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Giving Blood and Enrolling on the Stem Cell Donor Registry: Ranking of Obstacles and Motives in Switzerland

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Keywords
Blood donation · Blood stem cell donation · Donor motivation

Summary
Background: To obtain a better understanding of factors affecting blood and blood stem cell donation behavior in Switzerland, a series of studies has been performed. In the recent study of this series, which is described here, motivators and barriers in the field of blood and blood stem cell donation were identified. **Methods:** Web-based survey data from a non-random sample of the Swiss population 2012/2013 (n = 3,153) were used to describe and compare the ranking of motives and obstacles to donate blood and to enroll on the Swiss blood stem cell registry. Wilcoxon rank-sum test and Spearman's rank correlations were used to assess differences and associations between ranks and groups. **Results:** The prospect of saving lives and solidarity were the top two motives to donate blood or to enroll on the blood stem cell registry. The top two obstacles to enroll on the blood stem cell registry were lack of general information on blood stem cell donation and on its risks, whereas the top two obstacles to donate blood were the lack of information where and when to donate and deferral of or exclusion from blood donation. **Conclusion:** Classical altruistic motives are top drivers for giving blood as well as registering for blood stem cell donation. Recruitment campaigns should focus on these motivators. Similarities in motivational factors as well as in obstacles regarding blood and blood stem cell donation can be found.

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Introduction

Although the supply with blood and blood components in Switzerland is currently sufficient, seasonal shortages in blood can happen. As regards the situation in registered blood stem cell donors, Switzerland is underperforming in comparison to other countries, e.g. Germany and the USA. Moreover, in a comparably small country like Switzerland, the need for blood stem cells cannot be covered by the equally small donor pool, i.e. Switzerland is depending on imports of blood stem cells from other countries. In the medium and long term, covering the demand for blood and blood components for the Swiss health care system represents a challenge, not only for demographic reasons but also due to societal and cultural changes. In order to obtain a better understanding of factors affecting blood and blood stem cell donation behavior in Switzerland, a series of studies has been performed, focusing on the following specific questions: What is the level of knowledge about blood donation and blood stem cell donation in the population? What are the socio-economic, socio-cultural, and socio-demographic characteristics of donors and non-donors in Switzerland? What are motivators and barriers to donate blood or to register as blood stem cell donors? In what ways do socio-demographic characteristics influence blood donation and the intention to register as blood stem cell donors? In the recent study of this series described in this paper, an online survey, we concentrated on the identification of motivators and barriers in the field of blood and blood stem cell donation.

The current study (see fig. 1) is the third in a series of different motivational studies aiming at a better understanding of motives and obstacles in blood and blood stem cell donation. Results of the previous studies have already been published in this journal earlier [1].

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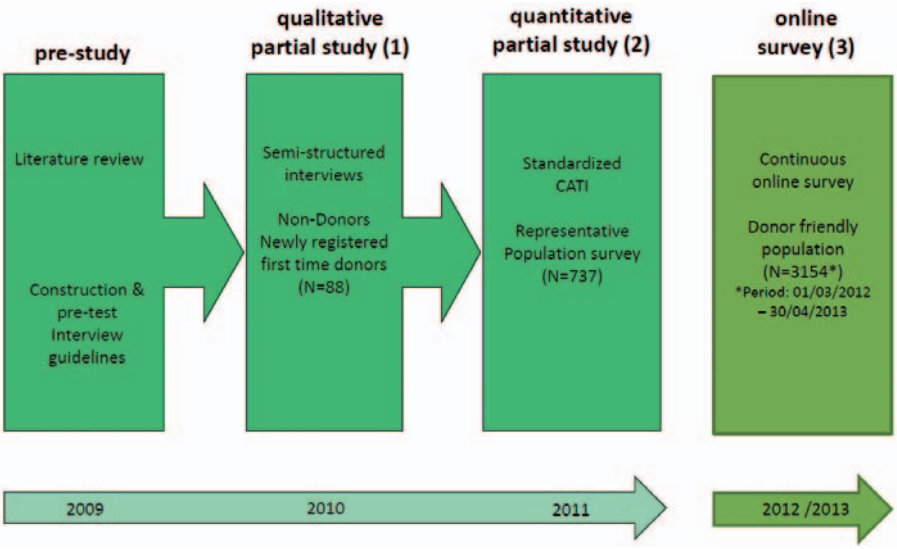

Fig. 1. Overall study design and project steps* (*online survey analyzed here).

Table 1. Frequency distribution and central tendency for variables in the sample[a]

	n	%	mean (SD)
Total number of participants	3,153	100.0	
Blood donation survey completed	522	16.5	
Stem cell registry enrollment survey completed	62	2.0	
Both surveys completed	2,569	81.5	
Gender			
Male	1,636	52.0	
Female	1,510	48.0	
Education[b]			
Still in education	24	0.8	
Primary education	176	5.7	
Secondary education	2,051	66.3	
Tertiary education	844	27.3	
Blood donor status			
Donor	606	19.6	
Non-donor	2,485	80.4	
Stem cell registry enrollment status, %			
Enrolled	601	22.8	
Not enrolled	2,030	77.2	
Age, years			39.8 (13.6)
Time since last blood donation, months			8.5 (32.5)

[a]Data source: Swiss Transfusion SRC.
[b]Primary education = ISCED-97 (0–2); secondary education = ISCED-97 (3–4); tertiary education = ISCED-97 (5–6).

