



Perceptions and Experiences of Migrants in Korea Regarding Blood Donation in Association with Sociodemographic Status

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Background: With increasing number of migrants in Korea, there is an increasing need for blood products with rare blood antigens. Accordingly, the role of blood donors among migrants has been acknowledged. We investigated migrants' experiences and perceptions of blood donation along with their sociodemographic status and identified the effects on self-reported blood donation status.

Methods: A cross-sectional survey using a self-developed, structured questionnaire was conducted on 479 migrants. The questionnaire included items about experiences, knowledge, and perceptions on blood donation and sociodemographic factors of respondents.

Results: Most migrants in this study were from Southeast Asia (54.7%) or China (39.9%). Among them, 28.6% (N=137) had donated blood previously, and 2.7% (N=13) had previously donated blood in Korea. All previous blood donors were volunteers, and the two major deterrents of blood donation for non-donors were the fear of pain and lack of knowledge about blood donation. In multivariable logistic regression analysis, the country of birth (odds ratio [OR]=2.65, $P<0.001$ [China]; OR=4.85, $P=0.001$ [countries other than China and Southeast Asian countries]) and employment status (OR=2.80, $P=0.034$) were independently associated with blood donation.

Conclusions: This is the first Korean study to analyze migrants' experiences and perceptions of blood donation in relation to their sociodemographic status. Our findings can help establish blood donation policies for migrants, devise campaigns to enhance blood donation awareness, and ultimately create a pool of rare blood resources in a multicultural society.

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Key Words: Blood donation, Migrants, Survey, Sociodemographic factors

INTRODUCTION

Since the 2000s, Korea has rapidly transformed into a multicultural society fueled by international marriages and an influx of foreign workers in response to a low birth rate and aging popu-

lation. According to the South Korea Population and Housing Census 2018, the number of foreigners living in Korea is approximately 1.65 million, which accounts for 3.2% of the total population, and is increasing annually [1]. Among them, Chinese and Southeast Asians are the majority, with Chinese-Ko-

rean or Chinese accounting for the largest proportion (45.2%), followed by Vietnamese (10.2%) and Thais (9.1%).

In view of transfusion medicine, multiculturalization has several important implications. First, the diversity of red blood cell (RBC) antigens in the population increases, raising the need for blood donors with antigens that are rare in the general Korean population. For example, the Miltenberger (Mi^a) antigen, which is clinically significant because antibodies against Mia can cause life-threatening hemolytic transfusion reactions or hemolytic diseases in newborns, is rare among Koreans, but is relatively common in people from Southeast Asian countries, such as Thailand (9.7%), Taiwan (7.3%), and Hong Kong (6.3%) [2–6]. Second, the prevalence of diseases requiring repetitive transfusions during treatment, such as thalassemia or sickle cell disease, is expected to increase with the influx of migrants from various countries; hence, the risk of RBC alloimmunization due to antigenic differences between blood donors and recipients will rise. Alloimmunization requires additional transfusions of antigen-negative blood, which can be difficult to find. Third, the proportion of people eligible for blood donation, considering medical conditions, such as iron deficiency or infectious diseases, varies by country or race [7].

In several western countries, where the migrant proportion is relatively high, blood donation statistical data according to race and nationality are reported, and the effect of blood donation and factors affecting migrants' donation status have been studied [8–13]. While diversity in the Korean population is rising, details on the blood donation trends in the migrant population are scarce. This is the first Korean study to evaluate the blood donation trends and perceptions among migrants through a questionnaire survey and to determine the effects of sociodemographic status and perceptions on blood donation.

