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Exploring trends, challenges and issues of blood donation in Yaounde-Cameroon

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Abstract

Background: Access to a safe and adequate blood supply has proven to be challenging in sub-Saharan Africa, where systemic deficiencies have greatly been recorded. Blood availability is a public health issue of concern in Sub-Saharan Africa where both the demand and discard rates of blood are high and this includes Cameroon.

Objective: This research study was carried out in order to capture the trends of blood donation, and to address the epidemiological aspects of blood donation in Yaounde.

Study design and methods: The research was quantitative and relied on a cross-sectional study. With record base supplied by the National Blood Transfusion Center, as well as data from a random-sample survey of 300 blood donors at the Yaounde Central Hospitals' blood bank. Statistical methods were applied to estimate national blood activities from January 2018 to September 2019, and the data subsequently analyzed using the Statistical Package for the Social Sciences (SPSS).

Results: The results revealed a low frequency of blood donation, and portrayed that 81.3% of donors were first time donors. The majority of donors in our study were family/replacement (98.5%) while the minority voluntary (1.6%). More so, among the different aspects studied, five factors were found to be effectively associated to blood donation frequency namely: presence of tattoos/scarifications/piercings, the motivation underlying the blood donation, the blood group, the rhesus group and the occurrence of an accident during previous blood donations.

Conclusion: Results could be useful to provide updates for the government and international organizations' programs involved in the improvement of blood donor recruitment strategies in Cameroon. The outcome is to permit the elaboration of more effective strategies for recruiting and retaining voluntary regular blood donors and help move away from the use of replacement donors as the main source of blood, hence providing the population with safe blood and consequently reduce mortality rates linked to the availability and quality of blood.

Keywords: Blood donation; Donors; Epidemiology; Public health; Yaounde-Cameroon

1. Introduction

First coined in the first half of the twentieth century by the African American surgeon and medical researcher Charles Richard Drew (1904–1950), the term blood donor refers to the process of collecting, testing, preparing, and storing blood and blood components [1]. A blood donation occurs when a person voluntarily has blood drawn and used for transfusions. Be interested in blood donation derives from the evidence that blood is the most essential component of

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the human body and that, there is no substitute for blood. It's activity is strongly associated to blood transfusion that saves individuals from adverse situations such as premature mortality. Thus, blood donation is an essential component in the management of many diseases. It is the main lifesaving for an individual with loss of large volumes of blood from accidents, hemorrhages or surgery. That is probably why blood donation has become and is remained the major source of blood components worldwide. According to the WHO, the annual global blood collection is 118.5 million units of blood. Of these, 40% are collected in high-income countries, home to 16% of the world's population. Based on samples of 1000 people, the blood donation rate is 31.5 donations in high-income countries, 16.4 donations in upper-middle-income countries, 6.6 donations in lower-middle-income countries and 5.0 donations in low-income countries [2]. Though having blood at the right time is challenging these days, it is recommended that blood donation should be monitored. In that perspective, the WHO states that the safest blood donors are voluntary donors and the non-remunerated ones from low-risk populations. As per the Melbourne declaration, voluntary non-remunerated blood donation (VNRBD) has been globally declared to be the cornerstone of safe and secure blood [3]. Since then, maintaining a sufficient blood supply is a constant challenge for transfusion medicine. This is especially true for developed societies on the one hand (with the increase in the elderly population exposed to chronic diseases related to blood and to a variety of surgical procedures, which increase the demand for blood transfusion, and which also leads to a decline of eligible donors), and on the other hand for developing societies (such as Africa with high maternal mortality, high motor accident, and with a large non-immune population because of exposition to many infectious diseases) [4, 5, 6, 7, 8]. That is probably why, blood donation and transfusion is included on the WHO list of essential medications as a lifesaving therapy. Therefore, it is vital that the quality and safety of blood and the products derived from it, are assured that they are readily available in sufficient quantities. However, access to a safe and adequate blood supply remains an enduring public health challenge in many developing countries. For example and according to WHO (2022, op. cit.), about 13 300 blood centers in 169 countries reported having collected a total of 106 million donations in 2021, with variation according to income group as the median annual donations per blood center was 1 300 in the low-income countries, 4 400 in lower-middle-income countries and 9 300 in upper-middle-income countries, as compared to 25 700 in high-income countries. In Cameroon, blood scarcity is frequently encountered in healthcare settings and is attributable to an imbalance between the increasing demand for safe blood and blood products on the one hand and failure to organize regular blood supply due to several factors, including lack of motivation among potential donors. In Yaoundé as well as in other Cameroonian cities, the source for blood to be transfused relies mainly on voluntary non-remunerated blood donors. Even though over a thousand of blood units are collected every year, many more are still needed to meet the local demand, to ensure the sufficient and timely provision of blood. Since the epidemiological characteristics of the blood donor populations are dynamic, epidemiological information about blood donors is therefore important for formulating and monitoring donor recruitment strategies to meet blood requirements. That is why this study was undertaken, in the belief that analyzing epidemiological factors that affect blood donors may further bring light on issues of supply and safety, and help in planning for its rational use.