Material and Methods

Study Design, Study Population and Data

The study was designed as descriptive cross-sectional online survey of motives and obstacles to enroll on the Swiss blood stem cell registry and to donate blood. Recruitment of survey participants was based on non-random self-selection. The online survey was announced on the websites of Swiss Transfusion SRC, several regional blood establishments, and the Federal Office of Public Health, and all site visitors were invited to participate in the web-based survey which was available in German, French, and Italian. In order to prevent repeated participation, the client computer's IP address was recorded. Although there are inherent limitations in such an approach, it allows preventing multiple entries from a computer on a per ISP session basis. Survey data were collected between March 1, 2012 and April 30, 2013 by Swiss Transfusion SRC. In total, 3,153 individuals participated in the survey. The survey consisted of two parts. In the first part, participants were asked to rank motives and obstacles to donate blood. In the second part, participants were asked to rank motives and obstacles to enroll on the Swiss blood stem cell registry. Participants were given the choice of completing either one part or both parts of the survey. 2,569 participants completed both parts, 522 participants merely completed the blood donation part and 62 participants completed the registry enrollment part. The characteristics of the participants are shown in table 1.

Table 2. Rank-order of motives to enroll on the Swiss blood stem cell registry[a]

Motive[b]	Total			Men			Women			p	Donor			Non-donor			p	Enrolled			Not enrolled			p
	n	r	bc	n	r	bc	n	r	bc		n	r	bc	n	r	bc		n	r	bc	n	r	bc	
Blood stem cells save lives	1,716	1	7,028	824	1	3,405	889	1	3,611	0.4611	1,335	1	5,493	343	1	1,384	0.3828	420	1	1,733	1,227	1	5,018	0.4914
Solidarity with fellow humans	1,423	2	5,057	683	2	2,485	737	2	2,563	*0.0019*	1,117	2	3,934	274	2	1,005	0.0552	366	2	1,290	1,005	2	3,588	0.3349
Increase patients' chances for recovery/ survival	1,288	3	4,341	584	3	1,920	701	3	2,409	*0.0280*	992	3	3,323	267	4	909	0.6666	349	3	1,179	896	4	3,012	0.9762
Relative/friend needs blood stem cells	1,002	4	4,052	464	4	1,852	534	4	2,180	0.1296	761	4	3,040	223	3	937	*0.0074*	125	5	415	827	3	3,415	*0.0000*
In accordance with my principles	705	5	2,196	341	5	1,082	362	5	1,110	0.2174	561	5	1,749	127	5	403	0.6481	281	4	900	399	5	1,222	0.1776
Donor center contacts me	386	6	1,235	218	6	725	168	7	510	*0.0395*	353	6	1,134	31	9	98	0.8028	74	6	189	291	6	968	*0.0000*
Identity of the recipient is disclosed	326	7	1,014	141	7	437	182	6	567	0.8997	224	7	674	86	6	280	0.1468	36	7	90	271	7	864	*0.0038*
Accompanied by a relative/friend	240	8	628	97	9	259	139	8	360	0.6545	169	8	438	70	7	187	0.6988	25	8	63	202	8	535	0.6556
Financial incentive	126	9	423	76	8	264	50	9	159	0.2201	84	10	280	37	8	125	0.9310	8	11	26	112	9	380	0.8626
Other reasons (b)	91	10	380	52	10	225	39	10	155	0.2344	78	9	321	13	11	59	0.2012	14	9	52	74	10	318	0.1206
Small reward	107	11	289	60	11	169	46	11	118	0.3547	73	11	186	30	10	94	*0.0276*	17	10	40	87	11	243	0.1791
Other reasons (a)	26	12	100	18	12	67	8	12	33	0.3959	22	12	82	4	12	18	0.2613	6	12	17	19	12	78	0.1317

n = Number of selections, r = rank, bc = Borda count; p = probability value of Wilcoxon rank-sum test. All ranks are based on Borda counts within groups, i.e. for all participants (total), men, women etc.
[a]Data source: Swiss Transfusion SRC.
[b]Other reasons (a) and (b) refer to motives which could be freely determined and ranked by the survey participants.

Table 3. Rank-order of obstacles to enroll on the Swiss blood stem cell registry[a]

Obstacle[c]	Total			Men			Women			p	Donor			Non-donor			p	Enrolled[b]			Not enrolled			p
	n	r	bc	n	r	bc	n	r	bc		n	r	bc	n	r	bc		n	r	bc	n	r	bc	
Lack of information on blood stem cell donation	1,659	1	7,465	825	1	3,742	830	1	3,712	0.1096	1,282	1	5,820	347	1	1,522	*0.0003*	–	–	–	1,559	1	7,004	–
Lack of information on risks	1,092	2	4,089	515	2	1,932	574	2	2,146	0.7891	810	2	3,065	254	2	926	0.1472	–	–	–	1,035	2	3,872	–
Registration is not an issue	585	3	2,103	364	3	1,367	219	5	730	*0.0001*	480	3	1,738	95	5	331	0.4166	–	–	–	542	3	1,944	–
Afraid of medical procedures	563	4	1,984	211	4	724	349	3	1,253	0.1440	348	4	1,182	191	3	708	*0.0077*	–	–	–	547	4	1,930	–
Other obstacles (b)	326	5	1,478	153	6	683	173	4	795	0.2069	256	5	1,150	66	6	312	*0.0126*	–	–	–	305	5	1,384	–
Lack of time	369	6	1,343	161	7	602	205	6	728	0.1906	238	7	860	119	4	430	0.8974	–	–	–	356	6	1,303	–
Lack of incentives	410	7	1,303	223	5	716	185	7	582	0.6297	311	6	970	88	7	293	0.1614	–	–	–	384	7	1,218	–
Severe health risks	212	8	597	85	10	247	127	8	350	0.4260	152	8	421	52	11	149	0.6407	–	–	–	204	8	578	–
Medical advice/health check	176	9	569	89	8	274	86	10	290	0.1752	120	9	374	53	8	189	*0.0477*	–	–	–	168	9	536	–
Registration is too time consuming	180	10	555	81	9	255	96	11	288	0.4385	117	10	365	53	10	154	0.3233	–	–	–	173	10	532	–
Ill health	125	11	405	40	13	114	85	9	291	0.0538	68	13	221	52	9	168	0.9848	–	–	–	120	11	393	–
Other obstacles (a)	86	12	340	38	12	149	48	12	191	0.7900	68	11	263	17	12	74	0.0748	–	–	–	78	12	308	–
No need to register	111	13	311	68	11	208	42	13	98	*0.0116*	83	12	230	23	13	61	0.7837	–	–	–	102	13	278	–

