Determinants of voluntary blood donation in the city of Bahir Dar: A case–control study

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Abstract:
BACKGROUND: In a normal adult, the volume of blood needed to maintain physiological needs ranges from 5 liters to 6 liters. Disease and traumatic conditions may decrease this volume. Medically, this condition can be treated safely by blood transfusion. However, residents of the city of Bahir Dar have a low rate of volunteering to donate blood. No study has examined this situation, and therefore, this study was designed to fill this gap.

AIM: The aim of this study is to identify the determinants of voluntary blood donation in the city of Bahir Dar.

SETTING AND DESIGN: An unmatched case–control study design was used.

METHODS AND MATERIALS: The sample size was calculated using Epi-Info Software, 109 cases and 218 controls were included in the study. Data were entered into the computer using Epi-Info and were analyzed using SPSS.

STATISTICAL ANALYSIS USED: Logistic regression was used. Adjusted odds ratios (AOR) and 95% confidence interval (CI) were used to identify the determinants.

RESULTS: In this study, voluntary blood donation was more among male donors (AOR: 2.66; [95% CI: 1.03–6.88]), health professionals (AOR 18.56; [95% CI, 6.26–55.09]), negligence (AOR 0.12; [95% CI, 0.05–0.31]), lack of information (AOR 0.24; [95% CI, 0.1–0.58]), a convenient place (AOR 11.36; [95% CI, 3.61–35.73]), fear (AOR 0.26; [95% CI, 0.12–0.61]) and lack of opportunity (AOR 0.23; [95% CI, 0.1–0.52]).

CONCLUSION: Decision-makers in the area of blood collection should work hard to create awareness on voluntary blood donation. High-level decision-makers and the other partners should endeavor to make blood collection locations more convenient.

Keywords: Bahir Dar, determinants, Ethiopia voluntary blood donation

Introduction

In normal adults, 5–6 liters of blood is required to maintain normal physiological needs.[1] The blood volume may be depleted and need to be replaced due to disease conditions or trauma. Donors should be selected using a standardized procedure to protect their health, ensure patient safety, confirm the quality of the blood, and minimize resource waste resulting from the collection of unsuitable donations.[2] Vasovagal episodes and soft-tissue injuries are the most common donor reactions; the majority of these reactions are minor, and the donors usually quickly recover.[1,2]

According to the WHO, national blood transfusion services should be based on the nonremunerated volunteer blood donors.[3] However, <25% of the blood supplies in many countries are from voluntary unpaid...
blood donors, which are considered to be the safest blood sources.[8,9]

Some of the mentioned reasons for not donating blood in different studies include fear of needles, fear of the sight of blood, fear of contracting HIV/AIDS, fear of HIV screening, fear of stigma and discrimination, donation anxiety, and fear of complications.[8,9] There is also evidence that individuals may not donate blood because they are too busy to go to a blood bank.[9,13,16,20] An inconvenient blood donation location has also been mentioned as a barrier for voluntary blood donation in some studies.[8,13,16,20]

A governmental health institution in Bahir Dar has reported that people are dying due to a lack of blood.[21] However, research on the determinants of voluntary blood donation is limited in general in Ethiopia and in particular in the city of Bahir Dar. Therefore, the aim of this study was to identify the determinants of voluntary blood donation in the city of Bahir Dar.

**Methods and Materials**

An unmatched case–control study was performed. The study was conducted in Bahir Dar, which is the capital of the Amhara Regional state. Bahir Dar is located at the geographical coordinates of 11° 38' North latitude and 37° 15' East longitude and is approximately 560 km northwest part of Addis Ababa (the capital city of Ethiopia). According to the 2007 Ethiopian census report, the total population of the city was 220,344.[21] The city sits at an altitude of 1,830 meters above sea level and is characterized by a tropical climate with an average temperature of 29°C. The city covers an area of 16,000 hectares. The data were collected from February 10 to March 14, 2014. Study participants who were unable to communicate and Jehovah’s Witnesses were excluded from the study.

The sample size was calculated using the EPI-Info software developed by Center for disease control and prevention (CDC, Atlanta, USA). The following parameters were used: 95% confidence interval, 80% power, 2:1 ratio of controls to cases, an expected frequency of exposure in the control group of 50%, a minimum detectable odds ratio of 2, a percentage of exposure among the cases of 66.7%, and a 10% nonresponse rate. Based on these parameters, the estimated necessary sample size was 327 (109 cases and 218 controls).

The cases were individuals who had donated blood voluntarily in the past year and were randomly selected from the donors’ registration book of the town. The controls were members of the community who had never donated blood and were selected from the community using a systematic random sampling technique.

Data were collected using a structured Amharic questionnaire. Ten diploma nurses collected the data using a face-to-face interview, and four people with a bachelor’s degree in public health supervised the data collection process.

The questionnaire was prepared in English and translated into Amharic and then back into English to maintain consistency. A pretest was performed with 50 participants in the same setting, and necessary corrections were made in the questionnaire. Two days of training were provided for the data collectors and supervisors. The data collection process was closely supervised by the supervisors and investigators. The completeness of the questionnaire was reviewed daily by the investigators and supervisors.

