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Original Article

Voluntary blood donation practice and associated factors in Shashemene town, Oromia region, Southern Ethiopia: A Cross Sectional Study

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Abstract

Background: Global voluntary blood donation rates are critically low, particularly in Sub-Saharan Africa, where many countries collect fewer than 5 donations per 1,000 population compared to over 50 in high-income nations. In Ethiopia, only about 1% of eligible individuals donate blood annually which is far below the World Health Organization's (WHO's) 3% target - and the reasons behind this shortfall remain unclear despite ongoing national efforts. The primary aim of the current study was to assess the prevalence of voluntary blood donation and identify the associated factors among adults aged 18-65 in Shashemene town, Oromia Region, Southern Ethiopia.

Methods: A community-based cross-sectional study was conducted in Shashemene town, Southern Ethiopia, from May 22 to June 22, 2025, among adults aged 18–65 years. A multi-stage sampling technique was applied to ensure representativeness, selecting eight kebeles and 742 individuals were systematically sampled. Data were collected via Kobo Toolbox and analyzed with SPSS version 26. Descriptive statistics were computed, followed by logistic regression analysis. Model selection used stepwise backward elimination, and model fitness was assessed using the Hosmer-Lemeshow test. Statistical significance was set at $p < .05$ with 95% confidence intervals, and results were reported as AOR.

Results: A total of 742 participants involved in the study yielding the response rate 100%. The prevalence of VBD was 28%. Multivariable analysis revealed that male sex (AOR = 1.62, 95% CI [1.01–2.58], $p < 0.05$), higher educational attainment (AOR = 1.74, 95% CI [1.02–2.95], $p < 0.05$), good knowledge (AOR = 2.94, 95% CI [1.88–4.60], $P < 0.001$), favorable attitudes (AOR = 2.11, 95% CI [1.28–3.49], $p < 0.003$), previous donation experience (AOR = 3.65, 95% CI [2.12–6.28], $p < .05$), absence of fear of pain (AOR = 1.58, 95% CI [1.03–2.43], $p < 0.05$), community support (AOR = 2.21, 95% CI [1.40–3.47], $p < 0.05$), and proximity to donation sites (AOR = 2.09, 95% CI [1.20–3.63], $p < .001$) were significant predictors of donation practices.

Conclusion: Voluntary blood donation (VBD) practice in Shashemene town remains below national and WHO recommendations. Male sex, higher educational attainment, good knowledge, favorable attitudes, previous donation experience, absence of fear of pain, community support, proximity to donation sites were factors associated with voluntary donation practice. The findings of this study suggest that targeted health education campaigns must be delivered through mass media to enhance public awareness and address persistent misconceptions. Expanding access via mobile donation units, and encouraging repeat donations are also essential. Targeting women, less-educated groups, and integrating VBD into national health strategies will ensure sustainable progress.

Keywords: Voluntary blood donation, associated factors, Shashemene, Ethiopia

Introduction

Blood donation and transfusion are essential components of healthcare, supporting emergency care, surgeries, trauma management, and chronic illness treatment. The World Health Organization (WHO) identifies voluntary, unpaid blood donation (VBD) as the safest and most sustainable source of blood, as paid donations increase the risk of transfusion-transmissible infections (1). Despite this, many low- and middle-income countries, including Ethiopia, continue to face critical shortages due to persistently low voluntary donation rates.

In Ethiopia, only about 25% of blood is collected from voluntary donors, far below the WHO recommendation of 100% voluntary, non-remunerated donations (2,3). Likewise, only around 1% of eligible adults donate blood annually, compared with the WHO benchmark of at least 3% (4,5). These gaps result in preventable complications, delays in care, and increased morbidity and mortality among patients needing transfusions for obstetric emergencies, trauma, surgery, and chronic illnesses (6,7). Barriers include cultural and religious beliefs, stigma, misconceptions, fear of weakness after donation, limited awareness, and inadequate access to donation centers (2,8,9). Heavy reliance on family

replacement or paid donors further compromises safety and sustainability (10).

Globally, high-income countries report more than 50 donations per 1,000 population due to strong recruitment systems and high public awareness, whereas many Sub-Saharan African countries—including Ethiopia - struggle to reach even 5 per 1,000 (11). Structural constraints and weak donor mobilization worsen these disparities, and although some urban areas like Hawassa show modest progress, national demand remains unmet (3,6). Sociocultural and psychological barriers, low motivation, and limited impact of existing awareness campaigns - particularly those not tailored to local contexts - continue to hinder participation (12,13).