2. Material and methods

2.1. Study setting and target population

The study was carried out at the National Blood Transfusion Center located and at the blood bank of the Yaounde Central hospital. Located in the Central Region of Cameroon, the Yaounde central hospital was created in 1930 to provide healthcare at affordable costs to the entire population of Cameroon. The blood bank is located in the compartment of the emergency service, and contains several rooms such as a reception room, the medical selection room, the test validation hall, isolation hall, distribution of reagents, donor rest hall, staff room, storage room, cash register and the computer room. Choice of the Yaounde Central Hospital is explained by the fact that it hosts the largest blood banks of the country with a well-trained and qualified staff. The blood transfusion center serves for the surrounding hospitals in the city and even beyong. The target population was made up of blood donors, donating at the Yaounde central hospital's blood bank. Inclusion criteria were individuals whose Yaounde is the permanent residence, who have not donated in the past 12 and 16 weeks, who are 18 to 65 years old, who weigh at least 50 kg, who are neither pregnant nor menstrating (for females), and eligible for whole blood donation according to the national hemotherapy guidelines.

2.2. Study design, sample size determination and sampling technique

This was a cross-sectional consisting of two parts: a retrospective study (consultation of the National Blood Transfusion Center registry for the period from 2015 to 2020) and a prospective study performed in 2021, namely during blood donation campaigns or during spontaneous blood donations at the Blood bank of the Yaounde central hospital. For the latter, we had to resort to sampling. Thus, to determine the required sample size for the study, we resorted to the Lorentz's formula : $n = Z^2 \times p \times (1-p)/c^2$, with: Z=Z value (e.g. 1.96 for 95% confidence level); p = percentage picking a choice, expressed as decimal (.5 used for sample size needed); c = confidence interval, expressed as decimal (e.g., .04 =

±4); P= percentage of yearly blood donations in Cameroon, which was 20% in 2018 according to the ministry of public health). When applying the formula ($n= (1.96)^2 \times (0.2) \times (1-0.2)/(0.05)^2$), the size calculated was 246 participants. However, by anticipating cases of rejection or incorrectly completed questionnaires, and in order to increase the statistical power of this study, the sample size was rounded to 300 participants. The study participants were selected randomly from the blood donors who met our inclusion criteria.