n = Number of selections, r = rank, bc = Borda count; p = probability value of Wilcoxon rank-sum test. All ranks are based on Borda counts within groups, i.e. for all participants (total), men, women etc.
[a]Data source: Swiss Transfusion SRC.
[b]Survey participants who were enrolled on the Swiss blood stem cell registry were not asked to rank obstacles.
[c]Other obstacles (a) and (b) refer to obstacles which could be freely determined and ranked by the survey participants. The vast majority of freely determined obstacles (b) refer to reasons which lead to deferral of blood donation (pregnancy/birth, iron deficiency etc.) or even exclusion from blood donation (men who have sex with men, recipients of blood transfusions etc.).

Table 4. Rank-order of motives to donate blood[a]

Motive[b]	Total			Men			Women			p	Donor			Non-donor			p	Enrolled			Not enrolled			p
	n	r	bc	n	r	bc	n	r	bc		n	r	bc	n	r	bc		n	r	bc	n	r	bc	
Blood saves lives	2,652	1	11,414	1,402	1	6,060	1243	1	5,321	0.4333	2,193	1	9,528	456	1	1,871	*0.0000*	506	1	2,191	1,689	1	7,233	0.1353
Solidarity with fellow humans	2,130	2	7,416	1,100	2	3,807	1024	2	3,587	0.5098	1,775	2	6,144	352	2	1,263	*0.0191*	432	2	1,492	1,328	2	4,583	0.9930
Low blood supplies	1,963	3	6,471	1,060	3	3,488	895	3	2,949	0.9478	1,654	3	5,447	304	4	1,005	0.6029	380	3	1,238	1,248	3	4,099	0.4695
Moral duty	1,210	4	3,725	689	4	2,192	517	5	1,521	*0.0020*	1,085	4	3,372	121	6	338	*0.0140*	275	4	844	734	4	2,279	0.6519
Relative/friend needs blood	850	5	2,952	383	6	1,252	463	4	1,688	*0.0001*	602	6	1,919	247	3	1,031	*0.0000*	137	6	419	594	5	2,146	*0.0001*
Emergency (i.e. natural disaster)	1,087	6	2,700	552	5	1,339	529	6	1,345	0.1385	874	5	2,056	211	5	639	*0.0000*	213	5	523	701	6	1,765	0.4870
Donor center contacts me	588	7	1,655	352	7	991	234	7	656	0.9070	529	7	1,474	58	8	177	0.1427	111	7	304	372	7	1,050	0.5872
Accompanied by a relative/friend	306	8	879	112	9	324	193	8	554	0.9069	205	9	568	99	7	309	*0.0468*	44	9	130	217	8	626	0.7738
Other reasons (b)	216	9	781	130	8	463	86	9	318	0.5150	187	8	661	29	10	120	*0.0432*	44	8	161	136	9	491	0.9986
Small reward	200	10	478	129	10	284	70	10	189	*0.0063*	160	10	364	39	11	109	*0.0201*	25	10	51	136	10	323	0.1262
Financial incentive	101	11	309	56	11	171	43	11	130	0.8850	57	11	166	43	9	138	0.2479	13	11	31	66	11	209	*0.0466*
Other reasons (a)	43	12	136	27	12	86	16	12	50	0.8361	36	12	108	7	12	28	0.0843	6	12	21	31	12	95	0.4469

n = number of selections, r = rank, bc = Borda count; p = probability value of Wilcoxon rank-sum test. All ranks are based on Borda counts within groups, i.e. for all participants (total), men, women etc.
[a]Data source: Swiss Transfusion SRC.
[b]Other reasons (a) and (b) refer to motives which could be freely determined and ranked by the survey participants.

Table 5. Rank-order of obstacles to donate blood[a]

Obstacle[b]	Total			Men			Women			p	Donor			Non-donor			p	Enrolled			Not enrolled			p
	n	r	bc	n	r	bc	n	r	bc		n	r	bc	n	r	bc		n	r	bc	n	r	bc	
Lack of information (time, place)	370	1	1,464	129	1	511	239	1	944	0.8095	100	5	380	270	1	1,084	0.2332	29	4	115	306	1	1,216	0.9593
Other obstacles (b)	278	2	1,293	83	2	391	194	2	897	0.1533	117	1	528	160	2	760	*0.0027*	33	1	154	227	2	1,057	0.7573
No donation during work	291	3	1,098	99	2	391	187	3	688	0.1113	118	3	450	170	4	638	0.8899	43	1	154	212	3	804	0.2061
Opening hours (donor center)	267	4	953	101	4	361	165	5	588	0.8291	119	2	463	148	5	490	*0.0004*	34	3	128	210	4	737	0.2253
Ill health	213	5	870	57	7	233	153	4	629	0.9126	95	4	396	116	6	467	0.2568	26	5	111	168	5	688	0.5299
Afraid of needles	201	6	827	61	6	244	138	6	573	0.1368	40	12	160	159	3	657	0.6955	15	6	62	161	6	662	0.9660
Medical advice/health check	171	7	667	45	13	160	123	7	498	*0.0033*	60	6	254	109	8	406	*0.0054*	16	7	60	139	7	539	0.8762
Afraid of pain	169	8	605	50	9	175	119	8	430	0.7202	44	11	161	125	7	444	0.6763	8	12	20	138	8	509	*0.0027*
Donation is not an issue	145	9	569	79	5	312	65	10	252	0.8273	44	10	166	101	9	403	0.2506	11	8	41	115	9	446	0.7850
Far from my place	144	10	458	51	10	166	89	9	279	0.7134	58	9	180	84	11	271	0.5660	11	10	39	118	10	374	0.3906
Donation too time consuming	136	11	426	55	12	165	78	11	249	0.4112	59	8	190	74	12	224	0.4179	11	11	37	112	11	345	0.5259
Afraid of infection	122	12	417	53	8	193	66	13	210	*0.0345*	27	13	91	92	10	312	0.9610	4	13	16	99	12	337	0.3997
Other obstacles (a)	96	13	406	39	10	166	57	12	240	0.9535	47	7	205	49	13	201	*0.0082*	9	8	41	77	13	320	*0.0368*