MATERIALS AND METHODS

Study design and participants

We conducted a qualitative, cross-sectional study through face-to-face interviews with 479 migrants living in Korea from January to December 2017, using a self-developed, structured questionnaire. We calculated that at least 450 participants will be required for our study to have statistical relevance; they were enrolled based on the blood donation and response rates referenced in a previous paper, and the margins of error and confidence level were set at 5% and 95%, respectively [8]. Survey participants were recruited from multicultural centers and cathedrals in Seoul and Gyeonggi Province, companies with many

foreign workers in the Daegu and Gyeongbuk areas, and cathedrals and universities in Busan. Two principal researchers (laboratory physicians) conducted private interviews and involved translators if necessary. This study was approved by the institutional review board of Pusan National University Hospital, Yangsan, Korea (IRB No. 1706-029-056). All participants gave written informed consent.

Instruments

The questionnaire was self-administered and comprised the following three sections:

Section 1: Sociodemographic information and personal medical experiences

Questions about country of birth, sex, age group, marital status, occupation, length of stay in Korea, religion, education level, and the ABO blood type were included. Experiences of the migrants and their families concerning medical services (hospitalization, surgery, and blood transfusion) and hospital reliability were also investigated.

Section 2: Blood donation experience and motivation

This section included questions related to blood donation (e.g., prior blood donation experience, the country in which they had donated blood, and the reason for donating or not donating blood). Migrants with prior blood donation experience were asked for the total number of blood donations within the last year and the reasons or motives for the donation (multiple responses possible). The reasons for donating blood were categorized into voluntary and involuntary motives, and the detailed response options included "To help strangers," "To help my family, friends, or acquaintances," "Because of the news about a shortage of blood for transfusion," "For getting a reward such as a movie ticket or a gift certificate," "Reluctantly participated in the blood donation campaign," etc. In addition, the overall level of satisfaction regarding the blood donation process, including the accessibility of the blood donation site, the internal facilities, and the staff in charge, was investigated. Each item was rated on a scale of 1 ("strongly disagree") to 5 ("strongly agree") to indicate the participant's satisfaction. Participants with no prior blood donation experience were asked to select the two major reasons for not donating blood.

Section 3: Perception of and attitude towards blood donation and self-awareness

The basic understanding of blood donation was evaluated by

Table 1. Sociodemographic characteristics of the migrant participants

Variable	Response rate (%)	Overall	Previous donors	Non-donors	<i>P</i>
	Total N = 479 (100%)	N = 479 (100%)	N = 137 (28.6%)	N = 342 (71.4%)	
Country of birth	100.0				
Southeast Asia		262 (54.7)	49 (35.8)	213 (62.3)	<0.001
China		191 (39.9)	72 (52.6)	119 (34.8)	
Others		26 (5.4)	16 (11.7)	10 (2.9)	
Sex	99.8				
Male		200 (41.8)	65 (47.8)	135 (39.5)	0.119
Female		278 (58.2)	71 (52.2)	207 (60.5)	
Age group	93.3				
10–20 yr		155 (32.4)	34 (24.8)	121 (35.4)	0.005
30 yr		197 (41.1)	52 (38.0)	145 (42.4)	
40 yr		95 (19.8)	40 (29.2)	55 (16.1)	
> 50 yr		32 (6.7)	11 (8.0)	21 (6.1)	
Marital status	98.7				
Married		148 (31.3)	38 (27.9)	110 (32.6)	0.374
Single/divorced		325 (68.7)	98 (72.1)	227 (67.4)	
Occupation	98.3				
Self-employed		46 (9.8)	7 (5.2)	39 (11.6)	0.194
Employed		202 (42.9)	63 (46.7)	139 (41.4)	
Student		85 (18.0)	23 (17.0)	62 (18.5)	
Others		38 (8.1)	14 (10.4)	24 (7.1)	
Unemployed		100 (21.2)	28 (20.7)	72 (21.4)	
Length of stay in Korea	96.7				
< 5 yr		294 (63.5)	74 (54.8)	220 (67.1)	0.017
≥ 5 yr		169 (36.5)	61 (45.2)	108 (32.9)	
Religion	98.1				
Buddhism		76 (16.2)	17 (12.8)	59 (17.5)	0.716
Christian		110 (23.4)	31 (23.3)	79 (23.4)	
Catholic		116 (24.7)	37 (27.8)	79 (23.4)	
Others		23 (4.9)	7 (5.3)	16 (4.7)	
None		145 (30.9)	41 (30.8)	104 (30.9)	
Educational attainment	98.1				
Less than high school		63 (13.4)	15 (11.3)	48 (14.2)	0.091
High school graduate		162 (34.5)	38 (28.6)	124 (36.8)	
College or above		245 (52.1)	80 (60.2)	165 (49.0)	
Self-reported ABO blood group	98.1				
A		66 (13.8)	20 (14.8)	46 (13.7)	0.145
B		113 (23.5)	32 (23.7)	81 (24.2)	
O		152 (31.7)	48 (35.6)	104 (31.0)	
AB		67 (14.0)	23 (17.0)	44 (13.1)	
Unknown		72 (15.0)	12 (8.9)	60 (17.9)	