Shashemene town in Oromia Region represents a relevant yet understudied setting. Early indications suggest that voluntary blood donation is influenced by demographic characteristics, knowledge, and attitudes (7), but there is little empirical evidence specifically focused on adults aged 18-65. Addressing this gap is essential, as improving VBD is critical for strengthening Ethiopia's blood supply, reducing preventable mortality, and advancing health system resilience. This study aims to examine VBD practices and associated factors in Shashemene to support targeted interventions and culturally appropriate

awareness strategies aligned with WHO recommendations.

Methods and Materials

Study setting, design and period

A community-based cross-sectional study design was employed from May 22 to June 22, 2025 in Shashemene town. Shashemene town is located around 250 kilometers south of Ethiopia's capital city, Addis Ababa. According to CSA's 2007 Census projection, the town's current population is predicted to be 519,749, with 254,677 males and 265,072 females (14).

Shashemene is the administrative hub of the West Arsi zone, with four sub-cities and 36 kebeles. It houses a combination of governmental and private health care facilities that serve both urban and rural regions. There are two hospitals (Shashemene Referral and one regular hospital), 11 health centres, 38 health posts, a regional laboratory, and a blood bank. Shashemene Blood Bank and regional public health laboratory are prominent in delivering necessary diagnostic and medical services.

Population, eligibility, sample size determination and sampling procedure

All adults aged 18-65 years residing in Shashemene town, Oromia region, Southern Ethiopia were source population, while residents of selected kebeles of Shashemene

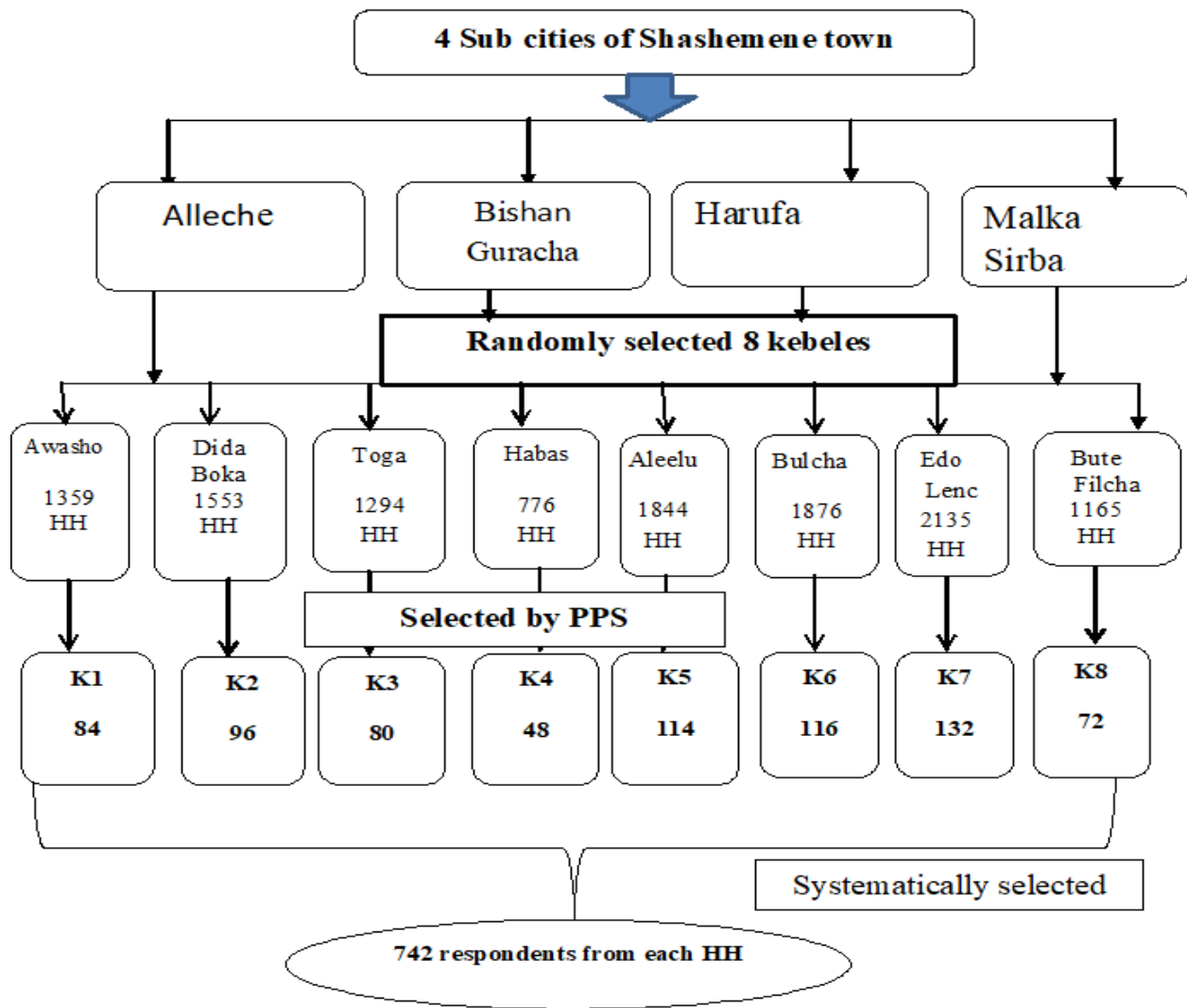
town, aged from 18-65 years old and those who are willing to participate and provide informed consent. Severely ill individuals or those unable to communicate due to disability or mental illness were excluded. The sample size was determined by using single population proportion formula by considering these assumptions: a margin of error (d) of 0.05, reflecting the degree of precision desired; a confidence level corresponding to a Z-value of 1.96 for a 95% confidence interval; and an estimated prevalence (p) of blood donation practice set at 35.7%, derived from prior studies in Harar Regional state, East Ethiopia (15), a design effect of 2 was applied (since two stage sampling method was employed), and a non-response rate of 5% was considered. Then, after substituting the above figures in to the sample size calculation, the final sample size was calculated to be 742.

