

# Motivators and barriers to blood donation among potential donors of African and Caucasian ethnicity

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**Background** - Minority blood donation, especially from individuals of African ethnicity, is a focus for many countries with diverse populations. As the need for antigen-negative RBC transfusions for patients with Sickle Cell Disease (SCD) continues to grow, inclusion of more African blood donors is essential to ensure this demand is met.

**Materials and methods** - This study aims to explore barriers and motivators to blood donation and awareness of SCD among potential donors of diverse ethnic backgrounds in Ireland. Following ethical approval, patients attending the National Sickle Cell Disease and Thalassemia service at St James's Hospital were invited to share an online anonymous survey within their local communities to achieve snowball-sampling.

**Results** - 387 respondents completed the survey, including 311 non-donors (median age 25 years, 67% female). Ethnic backgrounds included: African or African-Irish (59%), White or Caucasian (25%), Asian (8%), Hispanic or Latino (3%), Middle Eastern (3%), Multiracial or Biracial (2%). The most commonly identified barrier overall was lack of information on blood donation. African respondents were significantly more likely to report lack of information and malaria-related barriers than Caucasians. Motivators also varied across ethnic groups, with African respondents more likely to donate to help someone within their own community or for religious motivators. Awareness of SCD was higher among African respondents.

**Discussion** - While some barriers to blood donation are shared across all ethnic groups including lack of information, notable differences exist between Caucasian and African respondents. Specific actions to recruit and retain African blood donors should focus on these key areas.

**Keywords:** *African ethnicity, minority blood donor, motivators, barriers, haemoglobinopathy.*

## INTRODUCTION

Blood donors of minority ethnicity, especially those of African origin, are under-represented in many high-income Western countries. In Ireland, the number of patients with haemoglobinopathies, especially Sickle Cell Disease (SCD), has risen markedly over the past 30 years, resulting in increased demand for blood transfusion<sup>1</sup>. Given the high risk of alloimmunization among haemoglobinopathy patients, particularly those with

SCD, extended RBC matching is now recommended<sup>2,3</sup>. Consequently, the need for specific antigen-negative RBCs for SCD patients, is growing year on year. To increase the probability of a phenotypic match, donors and recipients should share the same racial and/or ethnic background. Hence the discrepancy between the number of blood donors of African origin and the number of SCD patients is creating a strain on the blood supply chain. In order to prevent alloimmunization and to ensure appropriately matched RBC transfusions are available for these patients, a suitable number of donors of African ancestry need to be included in the donor pool. Given this demand-supply discordance, it is unsurprising that recruitment of African donors has become a major priority for transfusion services worldwide.

A key step towards enhancing recruitment of blood donors is to first understand perceived barriers and facilitators to blood donation, which may vary across different demographic categories, including ethnicity. While a number of studies have explored motivators and barriers to blood donation among ethnic minorities, these were mainly performed in the US, Australia and Canada, with few studies in Europe and none in Ireland to date<sup>4-14</sup>. Indeed, a recent systematic review highlighted the lack of European studies as a key research priority, as barriers and facilitators may differ across social and cultural contexts<sup>15</sup>. Previously identified barriers among African minority groups include lack of awareness, mistrust, discrimination, fear and haemoglobin- or infection-related deferrals (e.g. due to malaria, hepatitis or HIV)<sup>4,8,13,14,16</sup>, while motivators include altruism, responses to recruitment and awareness campaigns and desire for health checks<sup>4,11,13,17</sup>. However, since the majority of studies focused on African-Americans, rather than African minorities in a European context, the motivators and barriers in the latter group remain poorly understood. As such, the goal of this study was to examine these factors among ethnic minority groups, particularly those of African ethnicity, in a European (Irish) context. Results from this study will inform interventions, including recruitment campaigns, to improve inclusion of African donors. These measures will not only augment our ability to provide matched blood for SCD patients but will also enhance the diversity of the blood supply for all potential blood transfusion recipients.

## **MATERIALS AND METHODS**

### **Survey measures and design**

An anonymous online survey with 33 questions was designed, incorporating questions adapted from previous surveys<sup>9,13</sup> and others specific to Irish donor eligibility criteria. The final survey content was determined by a multidisciplinary team with diverse ethnic backgrounds to ensure use of appropriate language to minimise respondent burden. Following local ethical approval, patients attending the National Sickle Cell Disease and Thalassemia service at St James's Hospital, Dublin were invited to share the survey within their local community, including, but not limited to, workplaces, churches, and universities. Additional participants were recruited via social media (e.g. Twitter and Facebook pages of societies representing ethnic minorities in Ireland) who were encouraged to share the survey to achieve snowball-sampling. Participants were asked to specify their age, sex and ethnicity. Inclusion criteria were adults aged  $\geq 18$  years who had not donated blood in Ireland, including those who had attempted but were deferred from blood donation. Those who had donated blood in Ireland were excluded. Survey data were collected from August-December 2021.