Results are expressed as number (%), except for response rates (% only).

summing the response scores for the following three questions (out of five points each): (1) “I think blood donation has a bad effect on health;” (2) “I think I may get an infectious disease through a needle while donating blood;” (3) “I think the blood donor’s disease may be transmitted to the person receiving the blood.” Furthermore, we investigated whether the participants perceived themselves as altruistic and persons with strong self-identity.

Data analysis

We used descriptive statistics for demographic data, socioeconomic status, and attitude towards blood donation. A chi-square test or Fisher’s exact test was used to compare categorical variables between the donor and non-donor groups. Multiple logistic regression was used to examine relationships between the blood donation status and various factors. The results were expressed as odds ratios (ORs) and 95% confidence intervals (CIs). $P < 0.05$ was considered statistically significant. All statistical analyses were performed using IBM SPSS Statistics for Windows (version 22.0, Armonk, NY, USA) and GraphPad Prism 8.4.3 (GraphPad Software, San Diego, CA, USA).

RESULTS

There were 24 questions in total, and the response rate for each question was more than 90% (except for the response to the motive for donating blood). Of the 479 survey participants, 137 (28.6%) had previously donated blood, whereas 342 (71.4%) had no blood donation experience. Among the previous donors, 13 (9.5%) had donated blood within the last year (in Korea or before migration).

Sociodemographic characteristics and personal medical experiences

The sociodemographic characteristics of the migrants are listed in Table 1. Of the 479 participants, 200 (41.8%) were men, and 352 (73.5%) were in their 30s or younger. Asians accounted for the majority (94.6%), and by country of birth, China accounted for the largest population (39.9%), followed by Vietnam (23.8%), the Philippines (17.5%), Cambodia (6.7%), and Thailand (5.0%). Personal medical experiences of the migrants and their acquaintances and migrants’ perceptions of blood donation and self-awareness are summarized in Table 2. We found significant differences in blood donation experience depending on the country of birth, age group, length of stay in Korea, surgery of family members or acquaintances, and hospital reliability.

Motivation and perception regarding blood donation

Of the 137 previous blood donors, 13 (7.6%) had donated blood in Korea, and the remaining donors had donated blood in their home country before migrating to Korea. Only 14 of the 137 blood donors responded to questions about the motive for blood donation; all of them indicated that they voluntarily donated blood (Fig. 1A). When the non-donors were asked about the reason for not donating blood (multiple responses possible), “Because of needle phobia or fear of pain” was the most frequent response (103/496), followed by “Because I do not know where and how to donate blood” (95/496, Fig. 1B). Furthermore, the overall score for the three questions about the level of knowledge or awareness about blood donation revealed that 235 (51.2%) migrants had positive perceptions about blood donation, regardless of previous blood donation experience.