2.3. Data collection

The study participants were interviewed during blood donation. After an extensive literature review and given the similarity of socio-cultural features between Cameroon and Brazil, we used The Brazilian Blood Donation Knowledge Questionnaire which is composed of 24 items based on blood donation requirements of the Brazilian Ministry of Health [9] and on some popular beliefs and concepts of the population regarding the blood donation process. The participants were questioned about previous donations history, reasons for donating blood, their knowledge and perception regarding blood donation, and their sociodemographic characteristics including sex, age, marital status, socioeconomic class, educational level. Before using the questionnaire the study instrument was subjected to face and content validity testing by two senior selected faculty members to assess its clarity, significance, and acceptability. Modifications and refinements were made as per the comments received to enable a better understanding and to organize the sequence of questions. Survey reliability was tested by a pilot study with ten randomly selected participants. The internal consistency of the questionnaire was verified by Cronbach's α coefficient (function of the number of test items and the average inter-correlation among the items). Cronbach's alpha coefficient was 0.73, which indicated that the survey could be used in this study. Two trained interviewers were involved in data collection, and questions were applied in a confidential face-to-face interview using paper forms. All potential participants were approached and invited to participate while they were waiting for blood donation in the waiting room of the blood bank facility.

2.4. Data analysis and interpretation

Data were entered with Epi info 3.5.1 and exported to SPSS 20 for analysis. Descriptive results were summarized and presented with tables in terms of frequencies and percentages. Chi-square or Fisher exact test was conducted to determine the relationships between the variables. The association of the independent variable with the categorical outcome variable was measured by calculating odds ratio with 95% confidence interval using bivariate analysis. P value < 0.05 was considered as statistically significant.

2.5. Ethical considerations

The study was approved by the ethics committee of the School of Health Sciences of the Catholic University of Central Africa. The participants were informed about the objectives of the study (written informed consent was obtained from all participants), expected duration of the interview and the ethical aspects involved. The questionnaires were stored separately from the informed consent terms to ensure participants' anonymity during data processing.

3. Results

3.1. General trends

Since 2015, the National Blood Transfusion Center has documented a low collection rate of red blood cell (RBC). Regardless of the year considered, the total amount of expected 400,000 to 500,000 blood pockets by the National Blood center was not reached. In parallel, collections and transfusions of RBC have shown a declining trend, including a decline of 69.9 % in collections and a 56.0% decline in transfusions between 2015 and 2021 (Figure 1). The peak of those declines is in 2020, corresponding to the global health crisis attributed to Covid-19 which hit the country hard.

3.2. Types of blood donors

Review of the National Blood Transfusion Center registry shows a massive participation of voluntary unpaid blood donors on family/replacement and paid donors. Besides, directed donation appears to be the most predominant type of donation (81.70%).

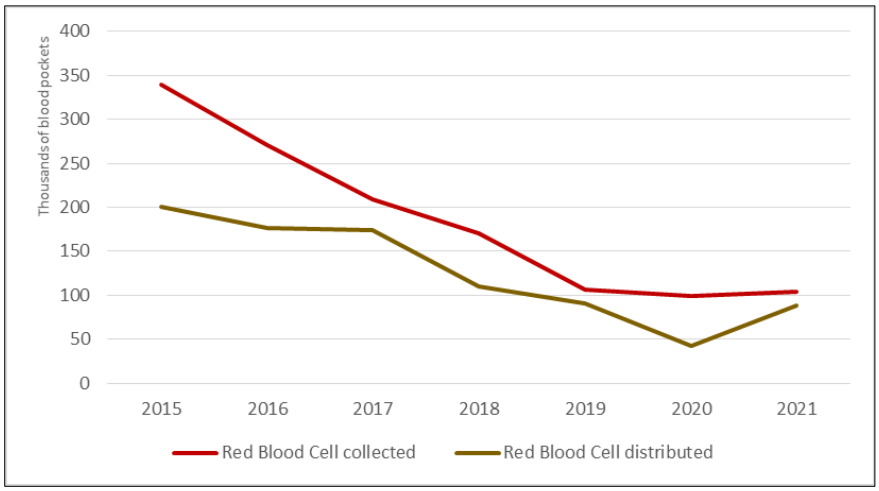

Figure 1 Trends in Red Blood Cell collection and transfusion in Cameroon

Table 1 Types of blood donors and of donation (n=1 297 473)

1.	Types of donors	Frequency	Percentage
	Voluntary unpaid	940 629	72.50
	Family/Replacement	253 617	19.60
	Paid donors	103 227	07.90
2.	Types of donation		
	Homologous donation	237 416	18.30
	Directed donation	1 060 057	81.70