The key areas addressed by this survey included: barriers and motivators to blood donation and awareness of conditions like SCD and Thalassemia. "Barriers" to blood donation consisted of 16 statements proceeding the statement: "*I have not donated before because...*" Additional free-text spaces were provided for respondents to include ineligibility reasons if they had been informed they could not donate and those who wished to include "other" self-reported barriers. "Motivators" consisted of 12 statements proceeding the statement "*I would consider donating blood if...*" Motivators and barriers were recorded on a four-point Likert scale. Participants were asked if they were "Aware of conditions like Sickle Cell Disease and Thalassemia" and if they responded "Yes" they were asked if they were aware of the need for frequent blood transfusions for these patients. Finally, awareness about conditions like SCD and shortages of blood to treat these conditions were investigated as potential motivators.

### **Statistical analysis**

Descriptive statistics were reported in frequencies and percentages for categorical data. Comparisons between

two groups were performed using the Student *t*-test for parametric data or the Mann-Whitney *U* test for non-parametric data. Fisher's exact test was used to compare odds ratios of barriers and motivators to blood donation present across different demographic subgroups. A *p*-value of <0.05 was considered statistically significant. Statistical analysis was conducted using GraphPad Prism 9.1 (GraphPad Software Inc., San Diego, CA).

## RESULTS

### Demographics

A total of 387 respondents participated in the survey. Following exclusion of donors and responses with missing or incomplete data, a total of 311 non-donors were included for analysis, with a median age of 25 (IQR 20-36) years and a female predominance (209/311, 67%) (Table I). Ethnic backgrounds of respondents included: African or African-Irish (183/311, 59%), White or Caucasian (77/311, 25%), Asian (25/311, 8%), Hispanic or Latino (9/311, 3%), Middle Eastern (9/311, 3%), Multiracial or Biracial (8/311, 2%) (Table I).

### Barriers and motivators to blood donation

Overall, the most common barrier to blood donation, identified by 58.8% of respondents, was lack of information on blood donation, with 30.7% reporting they were deemed to be ineligible at the blood donation centre and 35% citing "other" barriers. The most common self-reported reasons for ineligibility included: history of living in a malaria-endemic region, anaemia and/or iron deficiency, height/weight restrictions, temporary deferrals e.g. new piercing/tattoo, and exclusion due to a medical condition. "Other" self-reported barriers included fear of blood and/or fear of fainting. Uncommon barriers included: religious barriers (2%), belief that there is enough blood in the healthcare system (5%), distrust of the healthcare system (5.5%) and men who have sex with men (MSM) in 8.5% of male respondents. Only 2.4% reported a personal history of a sexually transmitted infection such as HIV, Hepatitis B or Hepatitis C and no respondent reported these infections in their partners. Similarly no respondent reported use of injectable drugs.

The most commonly identified motivators included: being asked by a family member or friend (95.4%), knowing someone who required blood transfusion (93.7%), greater availability of information about blood donation (88.7%),

being a "rare" blood type (87.8%) and donating to "help someone in my own community" (83.8%). Promotion of donation on social media and on TV/Radio were motivators in 67.6% and 66.7%, respectively. Religious motivators, including donation if suggested by a religious group and proximity of donation centres to places of worship were reported in 43.7% and 35.9%, respectively. Overall, 84% of respondents were aware of conditions like SCD and Thalassemia, with 83.9% indicating they would be more likely to donate if they knew more about these conditions and 96% if there was a shortage of blood for these conditions (Table I).

### Ethnicity-related factors

Significant differences in motivators and barriers to blood donation were observed between African and Caucasian respondents. African respondents were younger than Caucasians (median ages 23 versus 28 years,  $p=0.004$ ), consistent with the younger age of migrant groups living in Ireland<sup>18</sup>, however the proportions of males/females did not differ between these groups (Table II). Caucasians were more likely to have ever considered blood donation (85% Yes, 5% No, 10% Maybe) than African respondents (59% Yes, 23% No, 18% Maybe) ( $p=0.0002$ ) (Table II).

African respondents were 3 times more likely to report barriers due to lack of information than Caucasians (OR 3.1 CI 1.8-5.3,  $p<0.0001$ ) and 5 times more likely to report barriers due to having lived in a malaria-endemic region than Caucasians (OR 5.1 CI 2.1-12.3,  $p=0.0002$ ) (Table II). Additionally, in the free-text section for reporting ineligibility reasons, 42 African respondents described malaria-related barriers due a period of time spent living in their country of origin. This was the most commonly self-reported ineligibility reason by African respondents, with many expressing beliefs that this barrier was unfair and/or discriminatory. By contrast, malaria-related barriers were not self-reported by Caucasian respondents, with anaemia ( $n=10$ ), fear of blood/fainting ( $n=10$ ) and MSM ( $n=7$ ) being more common. Consistent with their self-reported barriers, Caucasians were twice as likely to report fear of needles/pain (OR 2.1, CI 1.1-3.7,  $p=0.02$ ) and Caucasian males were 6 times more likely to report MSM as a barrier (OR 6.0 CI 1.4-22.6,  $p=0.013$ ) than African males (Table II).