Predictors of blood donation

In simple logistic regression analysis, country of birth, age group, occupation, length of stay in Korea, acquaintance’s surgery, and hospital reliability were significant predictors of blood donation (Table 3). In multiple logistic regression analysis, country of birth (i.e., having migrated from China or a country outside Southeast Asia) and occupation (i.e., being employed) remained independently associated with higher odds of blood donation.

DISCUSSION

Our survey represents the first study on blood donation rates and perceptions among migrants in Korea, with most of the respondents (94.6%) being from China and Southeast Asia. The dominant population in this study may be representative of the migrant population in Korea, considering that the groups that accounted for the highest percentage of migrants in the South Korea Population and Housing Census 2018 report were Chinese and Southeast Asians.

We found that 137 migrants (28.6%) had previously donated blood, but only 13 (2.7% of the total respondents) had donated blood in Korea. This rate is lower than the average overall blood donation rate of 5.6% in Korea over the last three years, but it is nearly equivalent to that of African migrants in Australia (2.4%) [8, 14]. The blood donation rate in Korea is significantly lower than the reported total donation rate in migrants (28.6%); this difference may partially be due to differences in blood donation policies between countries. While Korea uses a voluntary blood donation system since 1999, some Southeast Asian countries have replacement donation systems, in which blood

Table 2. Personal medical experiences and perception of blood donation

Variable	Response rate (%)	Overall	Previous donors	Non-donors	<i>P</i>
		N = 479 (100%)	N = 137 (28.6%)	N = 342 (71.4%)	
Personal experiences					
Hospitalization (%)	93.1				
Yes		136 (30.5)	44 (33.3)	92 (29.3)	0.464
No		310 (69.5)	88 (66.7)	222 (70.7)	
Surgery (%)	92.3				
Yes		104 (23.5)	36 (27.1)	68 (22.0)	0.304
No		338 (76.5)	97 (72.9)	241 (78.0)	
Transfusion (%)	91.2				
Yes		39 (8.9)	13 (9.8)	26 (8.6)	0.818
No		398 (91.1)	120 (90.2)	278 (91.4)	
Surgery of acquaintances (%)	91.6				
Yes		223 (50.8)	55 (41.4)	168 (54.9)	0.012
No		216 (49.2)	78 (58.6)	138 (45.1)	
Transfusion of acquaintances (%)	90.6				
Yes		108 (24.9)	29 (22.3)	79 (26.0)	0.490
No		326 (75.1)	101 (77.7)	225 (74.0)	
Unpleasant memories with hospital services (%)	91.0				
Yes		127 (29.1)	38 (28.8)	89 (29.3)	1.000
No		309 (70.9)	94 (71.2)	215 (70.7)	
Hospital reliability	98.3				
Positive		284 (60.3)	69 (51.1)	215 (64.0)	0.026
Neutral		142 (30.1)	48 (35.6)	94 (28.0)	
Negative		45 (9.6)	18 (13.3)	27 (8.0)	
Perception of blood donation	95.8				
Positive		235 (51.2)	65 (47.8)	170 (52.6)	0.612
Neutral		101 (22.0)	33 (24.3)	68 (21.1)	
Negative		123 (26.8)	38 (27.9)	85 (26.3)	
Self-awareness					
Altruism	97.7				
Positive		52 (11.1)	10 (7.5)	42 (12.6)	0.265
Neutral		190 (40.6)	55 (41.0)	135 (40.4)	
Negative		226 (48.3)	69 (51.5)	157 (47.0)	
Self-identity	97.7				
Positive		56 (12.0)	12 (8.9)	44 (13.2)	0.077
Neutral		226 (48.3)	59 (43.7)	167 (50.2)	
Negative		186 (39.7)	64 (47.4)	122 (36.6)	

Results are expressed as number (%), except for response rates (% only).

donation is requested by hospital staff to replace the blood given to a hospitalized family member or acquaintance [15]. The China has implemented an obligatory blood donation system

(i.e., blood donation quotas are distributed by the government to social organizations or subdistricts) [16]. Nevertheless, the blood donation rate in most Southeast Asian countries is less

