A O, Balogun MR, Odukoya OO, Inem V, Onigbogi OO. Blood donation practices and willingness to donate among residents of an urban slum in Lagos Nigeria. *Niger Postgrad Med J*. 2014; 21 (1): 21-27.

[17] Lownik E, Riley E, Konstenius T, Riley W, McCullough J. Knowledge, attitudes and practices surveys of blood donation in developing countries. *Vox Sang*. 2012;103(1):64–74.

[18] Alsalmi MA, Almalki HM, Alghamdi AA AB. Knowledge, attitude and practice of blood donation among health professions students in Saudi Arabia; A cross-sectional study. *J Fam Med Prim Care*. 2019;8:2322–7.

[19] Abderrahman BH, Saleh MYN. Investigating knowledge and attitudes of blood Donors and barriers concerning blood donation in Jordan. *Procedia - Soc Behav Sci*. 2014;116(2000):2146–54.

[20] Melku M, Terefe B, Asrie F, Enawgaw B, Melak T, Tsegay YG, et al. Knowledge, attitude, and practice of adult population towards blood donation in Gondar Town, Northwest Ethiopia: a community based cross-sectional study. *J Blood Transfus*. 2016;2016:1–10.

[21] Service TNH. Blood groups. Available from: https://www.nhs.uk/conditions/blood-groups/. Accessed on 3/7/2022.

[22] Rizwan F, Al-Amri R, Al-Harthi A, Al-Otaibi N, Al-Otaibi R. Knowledge, attitude, and blood donation practices among medical students of Taif University, Saudi Arabia. *Saudi J Heal Sci*. 2022;11(1):68-73.

[23] Jacobs B AbZ. Attitudes and beliefs about blood donation among adults in Mwanza Region, Tanzania. *East Afr Med J*. 1995;72:345–348.

[24] Okoroiwu HU. Blood donors deferral prevalence and causes in a tertiary health care hospital , Southern Nigeria. *BMC Health Serv Res*. 2019;2:1–7.

[25] Kasraian L NN. Rates and reasons for blood donor deferral, shiraz, Iran. A retrospective study. *Sao Paulo Med J*. 2015;133(1):36–42.

[26] Custer B, Johnson ES, Sullivan SD, Hazlet TK, Ramsey SD, Hirschler NV et al. Quantifying loses to the donated blood supply due to donor deferral and miscollection. *Transfusion*. 2004;44(19):1417–26.

[27] World Health Organization (WHO). Donor selection guidelines on assessing donor suitability for blood donation. Luxemburg: WHP cataloguing-inpublication data. 2012. Available from https://apps.who.int/iris/handle/10665/76724. Accessed on 2/6/2022.

[28] Chauhan DN, Desai KN, Trivedi HJ AA. Evaluation of blood donor deferral causes: a tertiary-care Centre-based study. *Int J Med Sci Public Heal*. 2015;4(3):289–392.

[29] Rehman S, Arif SH, Mehdi G, Saeed N YF. The evaluation of blood donor deferral causes: a tertiary care Centre-based study. *J Blood Disord Transf*. 2012;3:131.

[30] Erhabor O, Isaac Z, Abdulrahaman Y, Ndakotsu M, Ikhuenbor DB, Aghedo F et al. Female gender participation in the blood donation process in resource poor settings: case study of Sokoto in North Western Nigeria. *J Blood Disord Transfus*. 2014;05(1): 1-7.

[31] Alla J, Muhammad, Habeeb A, Mustapha A, Andrew C, Saeed S. Gender distribution of blood donors and blood recipients in Rasheed

Shekoni Teaching Hospital Dutse, Jigawa State, Nigeria. *Int J Sci Res Eng Dev*. 2019;2(1): 20-24.

[32] United States Agency for International Development. Blood donation in Moldova: Knowledge, attitudes, and practice in the general population: survey final report.. 2011. Available from: http://aids.md/aids/files/342/reportcap-%0Ablood-donation-2007-en-ro.pdf. Accessed on 12/7/2022.

[33] Abiola OA, Abiola OO, Obadiah DD, Ekanem EE. The influence of sociodemographic factors, knowledge and attitude on the practice of blood donation. *Nig Q J Hosp Med*. 2017;27:2.

[34] Asamoah-Akuoko L, Hassall OW, Bates I, Ullum H. Blood donors' perceptions, motivators and deterrents in Sub-Saharan Africa – a scoping review of evidence. *Br J Haematol*. 2017;177(6):864–77.

[35] James AB, Schreiber GB, Hillyer CD, Shaz BH. Blood donations motivators and barriers: A descriptive study of African American and white voters. *Transfus Apher Sci*. 2013;48(1):87–93.