As mentioned above, the town has four sub-cities divided into 36 kebeles. Two kebeles were selected from each sub-city, using a lottery method, giving a total of eight kebeles. A sampling frame for each selected kebele was obtained from health extension workers' family folders. A multi-stage sampling approach was used, applying a design effect of 2.

Systematic random sampling was then employed to select households. The sampling interval ($K=17$) was calculated by

dividing the total number of households in each kebele by the allocated sample size. Using a central point in the kebele, a random direction was chosen by spinning a pencil, and the first household was selected by lottery. Subsequent households were

identified by adding the sampling interval until the required 742 households were reached. If a household had more than one eligible adult (18-65 years), one respondent was selected by simple lottery (Figure 1).



Where K= Kebele

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Figure 1: Diagrammatical representation of sampling procedure used for data collection

Data collection tools and quality assurance

Data were collected using a structured, interviewer-administered questionnaire

consisting of seven sections: socio-demographic characteristics, knowledge, attitudes, previous experience with blood

donation, health system-related factors, cultural and social influences, and psychological and behavioral aspects. The collection was conducted by trained 5 BSc nurses who have experience in data collection and fluent in local languages. Supervisor oversaw the data collection process to ensure quality and consistency.

To ensure the reliability and validity of the data; data collectors and supervisor received two days training on the study objectives, ethical considerations, kobo collect software usage training, and interview techniques. Pre-testing of the questionnaire was conducted on 5% of sample size at Arisi Negele town, which has a similar setting with Shashemene town and located within 30 km distance. The Feedback obtained from the pre-test was used to refine the questionnaire. Data quality was checked by the supervisor from the place of collection up to the final analyses. Supervisors monitored the data collection process daily and conduct random spot-checks of completed questionnaires for checking missing and other variations.

Variables of the study

The dependent variable of the study was ever donated blood with responses yes or no; Whereas the independent variables were:

- Socio-Demographic Factors: age (in years), gender, marital status, education

level, occupation, religion, monthly income

- Knowledge about blood donation: ever heard about VBD, knowledge of the minimum age for blood donation, knowledge of the benefits of blood donation, knowledge of risks associated with blood donation, awareness of where to donate blood in Shashemene, familiarity with the blood donation process, awareness that blood donations are essential for medical treatments
- Attitudes towards blood donation: perceived importance of blood donation, willingness to encourage others to donate blood, belief that donating blood is a civic duty, perception of safety in blood donation procedures, motivations for donating blood, fear of donating blood, specific concerns about donation (e.g., pain, infection, needles)
- Previous experience with blood donation: history of ever donating blood, frequency of past donation, timing of last donation, motivations for donating (e.g., personal experience, community service)
- Health system-related factors: distance to nearest blood donation center, mode of transportation to center, convenience of operating hours, challenges faced when attempting to donate blood
- Cultural and social factors: family or friends who donate blood, discussion of

blood donation with peers, cultural barriers to blood donation, community perception of blood donation, religious support for blood donation

- Psychological and behavioral factors: familiarity with the donation process, awareness of the importance of blood donations, personal motivation for donation, fear of donating blood, specific psychological concerns (e.g., pain, fainting, fear of needles)

Operational definitions

Knowledge: Participants were asked a series of structured questions, with correct answers scored as “1” and incorrect responses scored as “0.”. The total knowledge score was, and participants were categorized into good or poor knowledge based on the mean score. Respondents scored above the mean score were considered as knowledgeable for VBD were coded as 1, whereas those scored below mean score were considered as having poor knowledge regarding VBD coded as 0.