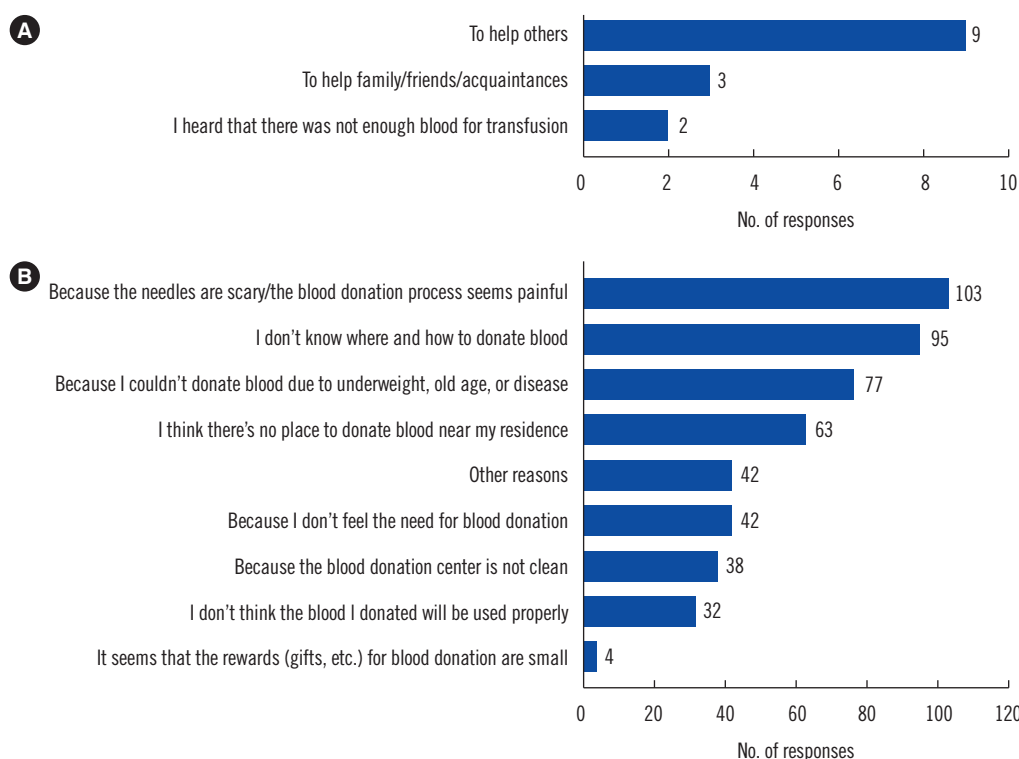


Fig. 1. Motivation and perception regarding blood donation. (A) response by previous donors and (B) reasons for not donating blood reported by non-donors.

Table 3. Results of logistic regression analysis for predicting the likelihood of blood donation

Variable	Simple logistic regression		Multiple logistic regression	
	OR (95% CI)	P	OR (95% CI)	P
Country of birth				
Southeast Asia	1.00		1.00	
China	2.63 (1.72–4.03)	<0.001	2.65 (1.57–4.47)	<0.001
Other	6.96 (2.98–16.26)	<0.001	4.85 (1.92–12.30)	0.001
Sex				
Male	1.00			
Female	0.71 (0.48–1.06)	0.097		
Age group				
10–20 yr	1.00		1.00	
30 yr	1.28 (0.78–2.09)	0.334	1.14 (0.58–2.23)	0.712
40 yr	2.59 (1.48–4.52)	0.001	1.90 (0.86–4.18)	0.112
> 50 yr	1.86 (0.82–4.24)	0.138	2.02 (0.68–5.99)	0.204
Marital status				
Married	1.00			
Single/divorced	1.25 (0.81–1.94)	0.319		

(Continued to the next page)