3.3. Blood screening and processing

Table 2 Types of blood screening performed in Cameroon (n=791 458)

	Types of screening	Frequency	Percentage
1.	Safety		
	Donors safety	41 585	05.26
	Recipients' safety	749 873	94.74
2.	Blood testing		
	Focused on Hepatitis B and C	51 088	06.45
	Focused on Serologic test for HIV	76 631	09.70
	Focused on Serologic test for syphilis	25 543	03.22
	Focused on all above	638 196	80.63
3.	Blood processing	274 369	34.70

Out of the 1 297 473 Red Blood Cell pockets collected between 2015 and 2020, 791 458 pockets were effectively and properly screened following basic quality procedures, that is a screening rate of 61%. Table 1 shows that recipient's safety and serologic test for HIV were the main determinants of blood screening. With regard to blood processing, whole blood donations are in general spun in centrifuges to separate it into transfusable components such as red cell

concentrates, platelet concentrates, plasma and cryoprecipitate. However, this requirement is far from being implemented at the National Blood Transfusion Center, as the processing rate recorded is extremely low (34.7%).

3.4. Main features of blood donation participants

Of the estimated and expected 300 individuals, 289 gave their consent to voluntary participate to the survey and completed the questionnaire, ie with a response/participation rate of 96%. Table 1 shows that most participants were male 369 (94.4%), aged between 18–29 years 188 (48.1%), while 117 (29.9%) were between 30–39 years old. Slightly more than half 206 (52.7) % were married while 179 (45.8%) were single. Although the majority 335 (85.7%) had received higher education, only 56 (14.3%) were from below secondary school.

Table 3 Donors' demographic features (n=289)

Characteristics	Frequency	Percentage
Gender		
Male	230	79.5
Female	59	21.5
Age (in years)		
[18-29]	139	48.1
[30-39]	96	33.2
[40-49]	54	18.7
Education		
None	04	01.4
Primary&secondary	125	43.2
Higher/University	160	55.4
Marital status		
Single	91	31.5
Married	167	57.8
Widowed	31	10.7
Professional status		
Unemployed (students, retired)	78	27.0
Employed (formal&informal)	211	73.0
Area or residence		
Inner city (central &peri-central neighbourhoods)	225	77.8
Employed (Peripheral & urban fronts)	64	22.2

3.5. Epidemiological aspects of blood donors

About 197 (68.2%) of study participants had no previous history of donation as they were first time donors, and more than one quarter (28%) of them were replacement type of donors. Table 2 shows that they were doing it as part of directed donation (82.4%). Several factors have been mentioned as a reason for donating blood: 69.5% of the blood donors were doing so in order to save lives, followed by those who were donating for disease screening's purposes (19.4%). From the total study participants, 197 (68.2%) had adequate knowledge towards blood donation, as they mentioned that the importance of blood donation is to save lives, and knew HIV, hepatitis virus and syphilis as transfusion transmittable infections. Besides, a small majority (56.1%) had favorable attitude towards blood donation, as they had a plan to donate blood voluntarily again in the future, and also as they perceived blood donation as a non-harmul act for the donors. With regard to the experienced psychological and physiological dimensions (mood, resilience,

physical well-being, energy level) of blood donation, 141 (48.8%) donors showed negative effects on well-being after blood donation, and 93 (32.2%) showed negative effects.

Table 4 Epidemiological features associated with blood donation in Yaoundé (n=289)