n = Number of selections, r = rank, bc = Borda count; p = probability value of Wilcoxon rank-sum test. All ranks are based on Borda counts within groups, i.e. for all participants (total), men, women etc.
[a]Data source: Swiss Transfusion SRC.
[b]Other obstacles (a) and (b) refer to obstacles which could be freely determined and ranked by the survey participants. The vast majority of freely determined obstacles (b) refer to reasons which lead to deferral of blood donation (pregnancy/birth, iron deficiency etc.) or even exclusion from blood donation (men who have sex with men, recipients of blood transfusions etc.).

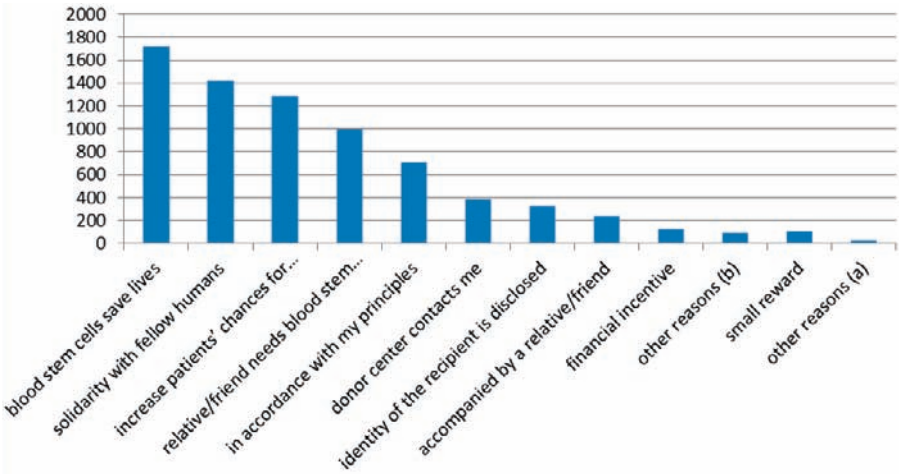

Fig. 2. Ranking of motives for registering as a blood stem cell donor.

Instruments and Variables

Previous studies identify several factors which are associated with blood donation or the intention to give blood [2–38] as well as factors that are associated with enrollment on the blood stem cell registry or the intention to do so [37, 39–52]. Based on these studies, we selected 10 factors that potentially encourage individuals to enroll on the blood stem cell registry (table 2) and 11 factors that potentially prevent individuals to enroll on the registry (table 3). Similarly, factors that encourage (table 4) and prevent blood donation (table 5) were selected. Participants were asked to rank these factors according to what they felt are the most important obstacles and motives for them to enroll on the registry or to give blood. Participants were allowed to select as many factors from the predefined list as they wished. Furthermore, participants were given the choice to add and rank a maximum of two further obstacles and motives if they felt that the predefined list did not meet their specific needs. In order to prevent response order effects, the position of each item on the predefined list was randomly assigned. The mean number of selected factors varied between 3.7 (obstacles to blood donation) and 5.0 (motives to blood donation), with median values of 2 and 4. Therefore, only the first five factors on the participants' preference lists, i.e. ranks 1 to 5, were considered in the further analysis. These individual ranks were transformed to Borda counts, i.e. factors which were ranked first received 5 points, factors which were ranked second received 4 points and so forth. Summed over all participants, the higher the Borda count, the more consensual is the support (or preference) for a specific factor in the population. Previous studies show that motives and obstacles to enroll on the stem cell registry and to donate blood may be influenced by gender, previous blood donation experience, and previous enrollment experience [1, 2, 9, 14, 15, 28, 37, 53]. Hence, we evaluated individual and aggregated ratings of motives and obstacles by gender, blood donor status, and enrollment status. Donor status was assessed by response to the question 'Have you given blood before?'. Subjects were categorized as donors or non-donors according to whether they reported to have donated blood or not. Similarly, subjects were categorized as enrolled or not enrolled according to whether they were currently enrolled on the Swiss blood stem cell registry or not.

Statistical Analysis

We used Stata 12.1 for all statistical analyses. The Wilcoxon rank-sum test was applied to assess differences in assigning ranks to individual factors between different groups of subjects. Spearman's rank correlations were used to assess associations of ranks between different groups. We report Spearman's Rho and p values. Statistical significance was established at $p \leq 0.05$.