Attitude towards VBD: Respondents attitude levels towards the VBD and was 7 assessed by Likert scale question like agreement level (1=Strongly agree, 2=Agree, 3=Neutral, 4= Disagree, 5= Strongly disagree) and Binary response question like (1=yes , 2=No). A respondent was considered as having favorable attitude towards VBD, if he/she answered at least

50% of the attitude questions correctly were coded as 1, whereas of respondent answered less than 50% were taken as having unfavorable attitude was coded as 0.

Voluntary Blood Donation Practice:

Coded as 1 = Yes if the participant has ever donated blood voluntarily at least once in their lifetime; 0 = No otherwise.

Civic duty refers to the responsibilities and obligations that individuals have as members of a society or community.

Kebele: The smallest administrative unit in Ethiopia.

Data processing and analysis

Data was coded, collected and entered into Kobo tool box and then exported to SPSS version 26 for analysis. Descriptive statistics was computed to summarize the data, including frequencies, percentages, means, and standard deviations. Bivariable analysis was conducted to identify factors associated with VBD, and variables with a p-value <0.25 in the bivariable analysis was entered in to a multivariable logistic regression model; it was used to see independent effect of independent variables on outcome variable by controlling effect of confounders. The strength of association was measured using odds ratios with 95% confidence intervals. A p-value <0.05 was considered as a cutoff point to test statistical significance. Variables with significant findings are reported by texts, graphs/charts

& tables. Model fitness was checked by Hosmer-Lemeshow-GOF-test and Multicollinearity between the IVs was checked by correlation test and variance inflation factor (VIF).

Results

Socio-demographic characteristics of the participants

A total of 742 participants were included with the response rate of 100%.

Table 1. The socio-demographic characteristics of the participants on VBD at Shashemene town, Oromia Region, Southern Ethiopia (N = 742)

| Variable | Category | Frequency (n) | Percentage (%) |
|-------------------|---|---------------|----------------|
| Age (years) | 18–25 | 74 | 10 |
| | 26–35 | 238 | 32 |
| | 36–45 | 282 | 38 |
| | 45–65 | 148 | 20 |
| Gender | Male | 401 | 54 |
| | Female | 341 | 46 |
| Marital Status | Married | 519 | 70 |
| | Single | 186 | 25 |
| | Divorce | 30 | 4 |
| | Widowed | 7 | 0.9 |
| | Widower | 1 | 0.1 |
| Educational Level | No Formal Education | 74 | 10 |
| | Primary Education | 334 | 45 |
| | Secondary Education | 186 | 25 |
| | Tertiary Education (Diploma, Degree, Masters) | 148 | 20 |
| Occupation | Self-owned business (Merchant) | 260 | 35 |
| | Employed (Government, NGO) | 208 | 28 |
| | Daily Laborer | 186 | 25 |
| | Student | 52 | 7 |
| | Others | 37 | 5 |
| | Monthly Income (Birr) | < 5000 | 297 |
| | 5000-10000 | 408 | 55 |
| | > 10000 | 37 | 5 |

Knowledge of voluntary blood donation among respondents

Most respondents had heard of voluntary blood donation and recognized its

Slightly more than half were male, and the mean age was 41 years (SD = 10.89). Most were married and had completed primary education. The most common occupation was self-owned business, and the majority reported a monthly income of 5,000-10,000 ETB. Detailed socio-demographic characteristics are presented below (Table 1).

life-saving importance. Knowledge levels were generally high, with 594 (80%) classified as having good knowledge based on the scoring criteria. Awareness of the

minimum age for donation, risks, and the donation process varied across participants.

Full distributions of knowledge items are shown in Table 2.