Items	Frequency (%)	COR (95% CI)	Chi2	P value	Df
Practice about blood donation					
First time	197 (68.2%)	1	4.683	0.224	1
Regular donor	11 (03.8%)	4.7 (1.67, 13.03)			
Casual/Replacement donor	81 (28.0%)	3.39(2.06-5.68)			
Types of donation					
Directed donation	238 (82.36%)	---	---	---	---
Allogeneic/homologous donation	51 (17.64%)	---	---		
Reasons for donation					
Save lives	201 (69.55%)	1			
Socioprofessional responsibility	15 (05.20%)	2.5 (0.83, 7.5)	39.016	<0.001*	1
Influence of friends	09 (03.11%)	---			
For incentives/money	08 (02.80%)	0.47(0.25-0.88)			
Screening for disease	56 (19.4 %)	8.1 (3.29, 20.2)			
Knowledge regarding blood donation					
Adequate	197 (68.2%)	1	5.683	<0.003*	4
Inadequate	92 (31.8%)	0.79(0.30-2.13)			
Attitude regarding blood donation					
Good	162 (56.1%)	1	11.631	<0.001*	2
Poor	127 (43.9%)	7.8 (4.36, 19.58)			
Psychological effects					
Positive effects	93 (32.2%)	1	0.200	0.682	2
No effects	55 (19.0%)	1.3 (0.98, 7.01)			
Negative effects	141 (48.8%)	4.6 (2.75, 11.1)			

Cor : Crude odds ratio ; * Significant p-value (0.05) ; X2: Chi-square ; df: degree of freedom.

3.6. Profile of blood donors

Based on a hierarchical classification, the profile of blood donors was established according to their similarity. The analysis in the graph below shows that these donors can be categorized into two groups. Group 1 (in blue) consisted of first time and regular blood donors. These are individuals who donate their blood to save or help a person unrelated to them. They are generally between 18-29 years of age, with a higher level of education for the most part. In addition, they are the only ones who bear the blood group B of rhesus negative. Group 2 (in purple) is that of repeat blood donors. Living outside of Yaoundé mainly in the urban fronts, they give their blood in general to help a family member or as a replacement. These are individuals of blood group O, and AB and Rhesus positive.