Lack of information on voluntary blood donation was measured using the 10 knowledge questions. If the study participants failed to respond to the six knowledge questions properly, they were labeled as lacking information on voluntary blood donation. The convenience of the location was measured using the question, “was the blood collection site convenient for you?” Lack of opportunity was measured using the question “did the blood bank give you an opportunity to donate blood voluntarily?” Study participants who responded yes to either fear of sharp materials or fear of the side effects of voluntary blood donation were labeled with a fear of donating blood voluntarily. Negligence was measured using the question “are you negligent in voluntary blood donation?” Negligent to voluntary blood donation means that failing to give proper attention to voluntary blood donation.[9]

The data were entered into the computer using EPI-Info is a software developed by Center for disease control and prevention (CDC, Atlanta, USA) and analyzed using the SPSS software version 20 (IBM, Armonk, Newyork, USA). Logistic regression (forward analysis) was used to identify the determinants of voluntary blood donation. Adjusted odds ratios (AORs) (adjusted for gender, site convenience, lack of time to donate blood, lack of opportunity, a history of blood-transfused relatives, occupation, fear, negligent, false perception, age, ethnicity, religion, educational status, peer pressure, and no particular reason) with 95% confidence intervals were used to assess the association, and $P < 0.05$ were defined as statistically significant.

Ethics clearance was obtained from the Bahir Dar University Ethics Review Committee. Permission to conduct the study was also obtained from the Amhara National Regional State Health Bureau and the Bahir Dar branch of the National Blood Bank. Written consent was obtained from the participants.
Results

A total of 322 study participants were involved in this study for a response rate of 98.5%. Out of these 322 participants, 109 were voluntary blood donors (cases). The mean age of the respondents was 30.28 years with a standard deviation of 10.26 years. The Hosmer and Lemshow goodness-of-fit test verified that the model was good ($P = 0.66$). Age, ethnicity, religion, educational status, peer pressure, lack of time, having a history of blood-transfused relatives, and no particular reason to donate were not associated with voluntary blood donation.

The odds of voluntary blood donation were 2.66 times higher for males than for females (AOR 2.66: 95% confidence interval [CI] 1.03–6.88). The odds of voluntary blood donation were 11.36 times higher when the location was convenient (AOR 11.36: 95% CI 3.61–35.73). The odds of voluntary blood donation in people who reported a lack of opportunity were 77% lower than those in people who reported that they had an opportunity to donate blood (AOR 0.23: 95% CI 0.1–0.52).

In this study, the odds of voluntary blood donation were 18.56 times higher in health professionals than in other professions (AOR 18.56: 95% CI 6.26–55.09). The odds of voluntary blood donations among people who reported fear of donating blood were 74% lower than the odds for people free from a fear of donating blood (AOR 0.26: 95% CI 0.12–0.61). The odds of voluntary blood donation among people who felt they were negligent (not giving proper attention to voluntary blood donation) were 88% lower than the odds among people who felt that they were nonnegligent for voluntary blood donation (AOR 0.12: 95% CI 0.05–0.31). The odds of voluntary blood donation in the presence of correct perceptions about voluntary blood donation were 89% higher (AOR 0.11: 95% CI 0.06–0.34). This study found that the lack of information decreased the odds of voluntary blood donation by 76% (AOR 0.24: 95% CI 0.1–0.58) [Table 1].

Discussion

The odds of voluntary blood donation were 2.66 times higher among males than among females. This result was consistent with studies from the United States of America and the knowledge, attitude, and practices survey conducted in developing countries.[7,24] The reason for this finding may be that women frequently lose blood by physiological mechanisms, such as menstruation and childbirth and they perceive that significant amount of blood lost from their body.

In this study, participants who mentioned that blood collection locations were convenient were 11.36 times more likely to donate blood than those who reported that the blood donation site was not convenient. This result was consistent with findings from other parts of the world.[8,13,16,20] Thus, the Ministry of Health and other organizations working on voluntary blood donation should consider making the blood donation site attractive as one strategy to increase voluntary blood donors.

In this study, respondents who believed that there were opportunities to donate blood were 77% more likely to donate blood than respondents who believed that there were no opportunities. This result was consistent with research conducted in France[9] and might suggest that giving people an opportunity increases their awareness regarding the issue.

The odds of voluntary blood donation for health professionals were 18.56 times higher than any other profession. This result agrees with a study from Sweden.[15] This is due to the reason that health professionals have a good awareness about the benefits of voluntary blood donation.

In addition, health professionals know that donating blood does not carry a risk of health problems and thus do not hesitate to give blood.

This study also found that people who feared donating blood were 74% less likely to donate blood. This result was consistent with studies performed in different parts of the world.[8,20] The fear of sharp materials and the adverse effects of blood donation make donors shy away from voluntary blood donation. This finding indicates that the Ministry of Health should focus on informing the public about voluntary blood donation.

Participants who reported that they were negligent in donating blood were 88% less likely to donate blood than those who reported that they were not negligent. This result was consistent with the findings from sub-Saharan countries and France.[8,13] One explanation might be that negligent people do not have enough information concerning the demand for blood in patient care. The Ministry of Health should disclose to the public the demand for blood in patient care.

People with false perceptions about blood donation were 89% less likely to donate blood than individuals with correct perceptions. This result was consistent with studies performed in different parts of the world.[12,13,15,24-27] False perceptions may create a bad image regarding blood donation and make people shy away from voluntary blood donation. Organizations working on voluntary blood donation should educate the public about voluntary blood donation.
In this study, participants who reported that they had no information about blood donation were 76% less likely to donate blood than study participants who reported having adequate information. This result was similar among studies performed in different parts of the world. The National Blood Bank should work hard to show the presence of voluntary blood collection for patient care.

### Conclusion and Recommendations

This study identified that gender, occupation, negligence, lack of information, having a convenient donation site, fear, and lack of opportunity were important predictors of voluntary blood donation. The national blood bank should work hard to increase the awareness of the public regarding voluntary blood donation. The Ministry of Health and other partners should also work to make blood collection sites more convenient. Scholars should conduct further longitudinal research on voluntary blood donation.

### Limitation

The main limitation of this study was recall bias because people may not remember their past exposure adequately. However, the inclusion of fresh voluntary blood donors (donating during the past year) as the cases should minimize the recall bias.

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### Conflicts of interest

There are no conflicts of interest.

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