Results

Overall, the three most important motives to enroll on the Swiss blood stem cell registry were the prospect to save lives, solidarity with fellow humans, and the prospect to increase patients' chances for recovery (fig. 2, table 2). Financial incentives, small rewards, and reasons specified by the participants were at the bottom end of the ranking. Agreement of overall ranking was consistently high between men and women (Rho = 0.97, p = 0.0000), blood donors and non-donors (Rho = 0.90, p = 0.0001), and participants who were or were not enrolled on the stem cell registry (Rho = 0.99, p = 0.0000). Differences between men and women were observed in the rankings of three motives. Women were more inclined to assign top ranks to 'solidarity' (p = 0.0019) and 'chances for recovery' (p = 0.0280) whereas men were more inclined to assign high ranks to 'donor center contacts me' (p = 0.0395). Differences between blood-donors and non-donors were found in the rankings of two motives. Non-donors compared to donors were more prone to assign top ranks when a 'relative or friend needs blood stem cells' (p = 0.0074) or a 'small reward' (p = 0.0276) would be given to them. Furthermore, participants who were not enrolled on the stem cell registry compared to those who were enrolled were more inclined to assign higher ranks to the items 'relative or friend needs blood stem cells' (p = 0.0000), 'donor center contacts me' (p = 0.0000), and 'identity of the blood stem cell recipient is disclosed' (p = 0.0038).

Lack of information on blood stem cell donation, lack of information on risks of blood stem cell donation, and stem cell donation not being an issue were the three most important obstacles to enrollment on the Swiss blood stem cell registry (fig. 3, table 3). The three least important obstacles in the ranking were ill health, obstacles introduced by the participants, and not perceiving the need to register. Again, agreement of overall ranking was consistently high between men and women (Rho = 0.87, p = 0.0001) as well as between blood

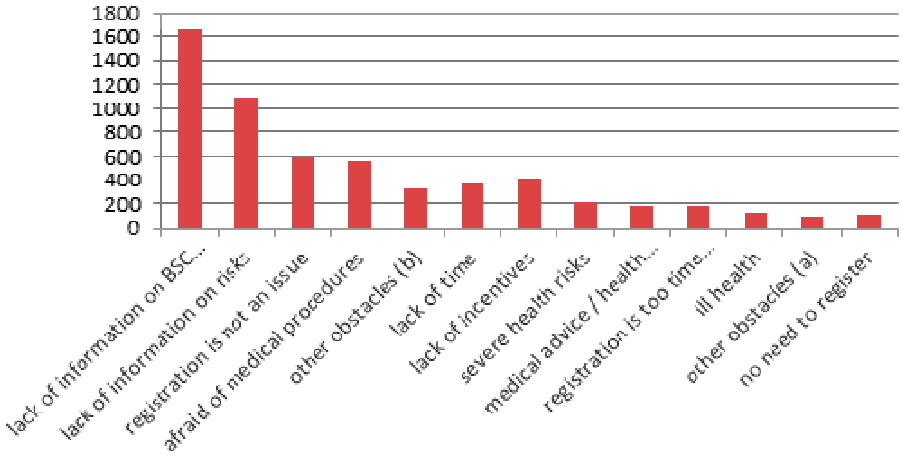

Fig. 3. Ranking of obstacles for registering as a blood stem cell donor.

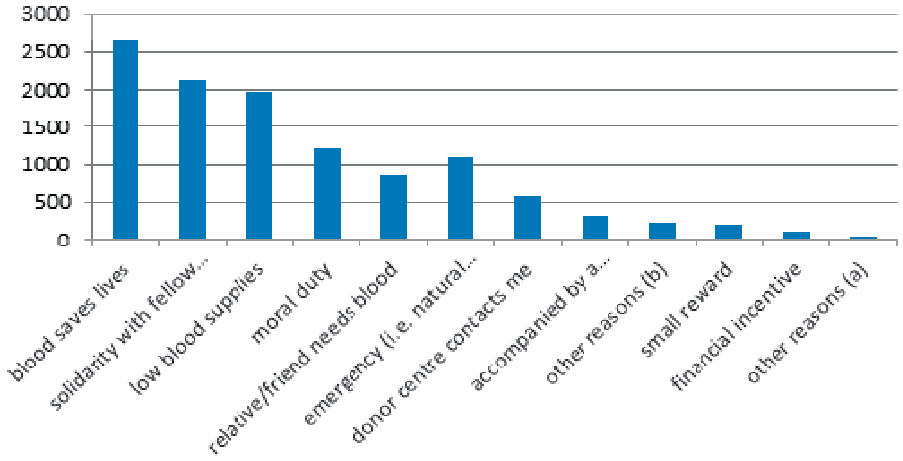

Fig. 4. Ranking of motives for donating blood.

donors and non-donors (Rho = 0.88, p = 0.0001). However, the agreement of overall ranking of obstacles was somewhat lower than the agreement of overall ranking of motives to enroll on the blood stem cell registry. Differences between men and women were observed in the rankings of just one obstacle. Men were more inclined to assign top ranks to 'registration is not an issue' (p = 0.0001). Blood donors compared to non-donors assigned higher ranks to 'lack of information on blood stem cell donation' (p = 0.0003), lower ranks to 'afraid of medical procedures' (p = 0.0077) and 'medical advice/health check' (p = 0.0477), and lower ranks to 'obstacles (b)' introduced by the participants (p = 0.0126) which mainly referred to conditions which lead to deferral of blood donation or exclusion from blood donation.