Table 3. Continued

Variable	Simple logistic regression		Multiple logistic regression	
	OR (95% CI)	<i>P</i>	OR (95% CI)	<i>P</i>
Occupation				
Self-employed	1.00		1.00	
Employed	2.53 (1.07–5.96)	0.034	2.80 (1.08–7.22)	0.034
Student	2.07 (0.81–5.27)	0.128	2.59 (0.85–7.89)	0.094
Others	3.25 (1.15–9.20)	0.026	2.94 (0.86–9.99)	0.084
Unemployed	2.17 (0.87–5.41)	0.098	2.51 (0.91–6.93)	0.076
Length of stay in Korea				
<5 yr	1.00		1.00	
≥5 yr	1.68 (1.12–2.53)	0.013	1.35 (0.80–2.29)	0.263
Religion				
Buddhism	1.00			
Christian	1.36 (0.69–2.69)	0.374		
Catholic	1.63 (0.84–3.16)	0.153		
Others	1.52 (0.54–4.29)	0.431		
None	1.37 (0.72–2.62)	0.344		
Educational attainment				
Less than high school	1.00			
High school graduate	0.98 (0.50–1.94)	0.955		
College or above	1.55 (0.82–2.94)	0.177		
Personal experiences				
Hospitalization (Yes)	1.21 (0.78–1.87)	0.399		
Surgery (Yes)	1.32 (0.82–2.10)	0.251		
Transfusion (Yes)	1.16 (0.58–2.33)	0.680		
Surgery of acquaintances (Yes)	0.58 (0.38–0.88)	0.009	0.60 (0.38–0.95)	0.030
Transfusion of acquaintances (Yes)	0.82 (0.50–1.33)	0.417		
Unpleasant memories with hospital services (Yes)	0.98 (0.62–1.53)	0.918		
Hospital reliability*				
Positive	0.63 (0.40–0.98)	0.039	0.78 (0.47–1.30)	0.339
Negative	1.31 (0.66–2.60)	0.449	1.85 (0.82–4.17)	0.139
Perception of blood donation*				
Positive	0.79 (0.48–1.31)	0.354		
Negative	0.92 (0.52–1.62)	0.776		
Self-awareness				
Altruism*				
Positive	1.08 (0.71–1.65)	0.725		
Negative	0.58 (0.27–1.25)	0.165		
Self-identity*				
Positive	1.49 (0.97–2.27)	0.068		
Negative	0.77 (0.38–1.56)	0.471		

*ORs were derived by setting the “neutral” response as a reference.
Abbreviations: OR, odds ratio; CI, confidence interval.

than 2%, and in China, the rate was 1.1% in 2016 [15, 17]. Since our study relied on self-reporting, the reported 28.6% overall donation rate of respondents may have been exaggerated.

Although the response rate in this study was low, we found that all previous blood donors had donated blood on a voluntary basis. The two major deterrents of blood donation cited by non-donors were fear of pain and lack of information about blood donation. Our findings are consistent with those of an Irish study that revealed non-eligibility due to medical reasons, lack of information (21%), and fear of needles (16%) as major obstacles to blood donation [18]. Lack of awareness about the necessity of blood donation and mistrust about the cleanliness of blood donation centers or the use of blood donation products also accounted for a significant number of responses in our study. Considering these concerns of non-donors, the population should be educated on how to participate in blood donation and the value thereof.

Multiple logistic regression analysis revealed that having migrated from a country outside Southeast Asia and being employed were positively associated with blood donation. An Australian study involving African migrants revealed that African origin, age over 45 years, and blood donation knowledge level were positively associated with blood donation [8]. In addition, a large household population-based study in the United States revealed that younger age, being a college graduate, being employed, and being physically active were positively associated with blood donation [19]. Several factors with no significant association with blood donation in this study were significant in previous studies. In a study in Hong Kong, prior experience of receiving blood was the most powerful predictor of being a blood donor (OR, 15.85; 95% CI, 7.18–34.99), and altruism was referred to as the most common motivator [20]. Altruism and increased awareness of the need for blood were also the main motivators of blood donation in a study of migrants in the Netherlands [13]. Due to the varied composition and characteristics of survey participants across studies, factors related to blood donation are expected to differ.