Ethnic differences were also observed in motivators for blood donation. African respondents were 9 times more likely to consider donating to help someone in their

Table I - Demographic parameters and survey results for all respondents

CHARACTERISTICS	Non-donors (n=311)			
Age (years) - Median (IQR)	25 (20-36)			
Female - n (%)	209 (69)			
African - n (%)	183 (59)			
Caucasian - n (%)	77 (25)			
Asian - n (%)	25 (8)			
Middle Eastern - n (%)	9 (3)			
Multiracial or Biracial - n (%)	8 (2)			
Considered blood donation before - Yes/No/Maybe (%)	67/17/16			
<b>BARRIERS - %</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
<i>"I have not donated blood before..."</i>				
For religious reasons	1	1	14	84
For personal reasons	5.8	15.5	22.3	56.4
As I have a fear of pain or needles	3.9	16.1	20.7	59.3
As I believe there is enough blood in the Irish healthcare system	0.7	4.7	24.1	70.5
As I do not trust the healthcare system	1.1	4.4	26.5	68
As I would have to take time off work	2.9	12.7	27.5	56.9
As the nearest donation centre is too far away	4	17.1	33.8	45.1
As I lack information on the donation service in Ireland	21.4	37.4	14.9	26.3
As donating blood is too time consuming	2.2	8.8	28.8	60.2
As I was informed at the donation centre that I could not give blood	23.5	7.2	24.2	45.1
For reasons other than those listed	14.8	20.2	26.2	38.8
Due to my diagnosis of a sexually transmitted infection such as HIV/AIDS, Hepatitis B or Hepatitis C	1.7	0.7	12	85.6
Due to my partner's diagnosis of a sexually transmitted infection such as HIV/AIDS, Hepatitis B or Hepatitis C	0	0	10.2	89.8
Because I have previously used injectable non-prescription drugs	0	0	10.5	89.5
(Men only) Because I have had sex with another man within the last 12 months	7.2	1.3	9.2	82.3
Because I have travelled to, or lived, in a region where malaria is very common e.g. Sub-Saharan Africa	11	5.9	12.9	70.2
<b>MOTIVATORS - %</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
<i>"I would consider donating blood..."</i>				
If my blood was more likely to be used to help someone in my own community	50	33.8	10.1	6.1
If I knew I had a rare blood type	59.6	28.2	6.8	5.4
If I was asked by a family member or friend	65.7	29.7	2.2	2.4
If I knew someone who required blood transfusion	64	29.7	3.5	2.8
If it was suggested by a Healthcare worker	45.2	39.9	11.4	3.5
If it was suggested by members of my religious group/religious leader	18.2	25.5	23.6	32.7
If I had more information about blood donation	53.3	35.4	6.4	4.9
If donation centres were closer to my work	35.1	40.2	14.9	9.8
If donation centres were closer to my home	43.3	40.8	8.0	7.9
If donation centres were closer to my place of worship	13.6	22.3	29.6	34.5
If I saw it being promoted on social media	21.8	45.8	20	12.4
If I saw or heard it being promoted on TV/radio	20.7	46	22.1	11.2
<b>AWARENESS OF SICKLE CELL DISEASE &amp; THALASSEMIA - %</b>	<b>Yes</b>	<b>No</b>		
Are you aware of conditions such as sickle cell disease and thalassemia?	84	16		
(Respondents who indicated "Yes" to the above only) Did you know that patients with these conditions may require frequent blood transfusions?	85	15		
Would you donate if you knew more about conditions like sickle cell disease or	83.9	16.1		
Would you donate if there was a shortage of blood for the treatment of these	96	4		

Demographic data and survey results are shown for the entire cohort (n=311) with results of a four-point Likert scale for each question expressed as a percentage of the total responses.