Overall, the three most important motives to donate blood were the prospect to save lives, solidarity with fellow humans, and to prevent low blood supplies (fig. 4, table 4). Small rewards, financial incentives, and reasons specified by the participants were at the bottom end of the ranking. Agreement of overall ranking was consistently high between men and women (Rho = 0.97, p = 0.0000), blood donors and non-donors (Rho = 0.90, p = 0.0001), and participants who were or were not enrolled on the stem cell registry (Rho = 0.99, p = 0.0000). Differences between men and women were observed in the rankings of three motives. Women were more inclined to assign top ranks to 'relative/friend needs blood' (p = 0.0001) and 'small reward' (p = 0.0063), whereas men were more inclined to assign higher ranks to moral duty (p = 0.0020). Differences between blood-donors and non-donors were found in the rankings of eight motives. Non-donors compared to donors were more prone to assign top ranks to solidarity (p = 0.0191), 'relative or friend needs blood' (p = 0.0000), 'emergency' (p = 0.0000), 'accompanied by a relative/friend' (p = 0.0468), 'small reward' (p = 0.0201), and 'other reasons (b)' which were freely determined by the participants (p = 0.0432). On the other hand, donors were more inclined to assign higher ranks to 'blood saves lives' (p = 0.0000) and 'moral duty' (p = 0.0140). Finally, rankings of two motives were different between participants who were or were not enrolled on the blood stem cell registry. Participants who were not enrolled were more inclined to assign higher ranks to 'relative/friend needs blood' (p = 0.0001) as well as 'financial incentive' (p = 0.0466).

Lack of information on where and when to donate blood, deferral of or exclusion from blood donation, and not being

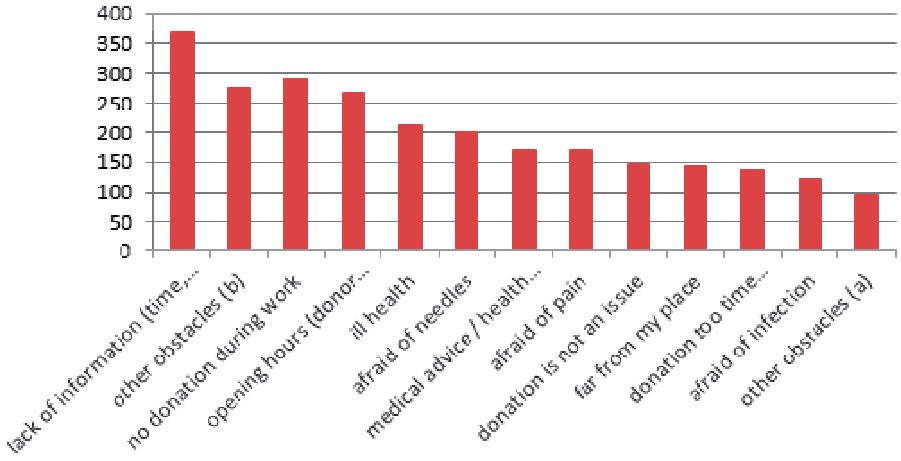

Fig. 5. Ranking of obstacles for donating blood.

able to donate blood during work were the three most important obstacles to donate blood (fig. 5, table 5). The three least important obstacles in the ranking were the perception that blood donation was too time-consuming, fear of infection, and obstacles introduced by the participants. Agreement of overall ranking was moderate to high between men and women (Rho = 0.72, p = 0.0059) and participants who were or were not enrolled on the blood stem cell registry (Rho = 0.86, p = 0.001). No statistically significant agreement of overall ranking was found between blood donors and non-donors. Differences between men and women were observed in the rankings of two obstacles. Men were more inclined to assign top ranks to 'afraid of infection' (p = 0.0345), whereas women were more inclined to assign high ranks to 'medical advice/health check' (p = 0.0033). Blood donors compared to non-donors were more prone to assign high ranks to 'other obstacles (b)' which mainly referred to reasons that lead to deferral of or exclusion from blood donation (p = 0.0027). Similarly, blood donors assigned higher ranks to 'opening hours of donor centers' (p = 0.0004) and 'medical advice/health check' (p = 0.0054) than non-donors. Finally, participants who were not enrolled compared on the blood stem cell registry were more inclined to assign higher ranks to 'afraid of pain' (p = 0.0027) those who were enrolled. Significant differences between groups were also found for 'other obstacles (a)'. Unlike 'other obstacles (b)', these obstacles were extremely diverse.

Finally, overall agreement of rankings between various groups was more pronounced for motives than for obstacles, especially in the case of blood donation. Our results also point out some important similarities and differences. Prospects to save lives and solidarity with fellow humans were the top two motives for both, to give blood and to enroll on the blood stem cell registry. On the other hand, the top two obstacles to enroll on the blood stem cell registry were related to general information on blood stem cell donation and its risks, whereas the top two obstacles to donate blood were the lack of practical information, i.e. where and when to donate, and the deferral of or exclusion from blood donation.

Discussion

Through a relatively simple online tool significant interest in blood and blood donation could be generated (between 5 and 20 survey participants/day, ongoing), which is encouraging for further similar gathering of data, especially in the light of a regular re-use of this survey tool. The need for information in both blood and blood stem cell donation seems to be remarkable to the authors. This fact, together with the eminence of equally information-related obstacles to donate blood and/or to enroll as a blood stem cell donor should be taken seriously in future communications of organizations active in blood and blood stem cell donation. In the light of the future challenges of demographic changes and the aging of donor populations, this knowledge could be used in order to optimize future communication strategies.

This study has several limitations. First, participation in the survey was based on self-selection. Hence, sampling bias is likely, i.e. the survey may have attracted people that were specifically interested in the survey's subject. Second, access to the internet is associated with several socio-economic and socio-demographic characteristics. According to the ITU report 2011, internet use is generally more popular among younger people, and people having attained secondary or tertiary educational levels use the internet more than those with primary education. Furthermore, the report states that in Switzerland 92% of men and 86% of women use the internet [54]. In comparing sample and population figures for age, gender, and education we found that the percentage of men in the sample (52.0%) was higher than the percentage of women (48.0%), whereas in the general Swiss population there were 49.3% men and 50.7% women. Survey participants in the age range between 15 and 75 years were younger (39.8 years) than people in the general population (44.1 years). Finally, we found substantially less people with primary educational level in the sample (5.7%) as compared with the general population (14.0%). The respective figures for secondary and tertiary educational levels were 66.8% and 27.5% in our sample and

54.7% and 31.3% in the Swiss population (subjects aged 24–64 years). While internet survey participants as compared to the general Swiss population were younger, male-dominated, and more educated, the differences were less pronounced with regard to age and gender than between educational levels.

