

# Analyzing the Causes of Blood Donor Deferrals and Characteristics of Deffered Individuals in Kurdistan Province, Iran

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## Abstract

**Introduction:** Donor recruitment is an essential step in blood banking. Accordingly, this study aimed to evaluate donor deferral rate, causes of deferrals, and characteristics of deferred individuals in Kurdistan province located in west of Iran.

**Methods:** This was a cross-sectional study carried out in Kurdistan Blood Transfusion Center from 2010 to 2015. A total of 175845 donors were selected to be screened. They were physically examined and detailed interviews were conducted with all the donors. In addition, standard operating procedures (SOPs) were used for donor selection and deferral.

**Results:** According to the obtained results, the deferral rate was 14.55% (25 586 out of 175 845). The top 7 deferral reasons included the use of certain medications (n=3996, 15.6%), abnormal blood pressure (n=2311, 9.03%), polycythemia (n=2177, 8.5%), risky behaviors (n=1848, 7.2%), previous donation in the last 3 months (n=1512, 5.9%), history of repeatedly reactive tests for infectious agents (n=1334, 5.21%), and anemia (n=1243, 4.85%). Meanwhile, the overall rate of deferral was higher in donors <35 years old ( $P<0.001$ ), females ( $P<0.001$ ), first-time donors ( $P<0.001$ ), unmarried ( $P<0.001$ ), and less than 12 years of schooling ( $P<0.001$ ).

**Conclusion:** The findings of this study indicated that the main reason for deferral was related to medications. Therefore, public education regarding health requirements of blood donors can be effective in reducing the number of deferrals.

**Keywords:** Blood donation, Deferral reasons, Blood donors

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## Introduction

Donor screening process is a crucial step to increase donated blood safety.<sup>1</sup> The purpose of blood donor screening is to minimize the risk of infections transmitted by blood products.<sup>2</sup> Both temporary and permanent blood donor deferrals result in a shrinkage in donor pools and low blood components available for transfusion.<sup>3</sup> Consequently, there should be an awareness regarding the causes of blood donation deferrals. Moreover, identification of the reasons for deferrals can lead to modifications in blood safety programs and recruitment strategies.<sup>4</sup>

Blood donor deferral prevalence has been reported from 5.6% to 35.6% in different countries.<sup>3-11</sup> This difference in prevalence percentage of deferral may be attributed

to various donor selection criteria due to differences in donor population and geographic distribution of transfusion-transmitted infections (TTIs).<sup>12</sup> The donor deferral rate in several cities of Iran has been reported as 25.6% (Isfahan),<sup>8</sup> 26.5% (Ilam),<sup>13</sup> 22.5% (Tehran),<sup>14</sup> and 30.9% (Shiraz).<sup>15</sup> According to what has been mentioned, the aim of this study was to determine the prevalence and reasons for blood donor deferrals in Kurdistan Province. To the best of the researchers' knowledge, this study is the first report analyzing the rate and reason of donor deferral in Kurdistan.

## Materials and Methods

### Donor Screening Strategy

This cross-sectional epidemiologic

study was performed in Kurdistan Blood Transfusion Organization during 2010-2015. All the donors underwent a screening process to determine their eligibility for donation. The standard operating procedures (SOPs) developed by the safe blood transfusion programme (SBTP) were applied for donor screening.<sup>16</sup> The screening process included identification, medical interview as well as blood pressure and hemoglobin measurements. Post-donation serologic analysis contained tests to detect hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV), and syphilis. Regular donors were considered based on their previous history of blood donation while first-time donors were defined as those without any records of blood donation. Besides, individuals who did not meet the donor selection criteria were deferred temporarily or permanently. Deferral rates, frequencies of different medical reasons for deferral, and demographic details were collected. Subjects who failed to donate, due to inability in venous access or vasovagal reaction, were not considered as deferrals since these donors were otherwise eligible.

**Statistical Analysis**

The SPSS software, version 16 was run to analyse the data. In addition, the chi-square test was used to assess a significant relationship between the categorical variables.

The significance level was set at 5% ( $P < 0.05$ ).

**Results**

A total of 175 845 blood donors were presented during the study period comprising of 55 339 (31.4%) first-time and 120 506 (68.5%) regular donors. Of the total number of donors, 160 433 (91.2%) of them were males while 15 412 (8.76%) were females. Deferrals occurred in 25 586 (14.55%) blood donors. The highest (15.6%) and lowest (11.9%) deferral rates belonged to the years 2012 and 2015, respectively. That is, 5153 (2012) and 3950 (2015) individuals were deferred, respectively. The results are provided in Table 1.