Table II - Comparison between African and Caucasian cohorts

CHARACTERISTICS	African Respondents (n=183)		Caucasian Respondents (n=77)		p value
Age (years) – Median (IQR)	23 (19-41.5)		28 (24-36)		0.004**
Female – n (%)	131 (72)		49 (64)		0.24
Considered blood donation – Yes/No/Maybe (%)	59/23/18		85/5/10		0.0002***
<b>BARRIERS – n (%)</b> <i>"I have not donated blood before..."</i>	<b>African Agree</b>	<b>Caucasian Agree</b>	<b>African Disagree</b>	<b>Caucasian Disagree</b>	<b>p value</b>
For religious reasons	6 (3)	0 (0)	177 (97)	77 (100)	0.18
For personal reasons	40 (22)	20 (26)	143 (78)	57 (74)	0.52
As I have a fear of pain or needles	38 (21)	27 (35)	145 (79)	50 (65)	0.02*
As I believe there is enough blood in the Irish healthcare system	14 (8)	3 (4)	169 (92)	74 (96)	0.41
As I do not trust the healthcare system	17 (9)	4 (5)	166 (91)	73 (95)	0.33
As I would have to take time off work	22 (12)	10 (13)	161 (88)	67 (87)	0.83
As the nearest donation centre is too far away	42 (23)	17 (22)	141 (77)	60 (78)	0.99
As I lack information on the donation service	122 (67)	30 (39)	61 (33)	47 (61)	<0.0001****
As donating blood is too time consuming	20 (11)	12 (16)	163 (89)	65 (84)	0.31
As I was informed at the donation centre that I could not give blood	54 (30)	29 (38)	129 (70)	48 (62)	0.24
For reasons other than those listed	53 (29)	28 (36)	130 (71)	49 (64)	0.24
Due to my diagnosis of a sexually transmitted infection such as HIV/AIDS, Hepatitis B or Hepatitis C	3 (2)	3 (4)	180 (98)	74 (96)	0.37
Due to my partner's diagnosis of a sexually transmitted infection such as HIV/AIDS, Hepatitis B or Hepatitis C	0 (0)	0 (0)	183 (100)	77 (100)	0.99
Because I have previously used injectable non-prescription drugs	0 (0)	0 (0)	183 (100)	77 (100)	0.99
(Men only) Because I have had sex with another man within the last 12 months	3 (6)	7 (27)	49 (94)	19 (73)	0.01*
Because I have travelled to, or lived, in a region where malaria is very common e.g. Sub-Saharan Africa	48 (26)	5 (6)	135 (74)	72 (94)	0.002***
<b>MOTIVATORS – n (%)</b> <i>"I would consider donating blood..."</i>	<b>African Agree</b>	<b>Caucasian Agree</b>	<b>African Disagree</b>	<b>Caucasian Disagree</b>	<b>p value</b>
If my blood was more likely to be used to help someone in my own community	170 (93)	45 (58)	13 (7)	32 (42)	<0.0001****
If I knew I had a rare blood type	159 (87)	70 (91)	24 (13)	7 (9)	0.41
If I was asked by a family member or friend	174 (95)	73 (95)	9 (5)	4 (5)	0.99
If I knew someone who required blood transfusion	171 (93)	72 (94)	12 (7)	5 (6)	0.99
If it was suggested by a Healthcare worker	152 (83)	67 (87)	31 (17)	10 (13)	0.46
If it was suggested by members of my religious group/religious leader	101 (55)	14 (18)	82 (45)	63 (82)	<0.0001***
If I had more information about blood donation	172 (94)	58 (75)	11 (6)	19 (25)	<0.0001***
If donation centres were closer to my work	137 (75)	51 (66)	46 (25)	26 (34)	0.17
If donation centres were closer to my home	153 (84)	59 (77)	30 (16)	18 (23)	0.22
If donation centres were closer to my place of worship	79 (43)	11 (14)	104 (57)	66 (86)	<0.0001***
If I saw it being promoted on social media	130 (71)	45 (58)	53 (29)	32 (42)	0.06
If I saw or heard it being promoted on TV/radio	124 (68)	47 (61)	59 (32)	30 (39)	0.32
<b>AWARENESS OF SICKLE CELL DISEASE &amp; THALASSEMIA – n (%)</b>	<b>African Yes</b>	<b>Caucasian Yes</b>	<b>African No</b>	<b>Caucasian No</b>	<b>p value</b>
Are you aware of conditions such as sickle cell disease and thalassemia?	167 (91)	51 (66)	16 (9)	26 (34)	<0.0001***
(Respondents who indicated "Yes" to the above only) Did you know that patients with these conditions may require frequent blood transfusions?	144 (86)	36 (71)	23 (14)	15 (29)	0.02*
Would you donate if you knew more about conditions like sickle cell disease or thalassemia?	161 (88)	58 (75)	22 (12)	19 (25)	0.01
Would you donate if there was a shortage of blood for the treatment of these conditions?	175 (96)	73 (95)	8 (4)	4 (5)	0.75

Demographic and survey results are compared between African (n=183) and Caucasian (n=77) respondents. For between-group comparisons, Likert scales were simplified by summation of "Agree" and "Strongly Agree" and "Disagree" and "Strongly Disagree" into one value each for "Agree" and "Disagree". Comparisons were performed using Fisher's exact test with p<0.05 considered significant. (\*p<0.05; \*\*p<0.01, \*\*\*p<0.001; \*\*\*\*p<0.0001)

own community than Caucasians (OR 9.3 CI 4.6-18.3,  $p < 0.0001$ ) (Table II). African respondents were 5 times more likely to donate if there was more information available (OR 5.1 CI 2.3-11.0  $p < 0.0001$ ). Religious motivators were more apparent in the African cohort, with African respondents being 5 times more likely to be motivated by a religious group (OR 5.5 CI 2.9-10.4  $p < 0.0001$ ) and 4 times more likely to be motivated by proximity of donation centres to places of worship (OR 4.6 CI 2.2-9.2  $p < 0.0001$ ) (Table II). Although motivation through promotion of blood donation on TV/Radio did not differ across ethnic groups, promotion on social media was a more common motivator among African respondents (71% Agree, 29% Disagree) than Caucasians (58% Agree, 42% Disagree), however this did not reach statistical significance ( $p = 0.06$ ).

Unsurprisingly, African respondents were 5 times more likely to be aware of Sickle Cell Disease and Thalassemia than Caucasians (92% versus 66%, OR 5.3 CI 2.7-10.5,  $p < 0.0001$ ) and were also twice as likely to donate if they knew more about these conditions (OR 2.4, CI 1.2-4.7,  $p = 0.01$ ). African respondents were also twice as likely to be aware of these patients' need for frequent blood transfusions (OR 2.6 CI 1.2-5.3  $p = 0.02$ ) (Table II).