Table 2. The knowledge of voluntary blood donation among respondents at Shashemene town, Oromia Region, Southern Ethiopia (N = 742)

| Variable | Category | Frequency (n) | Percentage (%) |
|--|-------------|---------------|----------------|
| Have you ever heard about voluntary blood donation? | Yes | 668 | 90 |
| | No | 74 | 10 |
| What is the minimum age for blood donation? | < 18 years | 4 | 0.5 |
| | 18–25 years | 341 | 46 |
| | 26–35 years | 186 | 25 |
| | 36–45 years | 111 | 15 |
| | 45+ years | 74 | 10 |
| Blood donation saves lives | Yes | 705 | 95 |
| | No | 37 | 5 |
| Blood donation is a kind community service (Altruism) | Yes | 519 | 70 |
| | No | 223 | 30 |
| Are there any risks associated with blood donation? | Yes | 519 | 70 |
| | No | 223 | 30 |
| Do you know where to donate blood in Shashemene? | Yes | 482 | 65 |
| | No | 260 | 35 |
| Are you familiar with the process of blood donation? | Yes | 445 | 60 |
| | No | 297 | 40 |
| Blood donations are essential for treatments/emergencies | Yes | 727 | 98 |
| | No | 15 | 2 |
| Knowledge toward VBD | Good | 954 | 80 |
| | Poor | 148 | 20 |

Attitudes towards voluntary blood donation

Almost all the respondents, 705 (95.0%), indicated that they believed blood donation is important. Similarly, a large majority, 519 (70.0%), of them stated that

they would encourage others to donate blood. In terms of safety perception, 445 (60.0%) participants reported that they considered blood donation procedures to be safe (Table 3).

Table 3. The attitudes toward VBD among Respondents at Shashemene town, Oromia Region, Southern Ethiopia (N = 742)

| Variable | Category | Frequency (n) | Percentage (%) |
|---|----------|---------------|----------------|
| Do you think blood donation is important? | Yes | 705 | 95 |
| | No | 37 | 5 |

| | | | |
|--|----------|-----|----|
| Would you encourage others to donate blood? | Yes | 519 | 70 |
| | No | 223 | 30 |
| Do you believe that donating blood is a civic duty? | Agree | 594 | 80 |
| | Disagree | 148 | 20 |
| How do you feel about the safety of blood donation procedures? | Safe | 445 | 60 |
| | Unsafe | 297 | 40 |

Previous experience with blood donation

Among the 742 respondents, 208 (28%) reported ever voluntarily donating blood. Of those who had donated, 208 (28%), most had donated only once 146

(70%). Regarding the timing of the last donation, the majority reported donating more than six months ago 167 (80%) (Figure 2).

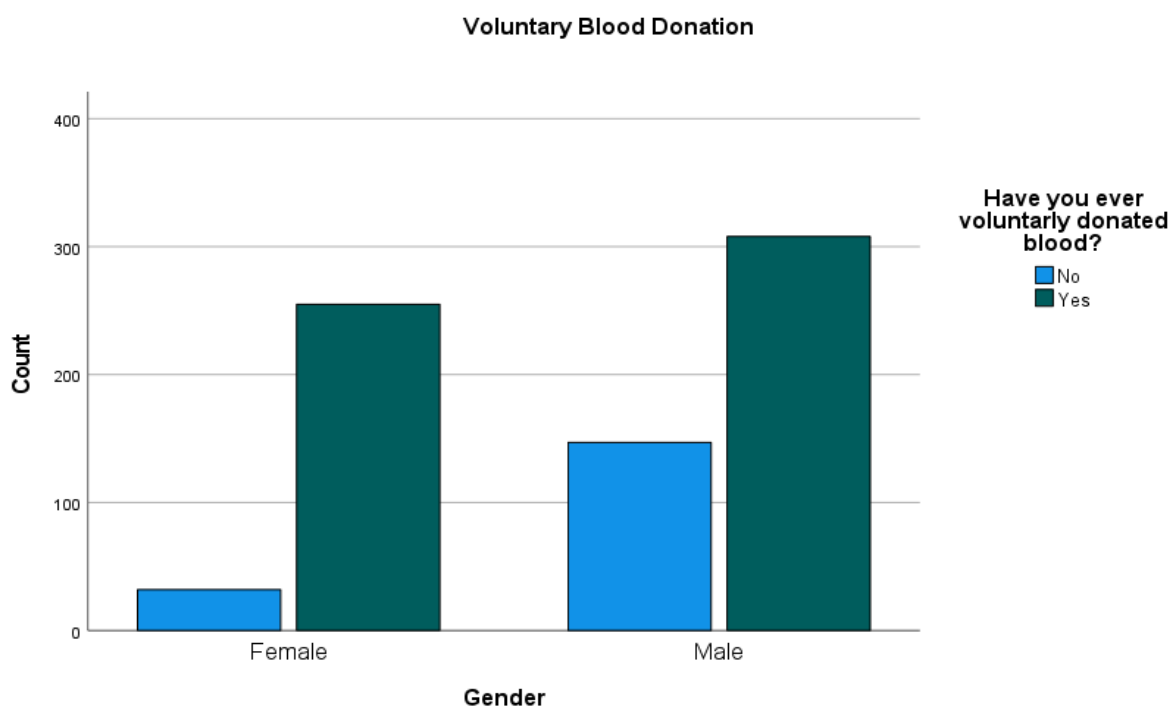


Figure 2. The VBD practices among respondents at Shashemene town, Oromia Region, Southern Ethiopia (N = 742)