The deferral rate had a decreasing trend from 2012 to 2015. Among the individuals, 23 294 (91%) were deferred temporarily while 2292 (8.95%) of them were deferred permanently. The overall proportion of deferrals was higher among those less than 35 years old ( $P < 0.001$ ), females ( $P < 0.001$ ), first-time donors ( $P < 0.001$ ), unmarried ( $P < 0.001$ ), and less than 12 years of schooling ( $P < 0.001$ ) (Table 2). Overall, 19829 men (77.4%) and 5757 women (22.5%) were deferred. In other words, men were deferred more than women. However, women had a higher deferral rate (5657 out of 15 412, 37.35%) compared to men (19 829 out of 160 433, 12.35%). Totally, the top 7 deferral reasons were as follows: the use of

**Table 1.** Blood Deferral Rate During 2010-2015 in Kurdistan Blood Transfusion Organization

Year	Blood Donors (N)	Number of Temporary Deferrals No. (%)	Number of Permanent Deferrals No. (%)	Total No. (%)
2010	29 539	3766 (12.74)	252 (0.85)	4018 (13.6)
2011	30 388	4125 (13.57)	498 (1.63)	4623 (15.21)
2012	30 507	4766 (15.62)	387 (1.26)	5153 (16.89)
2013	26 445	3412 (12.9)	349 (1.31)	3761 (14.22)
2014	29 125	3661(12.56)	420 (1.44)	4081 (14.01)
2015	29 841	3564 (11.94)	386 (1.29)	3950 (13.23)
Total	845 175	23294 (13.24)	2292 (1.30)	25586 (14.55)

**Table 2.** Demographic Features of Deffered Donors in Kurdistan Blood Transfusion Organization

Demographic Characteristics	Number of Temporary Deferrals (%)	P Value	Number of Permanent Deferrals (%)	P Value
Donation status	First-time	10854 (19.6)	816 (1.47)	< 0.001
	Regular	12440 (10.32)	1476 (1.22)	
Gender	Female	5405 (35.07)	352 (2.28)	<0.001
	Male	17889 (11.15)	1940 (1.2)	
Age (y)	18-25	2133 (9.1)	132 (5.75)	<0.001
	25-35	8123 (34.8)	485 (21.1)	
	35-45	5775 (24.7)	460 (20.06)	
	45-55	4661 (20.0)	598 (26.09)	
	55-65	2602 (11.1)	617 (26.91)	
Education	High school or lower	16388 (22.9)	1584 (2.2)	<0.001
	Academic	6906 (6.15)	708 (0.6)	
Marital status	Married	16734 (11.68)	1719 (1.2)	<0.001
	Single	6560 (16.24)	573 (1.4)	

certain medications (3996, 15.6%), abnormal blood pressure (2311, 9.03%), polycythemia (2177, 8.5%), risky behaviors (1848, 6.3%), previous donation in the last 3 months (1512, 5.9%), history of repeatedly reactive tests for infectious agents (1334, 5.21%), and anemia (1243, 4.85%).

The main reasons for deferrals among male donors were being on medication (3377, 17.03%), abnormal blood pressure (1735, 8.7%), and risky behaviors (1588, 8.08%) while in female donors, polycythemia (1417, 24.6%), anemia (962, 16.7%), and being on medication (619, 10.7%) caused the highest deferral reasons (Table 3).