Several multicultural countries have devised and implemented various minority donor recruitment programs based on blood group phenotyping data, sociodemographic information, and extensive research on blood donation motivators and barriers among minority groups. In the United States, various recruitment programs, including short educational sessions at places of religious worship to highlight the importance of blood donation, letters, motivational interviews, direct community engage-

ment, and group sponsorship, are implemented on a blood center basis [21–24]. A French study revealed that blood donation promotion based on an anthropological approach and cultural mediation among ethnic minorities was effective in minority blood donor recruitment [9]. In a study in China, previous blood donors responded that the most important services to provide during the blood donation process were properly responding to donors' questions and investigating the donor's physical condition [25]. Research findings about minority blood donation programs in foreign nations can be adapted to domestic circumstances to create suitable donor recruitment programs for the minority population in Korea.

A 2015 Korean study conducting RBC antigen typing in children from multicultural families revealed that the frequencies of some antigens, including Rh, were different from those in Korean children [26]. However, data on the attitude towards or perception of blood donation in native Koreans were scarce and mostly from college students [27, 28]. Altruism was the most important motive for blood donation among Korean college students, which is consistent with the findings in our and other studies [29, 30]. Nevertheless, blood donation certificates, rewards (souvenirs), and health check-ups were important motivators for blood donation among Korean college students. Given that there is no significant association between a positive attitude towards or knowledge of blood donation and actual blood donation behavior, providing appropriate rewards can help promote blood donation [29].

Considering the above points, a couple of suggestions can be made. It is imperative to lower the language barrier and provide accurate information about blood donation in an easy-to-understand manner. Information provided to migrants through media should not only include basic knowledge about blood donation but also elucidate the whole process of blood donation, how to participate in the donation, and how the blood products will be used. It would also be helpful to correct various misconceptions about blood donation to alleviate fear of blood donation. Furthermore, the role of visible rewards, such as certificates, souvenirs, and health check-ups, in promoting actual blood donation cannot be overlooked.

Our study had several limitations. First, some questionnaire items, including those querying the level of knowledge about blood donation, were unsystematic and had not been validated. Although numerous previous studies have identified a positive correlation between knowledge about blood donation and actual blood donation, our study did not reveal such a correlation, maybe because our questionnaire was insufficient to accurately

and objectively evaluate the knowledge levels [8, 20, 31–34]. In other studies, the knowledge level was evaluated based on a well-structured questionnaire of 12–16 items, whereas in this study, the knowledge level was scored using only three items [8, 20, 34]. Further studies using a better-organized and well-validated questionnaire should be conducted. Second, as previously stated, some responses, including the previous blood donation rate, may have been overrated due to the nature of the self-reporting survey.

In conclusion, we found that 28.6% of migrants in Korea had previously donated blood and 2.7% had donated blood in Korea. The blood donation experience differed depending on the country of origin and occupation. The primary reason for not donating blood was a lack of awareness of blood donation. This study is meaningful as it is the first study to reveal blood donation status and sociodemographic factors associated with blood donation among migrants in Korea, which is rapidly transforming into a multicultural society. To expand the blood donor pool for the migrants, trends and perceptions related to blood donation in this population should be identified further, along with extensive antigenic typing and test-related support.

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AUTHOR CONTRIBUTIONS

Kim HH contributed to the study conception and design; Lee HJ and Shin KH conducted the questionnaire-based survey; Kim HR interpreted the results, performed the statistical analysis, and drafted the manuscript; and Kim HH and Lee HJ supervised the study. All authors read and approved the final manuscript.

CONFLICT OF INTEREST

No potential conflicts of interest relevant to this study are reported.

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