Health System related factors

Nearly two-fifths of respondents, 296(39.9%), reported living more than 5 km away from the nearest blood donation center. In terms of transportation, 312(42%) of the participants reported walking to the

center, 282(38%) used public transport, and 148 (20%) traveled by private vehicle. Convenience of operating hours was reported by less than half of the respondents 341(46%). Additionally, 238(32%) reported facing challenges when donating blood (Table 4).

Table 4: Accessibility and Challenges of Blood Donation among Respondents in Shashemene town, Oromia Region, Southern Ethiopia (N = 742)

| Variable | Category | Frequency (n) | Percentage (%) |
|---|------------------|---------------|----------------|
| Distance to nearest blood donation center | < 1 km | 186 | 25.1 |
| | 1–5 km | 260 | 35 |
| | > 5 km | 296 | 39.9 |
| Mode of transport to center | Walking | 312 | 42 |
| | Public transport | 282 | 38 |
| | Private vehicle | 148 | 20 |
| Operating hours convenient? | Yes | 341 | 46 |
| | No | 401 | 54 |
| Challenges faced when donating | Yes | 238 | 32 |
| | No | 504 | 68 |

Cultural and social factors

The findings showed a high level of social and cultural acceptance, with 540(73%) of participants having family or friends who donate blood. Additionally, 578(78%) of participants reported no cultural barriers, and 90% stated their religion supports the practice. While

community perception was overwhelmingly positive (85%), the survey identified two areas for improvement: limited peer discussions about blood donation and the presence of perceived cultural barriers among a small percentage of the population (Table 5).

Table 5. The social and cultural aspects of blood donation among respondents at Shashemene town, Oromia Region, Southern Ethiopia (N = 742)

| Variable | Category | Frequency (n) | Percentage (%) |
|--|----------|---------------|----------------|
| Do any of your family/friends donate blood? | Yes | 540 | 73 |
| | No | 202 | 27 |
| Do you discuss blood donation with peers? | Yes | 401 | 54 |
| | No | 341 | 46 |
| Are there cultural barriers to blood donation? | No | 578 | 78 |
| | Yes | 164 | 22 |
| Community perception of blood donation | Positive | 631 | 85 |
| | Neutral | 74 | 10 |
| | Negative | 37 | 5 |
| Does your religion support blood donation? | Yes | 668 | 90 |
| | No | 74 | 10 |

Psychological and behavioral factors

A survey of 742 respondents found that 28% (208 people) had voluntarily

donated blood, while 72% (534 people) had not. Of those who had donated, 70% (146 people) had only done so once. Most donors,

80% (167 people), had not donated in over six months. The study also highlighted accessibility challenges. 40% of all respondents (296 people) lived more than five kilometers from a donation center. The most common mode of travel was public

transport, used by 60% (125 people) of donors. While the majority of donors (75%) did not face challenges, and 25% did experience difficulties during the donation process (Figure 3).

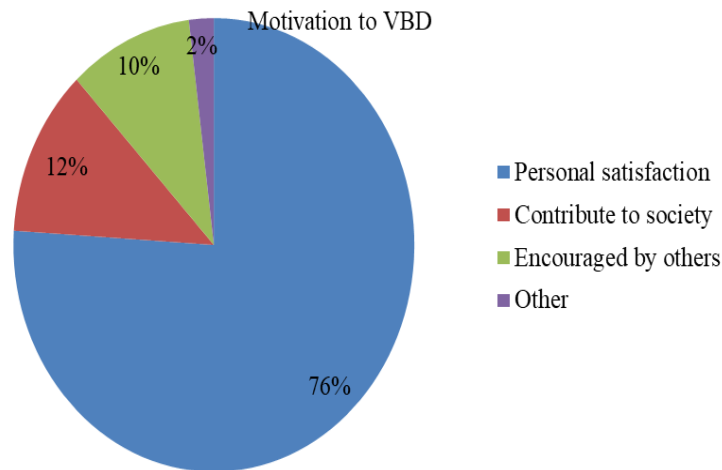


Figure 3. The factors motivating respondents for VBD at Shashemene town, Oromia Region, Southern Ethiopia (N=742)

Why respondents fear to donate blood?
 Participants were also requested **why they afraid of donating blood?** The responses to

this question given by the participants are shown below (Figure 4).