**Table 3.** Causes of Blood Donor Deferrals in Kurdistan Blood Transfusion Organization

Blood Donation Deferral Reasons	2010		2011		2012		2013		2014		2015		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Medications	456	91	808	100	96	149	693	66	652	113	672	100	3377 (17.03)	619 (10.7)
Abnormal blood pressure	178	69	247	101	346	143	564	123	285	83	115	57	1735 (8.7)	576 (10.0)
Anemia	80	189	56	168	60	133	26	61	23	31	36	191	281 (1.4)	962 (16.7)
Polycythemia	168	49	37	197	76	337	76	302	223	481	180	51	760 (3.8)	1417 (24.6)
Bloodletting	96	20	184	16	198	31	123	14	101	7	153	2	855 (4.3)	126 (2.1)
Risky behaviors	98	3	496	7	444	5	204	2	162	4	184	5	1588 (8.08)	26 (0.45)
Cardiovascular diseases	69	35	126	18	134	25	150	20	96	11	42	21	617 (3.1)	13 (2.2)
Surgery	31	10	43	9	67	9	57	6	43	10	41	3	282 (1.4)	47 (0.8)
Tattooing, acupuncture, or ear piercing	10	2	16	5	12	5	16	7	13	5	153	30	220 (1.1)	64 (1.1)
Drug abuse	18	4	79	1	113	1	56	0	61	0	62	0	389 (1.96)	6 (0.1)
Weight	3	6	3	9	10	9	4	8	7	13	8	12	35 (0.17)	57 (0.99)
Allergies	4	3	14	6	13	7	3	2	7	12	0	0	41 (0.2)	30 (0.52)
Elderly	60	3	24	6	23	8	32	4	103	10	62	0	304 (1.5)	31 (0.53)
Kidney disease	1	2	9	0	3	0	11	0	6	1	143	96	173 (0.87)	99 (1.7)
Skin problem	25	1	42	2	53	4	33	3	38	10	1	1	192 (0.96)	21 (0.36)
Respiratory diseases	128	25	203	18	145	25	142	23	134	16	2	1	754 (3.8)	108 (1.87)
Travel	1	2	5	0	6	0	1	0	3	0	3	0	19 (0.09)	2 (0.03)
History of repeatedly reactive test	101	13	181	29	110	23	75	8	103	12	657	22	1227 (6.1)	107 (1.85)
Dental procedure	19	3	56	3	45	6	35	2	7	3	46	2	208 (1.04)	19 (0.33)
Vaccination	19	4	14	0	10	1	7	1	2	0	9	2	61 (0.3)	8 (0.13)
Contact with hepatitis patient	7	0	5	8	2	12	1	2	0	0	3	1	32 (0.16)	23 (0.39)
Renal diseases	10	2	8	0	3	0	11	0	6	1	111	96	149 (0.75)	99 (1.7)
Infectious diseases	16	5	39	13	39	17	26	9	66	8	162	14	340 (1.7)	66 (1.14)
Nervous system disorders	41	10	53	14	92	13	94	10	63	10	25	4	360 (1.8)	61 (1.05)
Malignancy/ chemotherapy	0	0	3	0	2	0	0	0	5	0	0	0	10 (0.05)	0 (0)
Occupational limitation	2	2	6	1	14	0	6	0	5	1	5	0	38 (0.19)	4 (0.06)
Thrombosis	1	2	2	1	6	3	5	2	4	2	0	0	18 (0.09)	10 (0.17)
Blood donation interval of 3 months	157	30	277	32	394	21	247	19	235	16	63	21	1373 (6.9)	139 (2.4)
Prison history	14	2	20	1	19	3	10	1	7	0	9	0	79 (0.3)	7 (0.12)
Diabetes & on insulin	2	5	21	8	16	7	13	0	25	3	0	0	77 (0.3)	23 (0.39)
Blood disorders	4	2	6	2	6	2	5	0	9	2	11	5	41 (0.2)	13 (0.22)
Thyroid disorder	12	10	36	20	33	31	41	18	32	16	0	0	154 (0.77)	95 (1.65)
Fasting	20	7	5	0	24	4	33	7	40	9	11	2	133 (0.67)	29 (0.5)
Endoscopy	37	10	43	12	28	5	45	6	37	2	57	13	247 (1.24)	48 (0.83)
Fever	0	2	2	1	5	2	3	1	2	1	4	1	16 (0.08)	8 (0.13)
Others	940	567	459	187	919	556	163	23	449	161	125	42	3055 (15.4)	1536 (26.6)
<b>Total</b>	4018		4623		5153		3761		4081		3950		25586	

**Table 4.** Deferral Rates and Their Frequencies in Different Studies

Studies	Deferral Rate	Common Deferral Reasons
Iran, Kurdistan (present study)	14.55%	Medications (15.6%), abnormal blood pressure (9.03%), polycythemia (8.5%), risky behaviors (6.3%), previous donation in last 3 months (5.9%), history of repeatedly reactive test (5.21%), anemia (4.85%)
Kasraian et al, Shiraz, Iran <sup>15</sup>	30.90%	High risk behavior (43.60%), diseases (31.90%), others (13.50%)
Birjandi et al, Isfahan, Iran <sup>8</sup>	25.6%	Abnormal blood pressure (36.5%), high Hb level (24%), medication (23.3%), low Hb level (21.4%), travel (19.8%), bloodletting (19.7%), high-risk behavior (19.1%)
Maleki et al, Ilam, Iran <sup>13</sup>	26.5%	Medications (23.7%), high blood pressure (21.8%), hematological disorders (15.5%), bloodletting (11.9%), common cold (7.3%), risky behavior (4.9%)
Atar et al, Tehran, Iran <sup>14</sup>	22.5%	Risk of blood born disease (43.36%), disease/exposure (34.02%), medications (13.91%)
Gajjar et al, India <sup>17</sup>	11.16%	Anemia (48.33%), hypertension (11.94%), low body weight (7.95%), medications (6.13%)
Arslan et al, Turkey <sup>18</sup>	14.6%	Anemia (20.07%), common cold (17.70%), high-risk behavior (16.70%)
Abdelaal et al, Saudi Arabia <sup>19</sup>	8.7%	Persistent high pulse rate (19%), poor veins (17%), low blood pressure (12%)
Ekwere et al, Nigeria <sup>9</sup>	16%	Low hemoglobin (39%), high blood pressure (3.1%), under weight (2.4%)
Gonzo et al, Namibia <sup>20</sup>	8.6%	Anemia (45.0%), pregnancy & breast feeding (13.7%), medications (13.6%)
Tufail et al, Pakistan <sup>21</sup>	13.58%	Anemia (4.9%), HCV confirmed positive (3.1%), thrombocytopenia (1.8%), HBsAg positive (0.81%)
Waheed et al, Pakistan <sup>22</sup>	4.3%	Anemia (41%), underweight (22.5%), low blood pressure (5.1%), under/overage (5.9%)
Ngoma et al, Japan <sup>23</sup>	14%	Anemia (50%), interview decisions (27%), histories of blood transfusion or transplantation (57%), risky behavior (26%)
Rabeya et al, Malaysia <sup>24</sup>	5.6%	Low hemoglobin (40.7%), Hypertension (29.4%), Diseases (15.6%), Low blood pressure (3.5%), high hemoglobin (1.7%), Short duration of interval between donations (1.7%)
Charles et al, Trinidad and Tobago <sup>25</sup>	35.6%	High-risk sexual contact (27.6%), anemia (22.2%), hypertension (17.5%)
Chenna et al, India <sup>26</sup>	5.6%	Low Hemoglobin (48.1%), hypertension (16.4%), underweight (8.9%)