### Gender-related factors

Females accounted for the majority of respondents (209/311, 67%). Since the proportion of female respondents did not differ between ethnic groups, motivators and barriers were compared between genders, irrespective of ethnicity. Females were twice as likely to report fear of needles/pain (OR 2.3 CI 1.1-4.3,  $p = 0.02$ ) and lack of information as barriers than males (OR 1.9 CI 1.2-3.1,  $p = 0.01$ ) (Table III). Among "other" self-reported barriers, references to anaemia and/or iron deficiency were exclusively described by females. Females were more likely to be motivated by proximity of the donation centre to home (OR 3.3 CI 1.8-6.1,  $p = 0.0003$ ) or to work (OR 2.1 CI 1.2-3.6,  $p = 0.009$ ) and by promotion of blood donation on TV/Radio (OR 2.7 CI 1.6-4.6,  $p = 0.0001$ ) or social media (OR 2.0 CI 1.2-3.2,  $p = 0.01$ ) than males (Table III).

### Age-related factors

Because there was a significant difference in age between Caucasian and African respondents, age groups were analysed separately by ethnic group. Respondents were divided into those who were older or younger than the median age of each group. Motivators did not differ by

age among Caucasians and barriers were also similar, except for fear of pain/needles which was almost 4 times higher in younger than in older respondents (OR 3.9 CI 1.3-11.2  $p = 0.03$ ). Older respondents were more likely to have considered blood donation (89% Yes, 8% No, 3% Maybe) than younger respondents (77% Yes, 3% No, 20% Maybe) ( $p = 0.04$ ) (data not shown).

A greater variation across age groups was observed among African respondents, possibly due to the broader age range in this group (median age 23 [IQR 19-41.5] years for Africans and 28 [IQR 24-36] years for Caucasians). Again, fear of pain/needles was more common in the younger group (OR 2.4 CI 1.1-5.3,  $p = 0.03$ ) as well as lack of information (OR 4.6 CI 2.4-9.2  $p < 0.0001$ ) (Table IV). Younger respondents were more likely to report that the donation centre was "too far away" (OR 4.5 CI 2.0-9.8  $p = 0.0002$ ) and to be motivated by the donation centre being "closer to home" (OR 2.9 CI 1.2-7.1  $p = 0.01$ ) (Table IV). Younger respondents were more likely to donate if they knew someone who needed a blood transfusion (OR 13.8 CI 2.3-149.8,  $p = 0.002$ ) or if suggested by a religious leader (OR 2.4 CI 1.3-4.2  $p = 0.005$ ) (Table IV). Interestingly, older respondents were 5 times more likely to report they were "ineligible" to donate (OR 5.2 CI 2.5-10.8  $p < 0.0001$ ) and were 3 times more likely to report malaria-related barriers (OR 3.2 CI 1.5-6.4  $p = 0.002$ ) (Table IV).

## DISCUSSION

The mismatch between the lack of minority ethnic groups among the blood donor population and the rising demand for antigen-negative RBC transfusions for SCD patients in many Western countries has created an urgent need to enhance recruitment of minority ethnic donors, particularly those of African descent. Understanding barriers and motivators to blood donation in this cohort is essential to guide recruitment strategies and improve patient care.

We observed significant differences in barriers to blood donation between Caucasian and African respondents, with lack of information on blood donation and malaria-related barriers being more common in the latter group. Indeed, lack of information was the most common barrier identified across all ethnic groups. This finding suggests that education and awareness campaigns are essential to make the blood donation service more visible to all individuals, especially to minority ethnic groups,