Third, we rely on self-reported donor status. Subjects may be inclined to report donating because giving blood is considered to be socially desirable [55]. Similarly, we rely on self-reported blood stem cell registry enrollment.

In sum, our results cannot necessarily be generalized to the Swiss population. Rather, our results are potentially limited to a stratum of the population which is comparably young, well-educated, and more interested in or involved in blood donation and blood stem cell donation than the average population.

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Disclosure Statement

The authors declare that they have no conflict of interest.

References

1 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 Hemother 2013;40:133–138.
2 Belda Suarez IM, Fernandez-Montoya A, Rodriguez Fernandez A, Lopez-Berrio A, Cillero-Penuela M: How regular blood donors explain their behavior. Transfusion (Paris) 2004;44: 1441–1446.
3 Biastoch J: Beweggründe für und gegen das Blutspenden. Ausgewählte Ergebnisse einer prospektiven Studie 1987–1989 im Raum Magdeburg. Dissertation, Universität Magdeburg, 1992.,
4 Brittenham GM, Klein HG, Kushner JP, Ajioka RS: Preserving the national blood supply. Hematology Am Soc Hematol Educ Program 2001:422–432.
5 Callero PL, Piliavin JA: Developing a commitment to blood donation: the impact of one's first experience. J Appl Soc Psychol 1983;313:1–16.
6 Devine D, Goldman M, Engelfriet CP, Reesink HW, Hetherington C, Hall S, Steed A, Harding S, Westman P, Gogarty G, Katz LM, Bryant M: Donor recruitment research. Vox Sang 2007;93:250–259.
7 Ferguson E, France CR, Abraham C, Ditto B, Sheeran P: Improving blood donor recruitment and retention: integrating theoretical advances from social and behavioral science research agendas. Transfusion (Paris) 2007;47:1999–2010.
8 France CR, Montalva R, France JL, Trost Z: Enhancing attitudes and intentions in prospective blood donors: evaluation of a new donor recruitment brochure. Transfusion (Paris) 2008;48:526–530.
9 France JL, France CR, Himawan LK: Re-donation intentions among experienced blood donors: Does gender make a difference? Transfus Apher Sci 2008;38:159–166.
10 Gillespie TW, Hillyer CD: Blood donors and factors impacting the blood donation decision. Transfus Med Rev 2002;16:115–130.
11 Glatthaar A: Motivation zur Blutspende – eine empirische Studie einzelner Beweggründe und ihre Bedeutung für die Spendebereitschaft. Ein Beitrag zur Sicherung der Versorgung. Dissertation, Universität Tübingen, 1982.
12 Glynn SA, Kleinman SH, Schreiber GB, Zuck T, Combs SM, Bethel J, Garratty G, Williams AE: Motivations to donate blood: demographic comparisons. Transfusion (Paris) 2002;42:216–225.
13 Glynn SA, Schreiber GB, Murphy EL, Kessler D, Higgins M, Wright DJ, Mathew S, Tu Y, King M, Smith JW: Factors influencing the decision to donate: racial and ethnic comparisons. Transfusion (Paris) 2006;46:980–990.
14 Godin G, Conner M, Sheeran P, Belanger-Gravel A, Germain M: Determinants of repeated blood donation among new and experienced blood donors. Transfusion (Paris) 2007;47:1607–1615.
15 Godin G, Sheeran P, Conner M, Germain M, Blondeau D, Gagne C, Beaulieu D, Naccache H: Factors explaining the intention to give blood among the general population. Vox Sang 2005;89:140–149.
16 Goette L, Stutzer A: Blood donation and incentives: evidence from a field experiment. Basel, Center of Business and Economics, University of Basel, 2008.
17 Goette L, Stutzer A, Yavuzcan G, Frey BM: Free cholesterol testing as a motivation device in blood donations: evidence from field experiments. Transfusion (Paris) 2008;49:524–531.
18 Healy K: Embedded altruism: blood collection regimes and the European Union's donor population. Am J Sociol 2000;105:1633–1657.
19 Hollingsworth B, Wildman J: What population factors influence the decision to donate blood? Transfus Med 2004;14:9–12.
20 Hupfer ME, Taylor DW, Letwin JA: Understanding Canadian student motivations and beliefs about giving blood. Transfusion (Paris) 2005;45:149–161.
21 James V, Hewitt PE, Barbara JA: How understanding donor behavior should shape donor selection. Transfus Med Rev 1999;13:49–64.
22 Javadzadeh Shahshahani H: Why don't women volunteer to give blood? A study of knowledge, attitude and practice of women about blood donation, Yazd, Iran, 2005. Transfus Med 2007;17:451–454.
23 Klausegger C, Sinkovics RR: Freiwilliges Blutspendeverhalten – Analyse und Bestimmungsgründe sozial motivierten Verhaltens. Der Markt 2000;39: 123–136.
24 Koch M: Motivation zum Blutspenden. Das Problem der sogenannten Abbrecher Dissertation, Universität Tübingen, 1982.
25 Lemmens KP, Abraham C, Hoekstra T, Ruiter RA, De Kort WL, Brug J, Schaalma HP: Why don't young people volunteer to give blood? An investigation of the correlates of donation intentions among young nondonors. Transfusion (Paris) 2005;45:945–955.
26 Lemmens KP, Abraham C, Ruiter RA, Veldhuizen IJ, Bos AE, Schaalma HP: Identifying blood donors willing to help with recruitment. Vox Sang 2008;95:211–217.
27 Lemmens KP, Abraham C, Ruiter RA, Veldhuizen IJ, Dehing CJ, Bos AE, Schaalma HP: Modelling antecedents of blood donation motivation among non-donors of varying age and education. Br J Psychol 2009;100:71–90.
28 Marantidou O, Loukopoulou L, Zervou E, Martinis G, Egglezou A, Fountouli P, Dimoxenous P, Parara M, Gavalaki M, Maniatis A: Factors that motivate and hinder blood donation in Greece. Transfus Med 2007;17:443–450.
29 Mathew SM, King MR, Glynn SA, Dietz SK, Caswell SL, Schreiber GB: Opinions about donating blood among those who never gave and those who stopped: a focus group assessment. Transfusion (Paris) 2007;47:729–735.
30 McVittie C, Harris L, Tiliopoulos N: 'I intend to donate but ...': non-donors' views of blood donation in the UK. Psychol Health Med 2006;11:1–6.
31 Mikkelsen N: Who are the donors in 2003. Transfus Clin Biol 2004;11:47–52.
32 Misje AH, Bosnes V, Gasdal O, Heier HE: Motivation, recruitment and retention of voluntary non-remunerated blood donors: a survey-based questionnaire study. Vox Sang 2005;89:236–244.
33 Misje AH, Bosnes V, Heier HE: Recruiting and retaining young people as voluntary blood donors. Vox Sang 2008;94:119–124.
34 Piliavin JA, Callero PL: Giving Blood: The Development of an Altruistic Identity. Baltimore, Johns Hopkins University Press, 1991.
35 Post SG: Altruism, happiness, and health: it's good to be good. Int J Behav Med 2005;12:66–77.
36 Sojka BN, Sojka P: The blood donation experience: self-reported motives and obstacles for donating blood. Vox Sang 2008;94:56–63.
37 Volken T, Bänziger A, Rüesch P, Maeder N: Blutspende und Blutstammzellspende. Motive und Barrieren. Bern, Blutspende SRK Schweiz AG, 2013.
38 Farrugia A, Penrod J, Bult JM: Payment, compensation and replacement – the ethics and motivation of blood and plasma donation. Vox Sang 2010;99: 202–211.
39 Bergstrom TC, Garratt R, Sheehan-Connor D: One chance in a million: altruism and bone marrow registry. Santa Barbara, Department of Economics, University of Califonia, 2007.