Cause of fear to donate Blood

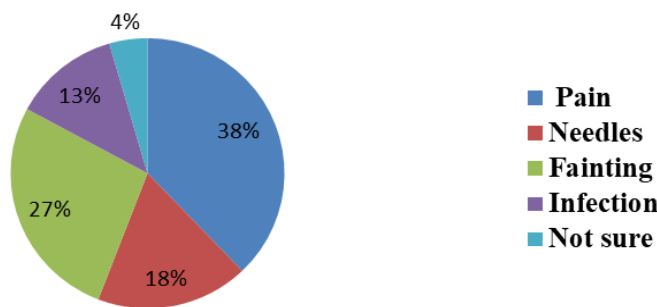


Figure 4. The misconceptions hindered VBD at Shashemene town, Oromia Region, Southern Ethiopia (N=742)

Factors associated with VBD

The investigation on the presence of association between independent variables and the outcome variable revealed several significant associations. Multivariable

logistic regression was performed to identify independent predictors of voluntary blood donation (VBD) among adults aged 18-65 years in Shashemene town. Variables that showed a p-value <0.25 in the bivariate analysis were entered into the model, including age group, sex, educational level, employment status, income, knowledge, attitude toward VBD, previous donation experience, fear of pain, community support, and distance to the donation center.

The analysis indicated that educational level, knowledge of blood donation; favorable attitude, previous donation experience, and proximity to a donation center were statistically significant predictors of VBD ($p < 0.05$). Specifically, participants with secondary education or higher were more likely to donate blood compared to those with no formal education (AOR = 2.46, 95% CI [1.45-4.19], $p < 0.001$), suggesting that higher education may enhance awareness and willingness to donate. Respondents with good knowledge of blood donation had nearly three times higher odds of donating than those with poor knowledge (AOR = 2.94, 95% CI [1.88-

4.60], $p < 0.001$), indicating that awareness of the process and benefits strongly influences donation behavior.

A favorable attitude toward blood donation also significantly increased the likelihood of donating (AOR = 2.11, 95% CI [1.28-3.49], $p < 0.003$), highlighting the role of personal beliefs and perceptions. Individuals with previous donation experience were substantially more likely to donate again (AOR = 3.65, 95% CI [2.12-6.28], $p < 0.001$), demonstrating the importance of prior practice in sustaining donation behavior. Additionally, participants residing within 1 km of a donation center were more likely to donate compared to those living more than 5 km away (AOR = 2.09, 95% CI [1.20-3.63], $p < 0.009$), indicating that accessibility significantly affects blood donation practices. These findings suggest that both socio-demographic factors, such as education, and psychosocial factors, including knowledge, attitude, experience, and accessibility, play crucial roles in voluntary blood donation (Table 6).

Table 6. The Factors associated with Voluntary Blood Donation (VBD) in Bivariate and Multivariable Analysis among Adults aged 18-65 in Shashemene town, Oromia, Ethiopia, 2025 (N=742).

| Variables | Category | VBD | | Adjusted OR (95% CI) |
|---------------------------|-----------------|------------|------------|----------------------|
| | | Yes (n, %) | No (n, %) | |
| Age (years) | 18-35 | 112 (38.3) | 180 (61.7) | 1.52 (0.83-2.80) |
| | 36-65 | 96 (24.3) | 362 (75.7) | 1 |
| Sex | Male | 138 (36.6) | 264 (63.4) | 1.62 (1.01-2.58)* |
| | Female | 70 (22.6) | 270 (77.4) | 1 |
| Education | Secondary+ | 122 (39.2) | 180 (60.8) | 1.74 (1.02-2.95)* |
| | Primary or less | 86 (22.8) | 354 (77.2) | 1 |
| Marital status | Single | 74 (34.9) | 138 (65.1) | 1.03 (0.51-2.05) |
| | Married | 134 (25.6) | 390 (74.4) | 1 |
| Employment | Employed | 88 (37.1) | 149 (62.9) | 0.56 (0.21-1.51) |
| | Unemployed | 120 (24.5) | 370 (75.5) | 1 |
| Income (ETB/month) | ≥3000 | 84 (34.1) | 162 (65.9) | 1.22 (0.59-2.52) |
| | <3000 | 124 (25.7) | 358 (74.3) | 1 |
| Knowledge on VBD | Good | 98 (34.5) | 186 (65.5) | 1.27 (0.66-2.43) |
| | Poor | 110 (25.5) | 322 (74.5) | 1 |
| Attitude toward VBD | Favorable | 102 (33.0) | 207 (67.0) | 2.11(1.28-3.49) |
| | Unfavorable | 106 (25.9) | 301 (74.1) | 1 |
| Previous donation | Yes | 92 (52.3) | 84 (47.7) | 3.65 (2.12-6.28)* |
| | No | 116 (20.2) | 450 (79.8) | 1 |
| Fear of pain | No | 134 (35.2) | 247 (64.8) | 1.58 (1.03-2.43)* |
| | Yes | 74 (20.4) | 287 (79.6) | 1 |
| Community support | Positive | 128 (42.4) | 174 (57.6) | 2.21 (1.40-3.47)* |
| | Negative | 80 (18.6) | 360 (81.4) | 1 |
| Distance to donation site | < 5 km | 90 (32.5) | 187 (67.5) | 2.09(1.20-3.63) |
| | ≥ 5 km | 118 (25.9) | 347 (74.1) | 1 |