Table III - Comparison between Male and Female respondents

CHARACTERISTICS	Female (n=209)		Male (n=96)		p value
Age (years) – Median (IQR)	24 (19.5-35.5)		25 (21-38)		0.09
Considered blood donation – Yes/No/Maybe (%)	67/16/17		66/21/13		0.34
African – n (%)	131 (63)		52 (54)		0.24
BARRIERS – n (%)	Female Agree	Male Agree	Female Disagree	Male Disagree	p value
<i>"I have not donated blood before..."</i>					
For religious reasons	5 (2)	1 (1)	204 (98)	95 (99)	0.67
For personal reasons	44 (21)	20 (21)	165 (79)	76 (79)	0.99
As I have a fear of pain or needles	51 (24)	12 (12.5)	158 (76)	84 (87.5)	0.02*
As I believe there is enough blood in the Irish healthcare system	11 (5)	7 (7)	198 (95)	89 (93)	0.60
As I do not trust the healthcare system	13 (6)	3 (3)	196 (94)	93 (97)	0.41
As I would have to take time off work	33 (16)	13 (14)	176 (84)	83 (86)	0.73
As the nearest donation centre is too far away	48 (23)	16 (17)	161 (77)	80 (83)	0.23
As I lack information on the donation service in Ireland	135 (65)	47 (49)	74 (35)	49 (51)	0.01*
As donating blood is too time consuming	21 (10)	12 (12.5)	188 (90)	84 (87.5)	0.55
As I was informed at the donation centre that I could not give blood	63 (30)	29 (30)	146 (70)	67 (70)	0.99
For reasons other than those listed	67 (32)	38 (40)	142 (68)	58 (60)	0.24
Due to my diagnosis of a sexually transmitted infection such as HIV/AIDS, Hepatitis B or Hepatitis C	5 (2)	2 (2)	204 (98)	94 (98)	0.99
Due to my partner's diagnosis of a sexually transmitted infection such as HIV/AIDS, Hepatitis B or Hepatitis C	0 (0)	0 (0)	209 (100)	96 (100)	0.99
Because I have previously used injectable non-prescription drugs	0 (0)	0 (0)	209 (100)	96 (100)	0.99
(Men only) Because I have had sex with another man within the last 12 months	NA	13 (14)	NA	83 (86)	NA
Because I have travelled to, or lived, in a region where malaria is very common e.g. Sub-Saharan Africa	34 (16)	17 (18)	175 (84)	79 (82)	0.74
MOTIVATORS – n (%)	Female Agree	Male Agree	Female Disagree	Male Disagree	p value
<i>"I would consider donating blood..."</i>					
If my blood was more likely to be used to help someone in my own community	180 (86)	75 (78)	29 (14)	21 (22)	0.10
If I knew I had a rare blood type	188 (90)	80 (83)	21 (10)	16 (17)	0.13
If I was asked by a family member or friend	202 (97)	88 (92)	7 (3)	8 (8)	0.08
If I knew someone who required blood transfusion	196 (94)	88 (92)	13 (6)	8 (8)	0.48
If it was suggested by a Healthcare worker	181 (87)	79 (82)	28 (13)	17 (18)	0.38
If it was suggested by members of my religious group/religious leader	91 (44)	41 (43)	118 (56)	55 (57)	0.90
If I had more information about blood donation	190 (91)	84 (87.5)	19 (9)	12 (12.5)	0.42
If donation centres were closer to my work	169 (81)	64 (67)	40 (19)	32 (33)	0.009**
If donation centres were closer to my home	188 (90)	70 (73)	21 (10)	26 (27)	0.0003***
If donation centres were closer to my place of worship	76 (36)	36 (37.5)	133 (64)	60 (62.5)	0.90
If I saw it being promoted on social media	153 (73)	56 (58)	56 (27)	40 (42)	0.01*
If I saw or heard it being promoted on TV/radio	158 (76)	45 (53)	51 (24)	51 (47)	0.0001***
AWARENESS OF SICKLE CELL DISEASE & THALASSEMIA – n (%)	Female Agree	Male Agree	Female Disagree	Male Disagree	p value
Are you aware of conditions such as sickle cell disease and thalassemia?	180 (86)	76 (79)	29 (14)	20 (21)	0.13
(Respondents who indicated "Yes" to the above only) Did you know that patients with these conditions may require frequent blood transfusions?	155 (86)	62 (82)	25 (14)	14 (18)	0.35
Would you donate if you knew more about conditions like sickle cell disease or thalassemia?	178 (85)	78 (81)	31 (15)	18 (19)	0.40
Would you donate if there was a shortage of blood for the treatment of these conditions?	203 (97)	89 (93)	6 (3)	7 (7)	0.12

Demographic data and survey results are compared between Female (n=209) and Male respondents (n=96). Respondents who selected "Gender non-binary" (n=3) or "Prefer not to say" (n=3) for gender were excluded from this section of the analysis but included for all other comparisons. Likert scales were simplified by summation of "Agree" and "Strongly Agree" and "Disagree" and "Strongly Disagree" into one value each for "Agree" and "Disagree". Comparisons were performed using Fisher's exact test with p<0.05 considered significant. (\*p<0.05; \*\*p<0.01, \*\*\*p<0.001; \*\*\*\*p<0.0001, NA= not applicable)