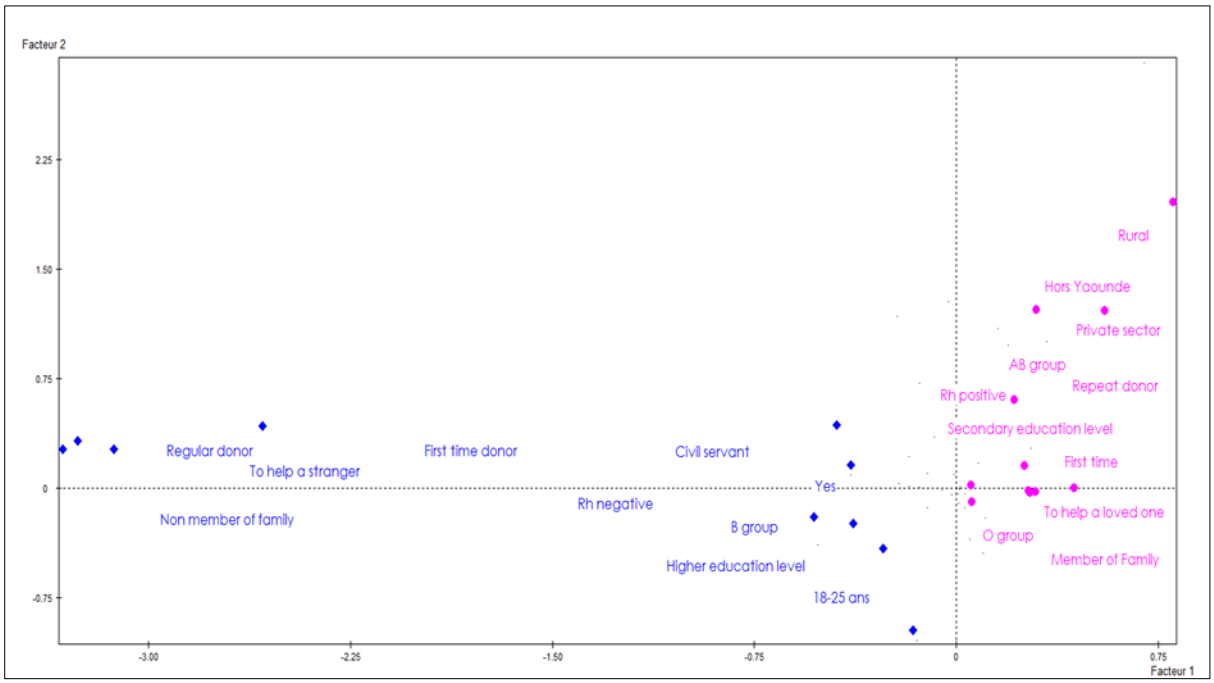

Figure 2 The profile of blood donors

4. Discussion

The findings of our study demonstrate that blood collection and use has continued to decrease in Cameroon. From 2015 to 2021, the number of whole blood collections declined by more than 50%, a great decline compared with declines reported in the USA from 2008 to 2015 that was around 3.5% [10]. Lower collections are likely a result of lower donation for blood products. Unlike developed countries such as the USA where the cause of the slowing decline of red blood cells and whole blood collections and use is likely continued implementation of technologies and patient blood management policies to reduce blood loss and use, in developing countries, potential donors have fear for syringes while some have other reasons. For example, there is also the fact that many people think that blood donated is sold. Also, despite the recognition that blood donation is important, several studies found that a common perception was that one could catch a disease through donating blood [11, 12, 13]. However, among the main factors that hinder blood donation, there are purely cultural considerations. In Cameroon (and this may be true for people of Sub Saharan Africa), people think that blood is mystical, so they mystify the gift of blood around their beliefs. Thus, some perceptions identified reflect spiritual and religious connotations of blood donation [14, 15, 16, 17]. It clearly appears that when the state and society do not agree on the nature of blood, there is a mismatch between blood donation practices and mobilization strategies. This mismatch is not conducive for fostering people's freedom to donate blood according to their perceptions of the nature of blood, i.e. it would not be possible to fully realize the potential of blood supply for all of society. Therefore, future revisions of the blood donation policy should include the different voices of society to promote a sustainable blood supply.

As it is known, an adequate and reliable supply of safe blood can be assured by a stable base of trusts donors. According to WHO (2022, op cit), they consisted of regular, voluntary, and unpaid blood donors, because they are the safest group of donors as the prevalence of bloodborne infections is lowest among them. In Cameroon, voluntary unpaid and family/replacement individuals were constitute the main donors, which is not surprising because in 79 countries around the world (whether in developed or in developing countries), more than 90% of blood supply is collected from voluntary unpaid and/or family/replacement blood donors. In Cameroon and in Sub Saharan Africa in general, this trend can be explained by the influence of cultural environment and perceptions. Linked to altruism and fear is the impact of culture on blood donation. In Sub Saharan Africa, people believe that blood is sacred and thus should be preserved, and that blood is common to kin (Asamoah-Akuoko et al, op.cit). That's why many people prefer to donate blood for a family member rather than to give to someone unknown to them. Moreover, in most African countries where the concepts of kinship and communalism are deeply rooted, donating blood for families is clearly a strong incentive. The influence of culture is reflected in spiritual and religious connotations ascribed to blood and blood donation, and impacts on blood donation. That is why individuals who view blood as gift from God and a source of salvation are more willing to donate than those who view blood as being able to transfer character or witchcraft to a recipient, as important

for rituals, or being prohibited by religion. In usual practice, blood donations are divided into groups based on who will receive the collected blood: homologous donation (when a donor gives blood for storage at a blood bank for transfusion to an unknown recipient) and directed donation (when a person, often a family member, donates blood for transfusion to a specific individual). In our study, directed donation has been the most prevalent type with 81.70%. This high prevalence of directed donation might be related to individuals' perceptions who consider blood as a substance that is private, precious, common to family, and not to be shared or taken outside the body except under the extreme circumstances of saving a life, especially that of a family member [18, 19].