Table 4 represents a comparison of blood donor deferral rates in various studies in Iran and other countries.

**Discussion**

In the present study, the deferral rate of Kurd blood donors for a 6-year long period was estimated as 14.55%. These donors were deferred for various reasons in pre-donation screening. This deferral rate was lower than those of the most previous reports in Iran<sup>8,13-15</sup> and other countries.<sup>3,9,25</sup> However, lower deferral rates have been reported in Islamabad (4.3%)<sup>22</sup> and Karachi (12.2%) in Pakistan<sup>27</sup>, Malaysia (5.6%),<sup>24</sup> India (11.16%),<sup>17</sup> Saudi Arabia (8.7%),<sup>19</sup> and Namibia (8.6%).<sup>20</sup> The most common cause of deferral at blood center of the present study was the use of medications (15.6%). This finding is consistent with the result of a recent report by Maleki et al<sup>13</sup> in Ilam (west of Iran).

Certain drugs can reduce the function and applicability of blood cells and products or cause adverse effects in recipients.<sup>28</sup> Blood donors on eligible medications should be deferred for a period consistent with the pharmacokinetics of the drugs. For example, in cases of anti-platelet drugs consumption, donors are deferred for piroxicam and clopidogrel from 2 to 14 days, respectively. Defferals for aspirin and paracetamol usage have been reported in nearly 5% of blood donations.<sup>29</sup> Hypersensitivity reactions due to aspirin is regarded

as a common concern in donors. Moreover, penicillin induced allergy may be encountered in blood recipients due to anti-penicillin antibodies in donated blood units.<sup>29</sup>

The second most common cause of deferral among Kurd donors was abnormal blood pressure. As regards gender, the highest leading cause of blood donation deferral in males was taking medications (17.03%) while polycythemia (24.6%) was found to be the leading deferral reason in females. This finding is in contrast to the findings of several other studies that have reported anemia as the most common cause of deferral especially among women.<sup>3,9,17,18,20-24</sup> In the present study, anemia was the second common cause of deferral in females and the seventh cause overall.

In addition, the overall deferral rate was higher in first-time compared to regular donors (21.08% vs. 11.54%, respectively). Similarly, the results from a study performed in southwest of Iran (Shiraz)<sup>15</sup> showed a higher deferral rate among first-time donors (48.1%) as compared to repeated donors (13.1%). In another study in Isfahan (center of Iran),<sup>8</sup> first-time donors constituted 76.5% of the total deferrals compared to 17.5% in repeated donors.

The findings of the present study also showed that 37.35% of the deferrals belonged to female donors while only 12.35% of the referrals was found to be related to male donors. Namely, deferral rates were higher in

female donors as compared to their male counterparts ( $P < 0.001$ ). This finding is in line with the results obtained by other studies.<sup>3,8,17,23,30</sup> In the current study, temporary deferrals were responsible for 91.05% of deferrals whereas permanent deferrals accounted for the remaining 8.95% (), which is similar to the findings of Khurram et al.<sup>27</sup>

### Conclusion

Generally, findings of this study indicated that the main reason for blood donation deferral was related to medications affecting donated blood quality or exposing the blood recipients at risk. Therefore, public education regarding the importance of blood donation and donors' conditions can be effective in reducing the number of deferrals.

### Ethical Approval

The present project was approved by the Research Ethics Committees of the Iranian Blood Transfusion Organization (IBTO).

### Competing Interests

None.

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