Table IV - Comparison between Older and Younger African respondents

CHARACTERISTICS	African Respondents Older (n=87)		African Respondents Younger (n=96)		p value
Female - n (%)	57 (66)		74 (77)		0.10
Considered blood donation - Yes/No/Maybe (%)	53/27/20		64/19/17		0.33
<b>BARRIERS - n (%)</b> <i>"I have not donated blood before..."</i>	<b>Older Agree</b>	<b>Younger Agree</b>	<b>Older Disagree</b>	<b>Younger Disagree</b>	<b>p value</b>
For religious reasons	5 (6)	1 (1)	82 (94)	95 (99)	0.10
For personal reasons	18 (21)	21 (22)	69 (79)	75 (78)	0.86
As I have a fear of pain or needles	10 (11)	23 (24)	77 (89)	73 (76)	0.03*
As I believe there is enough blood in the Irish healthcare system	6 (7)	2 (2)	81 (93)	94 (98)	0.15
As I do not trust the healthcare system	7 (8)	6 (6)	80 (92)	90 (94)	0.78
As I would have to take time off work	8 (9)	17 (18)	79 (91)	79 (82)	0.13
As the nearest donation centre is too far away	8 (9)	30 (31)	79 (91)	66 (69)	0.0002***
As I lack information on the donation service in Ireland	42 (48)	78 (81)	45 (52)	18 (19)	<0.0001****
As donating blood is too time consuming	5 (6)	10 (10)	82 (94)	86 (90)	0.30
As I was informed at the donation centre that I could not give blood	37 (43)	12 (12.5)	50 (57)	84 (87.5)	<0.0001****
For reasons other than those listed	30 (34)	31 (32)	57 (66)	65 (68)	0.76
Due to my diagnosis of a sexually transmitted infection such as HIV/AIDS, Hepatitis B or Hepatitis C	3 (3)	0 (0)	84 (97)	96 (100)	0.11
Due to my partner's diagnosis of a sexually transmitted infection such as HIV/AIDS, Hepatitis B or Hepatitis C	0 (0)	0 (0)	87 (100)	96 (100)	0.99
Because I have previously used injectable non-prescription drugs	0 (0)	0 (0)	87 (100)	96 (100)	0.99
(Men only) Because I have had sex with another man within the last 12 months	2 (2)	1 (1)	85 (98)	95 (99)	0.61
Because I have travelled to, or lived, in a region where malaria is very common e.g. Sub-Saharan Africa	29 (33)	13 (14)	58 (67)	83 (86)	0.002**
<b>MOTIVATORS - n (%)</b> <i>"I would consider donating blood..."</i>	<b>Older Agree</b>	<b>Younger Agree</b>	<b>Older Disagree</b>	<b>Younger Disagree</b>	<b>p value</b>
If my blood was more likely to be used to help someone in my own community	78 (90)	92 (96)	9 (10)	4 (4)	0.15
If I knew I had a rare blood type	71 (82)	87 (91)	16 (18)	9 (9)	0.09
If I was asked by a family member or friend	81 (93)	94 (98)	6 (7)	2 (2)	0.15
If I knew someone who required blood transfusion	76 (87)	95 (99)	11 (13)	1 (1)	0.002**
If it was suggested by a Healthcare worker	69 (79)	84 (87.5)	18 (21)	12 (12.5)	0.16
If it was suggested by members of my religious group/religious leader	37 (43)	61 (64)	50 (57)	35 (36)	0.005**
If I had more information about blood donation	78 (90)	93 (97)	9 (10)	3 (3)	0.07
If donation centres were closer to my work	64 (74)	74 (77)	23 (26)	22 (23)	0.61
If donation centres were closer to my home	67 (77)	87 (91)	20 (23)	9 (9)	0.01*
If donation centres were closer to my place of worship	31 (36)	47 (49)	56 (64)	49 (51)	0.07
If I saw it being promoted on social media	61 (70)	68 (71)	26 (30)	28 (29)	0.92
If I saw or heard it being promoted on TV/radio	57 (66)	67 (70)	30 (34)	29 (30)	0.64
<b>AWARENESS OF SICKLE CELL DISEASE &amp; THALASSEMIA - n (%)</b>	<b>Older Yes</b>	<b>Younger Yes</b>	<b>Older No</b>	<b>Younger No</b>	<b>p value</b>
Are you aware of conditions such as sickle cell disease and thalassemia?	77 (89)	89 (93)	10 (11)	7 (7)	0.44
(Respondents who indicated "Yes" to the above only) Did you know that patients with these conditions may require frequent blood transfusions?	66 (86)	76 (85)	11 (14)	13 (15)	0.99
Would you donate if you knew more about conditions like sickle cell disease or thalassemia?	75 (86)	85 (89)	12 (14)	11 (11)	0.66
Would you donate if there was a shortage of blood for the treatment of these conditions?	81 (93)	93 (97)	6 (7)	3 (3)	0.31

Demographic data and survey results are compared between African respondents who were older or younger than the median age of the cohort (23 years). "Older respondents" (n=87) were aged older than the median age and "Younger respondents" (n=96) were aged less than or equal to the median age of the cohort. Likert scales were simplified by summation of "Agree" and "Strongly Agree" and "Disagree" and "Strongly Disagree" into one value each for "Agree" and "Disagree". Comparisons were performed using Fisher's exact test with p<0.05 considered significant. (\*p<0.05; \*\*p<0.01; \*\*\*p<0.001; \*\*\*\*p<0.0001)



who may not be aware of how or where to donate. Age- and gender-related differences in barriers and facilitators to blood donation must also be considered in recruitment campaigns. We found that females were more likely to be motivated by promotion of blood donation on both social and traditional media and by proximity of donation centres to work or home than males. Interestingly, younger African respondents were more likely to report donation centres being "too far away" as a barrier and having a centre "closer to home" as a motivator than older respondents. Coupled with the fact that older respondents were more likely to be ineligible to donate, recruitment of younger African donors may require establishment of more donation centres or mobile units within the community, near places of work, worship or university campuses and enhanced use of media campaigns.