Blood screening is a common practice at the National Blood Transfusion Center. With regard to safety, attention has to be equally paid to both donors and recipients' safety, but in Cameroon, donors' safety is the weak link in the chain. Normally, a donor has to be examined and asked specific questions about its medical history to make sure that donating blood is not hazardous to its health; his hematocrit or hemoglobin level has to be tested to make sure that the loss of blood will not make him anemic; his pulse, blood pressure, and body temperature are also to be evaluated. However, those initial checks are not common to determine donor's eligibility or not. Failure to follow those requirements in Cameroon is attributed to lack of well-trained health personnel, of well-established structures for blood service collection, poor infrastructure and logistics to undertake those checks. Nevertheless, recipient' safety is assured because in 95% of cases, blood is examined for signs and symptoms of diseases (such as HIV and viral hepatitis) that can be transmitted in a blood transfusion; mostly that the donated blood may be given to pregnant women or women of child-bearing age, donors taking teratogenic (birth defect-causing) medications. One another additional point is about blood processing: our findings indicate a low rate of 34.7%, which is a bit close to the average of 38% recorded in low-income countries [20, 21]. Since blood can be used more effectively if it is processed into components (such as red cell concentrates, platelet concentrates, plasma and cryoprecipitate) in order to meet the needs of more than one patient, such a weak processing rate demonstrates that the capacity to provide patients with the different blood components they require is limited in the country.

With an ever-increasing demand on blood supplies worldwide, there is an immense need to ensure a safe and sufficient supply of blood products. However, recruiting and retaining blood donors remain key challenges for blood agencies. In an attempt to address these problems, a range of sociodemographic, psycho-physiological and epidemiologic factors that influence people's willingness to donate blood has been identified. Our study revealed that males were more active in donating blood. Our finding is consistent with other studies in Africa and in most regions globally, namely in Agbovi et al. [22] and Allain et al. [23] who reported 61% and 90% of males donors respectively in Togo and Ghana. It is therefore obvious that women donate less blood mostly due to physiological problems and low hemoglobin count [24]. One contributing factor might be that women do not meet donation cut-off values for hemoglobin given normal menses, menorrhagia, prenatal iron deficiency anemia and postnatal blood loss. From a cultural perspective, in various African countries it may be more likely for males to donate blood given long-standing beliefs that women are not as physically strong as men. In Western regions such as Europe, women were found to have higher rates of adverse reactions, primarily vasovagal events, and were also not as likely to meet hemoglobin cut off requirements for donation.

Several studies have highlighted different motivations for blood donation [25, 26]. We found a significant association between being a health care professional and donating blood. There are studies that support our findings that, being a health care professional provides a sense of socioprofessional responsibility and community welfare [27, 28]. The current study revealed that 02.8% of the participants cited money as a motivating factor or that a token gift should be given in return gift for blood donation. These findings were lower than findings by Alfouzan in 2014 and Abdel Gader et al. (op. cit) who reported that money (18.9%) and token gifts were motivating factors. Although earlier research revealed that motivating individuals financially increased the chances of donation, there is a potential risk of attracting infected donors with a need for money rather than offering a safe donation [29]. However, in our study, about 97 % of blood donation is by voluntary non-remunerated donors who donate blood by their own free will and without receiving in return any payment in cash or in kind that could be considered a substitute for money. An earlier study by Okpara [30] reported that 80% of respondents were prepared to donate freely. Among those donors, we find those who donate blood to find out their serological status (needed to endorse a marital relationship or an upcoming marriage), and those who donate blood in response to a need by a patient/family member, that is to save lives.

In this study about two-third of blood donors had adequate knowledge towards blood donation, a result which is higher than a study conducted in Jordan which reported that 28.6% of them had adequate knowledge towards blood donation [31]. The possible reason for this difference might lay on the type of blood donors. In our study, the number of replacement type of blood donors was relatively low. It is strongly believed that first time volunteer blood donors are more likely to have good knowledge towards blood donation compared to replacement type donors and it is considered as major contributing factor for blood donation. The knowledge of the individuals might be also different with regard to the design of the study. In Samreen et al study for example, variables on knowledge were about the frequency of blood