40 Galanis PA, Sparos LD, Katostaras T, Velonakis E, Kalokerinou A: Factors that influence Greeks' decision to register as potential bone marrow donors. Transplant Proc 2008;40:1271–1274.
41 Kollman C, Weis T, Switzer GE, Halet M, Kitajima D, Hegland J, Confer DL: Non-HLA barriers to unrelated donor stem cell transplantation. Bone Marrow Transplant 2001;27:581–587.
42 Laver JH, Hulsey TC, Jones JP, Gautreaux M, Barredo JC, Abboud MR: Assessment of barriers to bone marrow donation by unrelated African-American potential donors. Biol Blood Marrow Transplant 2001;7:45–48.
43 Myaskovsky L, Switzer GE, Dew MA, Goycoolea JM, Confer DL, Abress L: The association of donor center characteristics with attrition from the national marrow donor registry. Transplantation 2004;77:874–880.
44 Sarason IG, Sarason BR, Slichter SJ, Beatty PG, Meyer D, Bogiano DC: Increasing participation of blood donors in a bone-marrow registry. Health Psychol 1993;12:272–276.
45 Switzer GE, Dew MA, Butterworth VA, Simmons RG, Schimmel M: Understanding donors' motivations: a study of unrelated bone marrow donors. Soc Sci Med 1997;45:137–147.
46 Switzer GE, Dew MA, Goycoolea JM, Myaskovsky L, Abress L, Confer DL: Attrition of potential bone marrow donors at two key decision points leading to donation. Transplantation 2004;77:1529–1534.
47 Switzer GE, Dew MA, Harrington DJ, Crowley-Matoka M, Myaskovsky L, Abress L, Confer DL: Ethnic differences in donation-related characteristics among potential hematopoietic stem cell donors. Transplantation 2005;80:890–896.
48 Switzer GE, Dew MA, Magistro CA, Goycoolea JM, Twillman RK, Alter C: The effects of bereavement on adult sibling bone marrow donors' psychological well-being and reactions to donation. Bone Marrow Transplant 1998;21:181–188.
49 Switzer GE, Dew MA, Simmons RG: Donor ambivalence and postdonation outcomes: implications for living donation. Transplant Proc 1997;29:1476.
50 Switzer GE, Dew MA, Stukas AA, Goycoolea JM, Hegland J, Simmons RG: Factors associated with attrition from a national bone marrow registry. Bone Marrow Transplant 1999;24:313–319.
51 Switzer GE, Goycoolea JM, Dew MA, Graeff EC, Hegland J: Donating stimulated peripheral blood stem cells vs bone marrow: do donors experience the procedures differently? Bone Marrow Transplant 2001;27:917–923.
52 Switzer GE, Myaskovsky L, Goycoolea JM, Dew MA, Confer DL, King R: Factors associated with ambivalence about bone marrow donation among newly recruited unrelated potential donors. Transplantation 2003;75:1517–1523.
53 Munsterman KA, Grindon AJ, Sullivan MT, Trouern-Trend J, Blackmon MJ, Watkins J, Williams AE: Assessment of motivations for return donation among deferred blood donors. American Red Cross ARCNET Study Group. Transfusion (Paris) 1998;38:45–50.
54 ITU: Measuring the Information Society 2011. Geneva, International Telecomunication Union, 2011.
55 Stocké V, Hunkler C: Die angemessene Erfassung der Stärke und Richtung von Anreizen durch soziale Erwünschtheit. ZA-Information 2004;54:53–88.