The identification of malaria-related barriers among African respondents is highly pertinent and has been similarly observed in other European countries. Indeed, a recent Italian study identified that 72% of apparently healthy Sub-Saharan African individuals were deferred from blood donation due to detection of malaria antibodies on pre-donation serological testing<sup>19</sup>. In Ireland, individuals who have lived for at least 3 months within the first 5 years of life in a country where there is a malaria risk are currently permanently deferred from donation. Conversely, for a visitor to a malaria endemic region (non-resident), a 12 month deferral from date of return is applied and the donor is then accepted without the need for a malaria antibody test. Consequently, this barrier excludes the majority of individuals born in Sub-Saharan Africa. Furthermore, this may partially explain why older African respondents were more likely to report they were ineligible to donate and to report malaria-related barriers compared with younger respondents, as the former may have been born in Africa, whereas the latter may have been born in Ireland. Adjustments to current malaria risk-mitigation strategies are necessary if this barrier is to be overcome and to enable more individuals of African ethnicity to donate blood, similar to policies in other European countries and the UK<sup>20</sup>. In light of the rising pressure to supply appropriately matched blood for SCD patients, a programme to actively recruit donors of African ancestry, together with the introduction of a malaria antibody testing policy, is now

a major priority in Ireland. Even if the deferral rate is high, similar to findings elsewhere<sup>19</sup>, introduction of malaria antibody testing would nevertheless represent a significant positive step, as it will enable some potential donors born in Sub-Saharan African to participate, especially since this is the ethnic group most likely to provide phenotypically matched blood for SCD.

Interestingly, not all perceived barriers were higher among ethnic minority groups, with fear of pain/needles being more common barriers among Caucasians than Africans. This is in contrast to findings by Schreiber *et al.* that African-American first-time donors were significantly more likely to be afraid of needles and to believe donation is painful than Caucasians<sup>14</sup>. Conversely, findings by James *et al.* demonstrated White respondents had a higher prevalence of fear of fainting than African-Americans<sup>12</sup>, suggesting these findings are culture and context dependent.

Potential facilitators of blood donation also demonstrated variation across ethnic groups. Religious motivators were significantly higher in African than Caucasian respondents, highlighting that inclusion of religious leaders in promotion of blood donation and proximity of donation centres to places of worship are important facilitators to consider.

Interestingly, donation to help someone within one's own community was significantly more likely to be a motivator among African respondents than Caucasians. This is consistent with other studies that found individuals of African ethnicity preferred to donate within their own communities, including to help individuals with SCD<sup>4,6,21</sup>. Our study also observed higher levels of awareness of SCD in African respondents. Potential reasons for strong community motivation in this cohort may include cultural and historic differences, for example replacement or family blood donations may be more common in certain African countries than voluntary non-remunerated donations. Concerningly, negative factors such as discrimination, mistrust and social exclusion could also foster a preference to donate specifically for one's own community<sup>21</sup>. Reports of mistrust among minority ethnic groups are conflicting, with some groups reporting minority groups were more distrustful of blood donation services<sup>22,23</sup>, whereas others did not<sup>12,24</sup>. Our study similarly revealed low levels of mistrust, reported by only 5.5% of respondents, which did

not differ across ethnic groups. Importantly, a link between social marginalization and blood donation intentions has been shown, with individuals who experience social or institutional discrimination being less likely to donate<sup>8</sup>. While the reasons behind this community-oriented motivation are likely multifaceted, it is nevertheless an important finding, because promotion of blood donation through this angle could be well-received. Furthermore, removing barriers which are perceived as prejudicial or discriminatory, may increase donation rates among minority groups, while also promoting social inclusion.

Our study has a number of limitations that warrant discussion. Firstly, the majority of respondents were female, hence male-specific barriers and facilitators to donation are under-represented. Secondly, as this survey was disseminated largely by patients attending a dedicated Sickle Cell Disease service, respondents likely represent a highly motivated cohort with a greater awareness and knowledge of SCD and Thalassemia than would be found in the general population. Nevertheless, a strength of this survey is that it was not limited to one specific setting, being widely shared using snowball sampling, a method which is considered effective when researching minority groups<sup>25</sup>. Thirdly, differences between non-African respondents (e.g. Asian or Hispanic/Latino) and Caucasians or Africans were not explored in this study as the numbers of respondents was too low. Finally, comparison of deferral data obtained directly from donation centres would help to validate and confirm the subjective barriers reported in this study, however this was not possible due to the anonymous study design. Furthermore, data pertaining to deferral rates due to malaria- or anaemia-related barriers across gender and ethnic groups would provide additional insight. Future studies examining these areas in greater detail should be considered.

## **CONCLUSIONS**

This study enhances our understanding of ethnic differences in barriers and motivators to blood donation and is the first to explore this in an Irish context. Given that many European countries experience difficulties in the provision of phenotypically matched blood for SCD patients, these data provide valuable and actionable insights to inform future campaigns aimed at recruitment

of African donors. At a time when the importance of diversity and inclusivity are being increasingly recognized in all aspects of society, enhancing ethnic diversity among blood donors may reflect a positive force for healthcare and social equality.

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## **AUTHORSHIP**

Contribution: HF, MS, LS, PC, SK, NN, CS, KM and ET for conception, data collection, interpretation, literature review, final draft writing and critical revision. All Authors have participated sufficiently in this work, take public responsibility for the content and have made substantial contributions to this research.

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