donation, whereas in our study, the variables related to knowledge were the importance of blood donation along with transfusion transmittable infections. On the other hand, the level of knowledge in this study was lower than studies from Melku et al [32] and Al-Asadi and Al-Yassen [33]. The difference may be associated with the type of study subjects included in the studies. The above-mentioned studies include medical and health science students and also health care workers, whereas our study included the general public mainly made up of city dwellers with a very high level of education. Thus, it is expected that this group of people have high level of knowledge towards blood donation [34].
The results of our study also show that blood donation influences the well-being of donors. About 25% of donors experienced a positive effect with a mean duration of 3 days, 25% of donors experienced a negative effect with a mean duration of 24 hours, while in half of the donors, blood donation had no effects on well-being. These findings are very similar to those of other studies such as those of : (1) Sojka and Sojka [35] who identified donors with positive or negative effects, and (2) Hinrichs et al [36] who also found positive (26.5%) and negative (23.5%) effects of blood donation on well-being in the same proportions of blood donors. However, in a Dutch cohort study, positive and negative effects after blood donation were reported to occur in 4.6% and 13.9% of whole blood donors, respectively [37]. We believe that differences in the prevalence of effects might be related to the questionnaire phrasing or the study design. Whatever, the positive donation-related effects may be helpful in the recruitment of new donors and may motivate infrequent donors to donate more frequently as Suemnig et al. [38] showed that physical effects ("feeling physically better after donation") were a motivational factor to return to blood donation.

5. Conclusion

Blood is an essential component needed in healthcare facilities to save lives in a variety of circumstances, including traumas, surgeries, blood disorders, transplantations, pregnancy complications, and many other diseases. Thus it is a vital resource that strongly affects every national healthcare system's efficacy and sustainability and the system's ability to achieve the goal of universal health coverage. Although the WHO highlights that from 2010 to 2021, an increase of 11.6 million blood donations was detected, blood demand is continuously increasing. It will continue to grow in the next decades due to both stricter parameters to assure the safety of collected blood and the broader blood demand coming from the older population as well of the population exposed to accidents and infectious diseases. It emerges that these aspects might generate or generate a dangerous shortage of available blood, namely in developing countries such as Cameroon where blood collection is in decline mode. Therefore, it is crucial to incentivize an increase in the number of citizens who voluntarily decide to contribute to donation, thus overcoming the deficiency of available blood and contributing to community well-being. Since blood is a limited resource that has no alternative source other than humans, and which present a little lifecycle from donation to utilization, it is critical to set up different strategies : at the political level, governments must endeavor to build a stable base of blood donors by recruiting new donors particularly among young generations, and by retaining donors and increasing their frequency of donation; at the societal level, blood banks created by the governments could count on the support of civil society groups, which should draw awareness within community groups by (i) by advertising blood donation health benefits, (ii) by disseminating adequate knowledge and awareness of blood donation to eradicate misbeliefs about blood donation, so as to help ensuring the availability of blood when needed; at the individual level, we can resort to an original method, that is the system of reimbursement or replacement in which, when a patient needs blood, he must find a donor among his relatives to replace the blood bag used. Blood, indispensable to life, has increased in importance in the delivery of health care. With the goal of ensuring global access to safe blood and blood products, it is critical to improve blood safety and availability. Therefore and in accordance with WHO, the following integrated strategy for blood safety and availability should be implemented: (i) establishment of a national blood system with a well trained and equipped staff and a well-organized and coordinated blood transfusion services that can provide sufficient and timely supplies of safe blood and blood products; (ii) quality-assured screening of all donated blood and confirmatory testing of the results of all donors screen-reactive for infection markers, blood grouping and compatibility testing, and systems for processing blood into blood products, as appropriate, to meet health care needs.

Compliance with ethical standards

Acknowledgments

We would like to thank our participants for their time and participation.

Disclosure of conflict of interest

The author reports no conflicts of interest that could have influenced the output of this work.

Statement of ethical approval

The present research work does not contain any studies performed on animals/humans subjects by any of the authors.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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