* Statistically associated at $p < 0.05$; ** Statistically associated at p value 0.001

Discussion

This study explored VBD practices and associated factors among adults in Shashemene town. The overall VBD prevalence was 28%. This is comparable to earlier Ethiopian studies (16,17), likely due to similarities in socio-demographic profiles. However, it remains lower than national expectations and WHO recommendations for sustainable blood supply (1,4). Similar to findings from other low- and middle-income settings, structural, informational, and socio-

cultural barriers continue to limit regular voluntary donation (2).

Consistent with previous evidence, male participants were more likely to donate blood than females (7,8). This difference may reflect cultural norms, physiological factors, and gender-related health concerns (such as menstruation, pregnancy, and lactation) that can discourage women from donating (2,19).

Educational status was a significant predictor of VBD, aligning with earlier studies indicating that individuals with

secondary education or higher tend to have better awareness, understanding of eligibility, and more positive attitudes toward donation (20,21). While employment status showed an association in bivariate analysis, it was not significant in the multivariable model, suggesting that its effect may be mediated by education and awareness levels (22).

Good knowledge of blood donation had a strong positive relationship with VBD, echoing prior research emphasizing the role of accurate information in improving donation behavior (2,21). Favorable attitudes toward blood donation also increased the likelihood of donating, consistent with studies highlighting that perceiving donation as a civic responsibility enhances participation (19,23).

Previous donation experience emerged as one of the strongest predictors, mirroring evidence that first-time donors who have positive experiences are more likely to become repeat donors (24,25). Similarly, fear of pain, a prominent psychosocial barrier, negatively influenced donation practices, reinforcing findings from earlier studies underscoring the impact of anxiety and misconceptions on donor participation (10,26).

Community support was significantly associated with VBD, aligning with studies showing that encouragement from family,

peers, and community institutions increases the likelihood of donating blood (27,28). Accessibility also played a key role, as participants residing closer to donation sites were more likely to donate. This supports evidence that physical distance, transportation limitations, and inconvenient operating hours can hinder blood donation, particularly in resource-limited settings (5,6). The findings of this study have practical and societal implications for improving voluntary blood donation. Strengthened community engagement, culturally tailored awareness campaigns, and improved accessibility of donation services are essential to address knowledge gaps, misconceptions, and fears. Health institutions and local authorities should promote voluntary donation as a civic responsibility, integrate donor education into routine services, and enhance donor retention efforts. These actions can help reduce dependence on family replacement donors, improve emergency and maternal care, and strengthen overall health system responsiveness.

The study also identifies important research gaps. Future studies should explore cultural and psychological barriers in greater depth and assess the effectiveness of targeted interventions such as community mobilization, digital reminders, and school- or workplace-based programs. Comparative

and longitudinal research across different settings would generate more robust evidence to guide policy and strengthen voluntary blood donation practices in Ethiopia.

This study has several limitations. First, the cross-sectional design limits the ability to establish causal relationships between predictors and voluntary blood donation. Second, self-reported practices and attitudes may be affected by social desirability bias, potentially overestimating positive behaviors. Third, data were collected in an urban setting, which may not fully represent rural populations with different cultural and accessibility barriers. Fourth, some variables such as fear, cultural influence, and peer discussions were measured subjectively, which may introduce reporting bias. Despite these limitations, the study provides valuable insights into determinants of blood donation behavior in Shashemene town.

Authors' Contributions

KA was the principal investigator and conceived the study and was involved in the study design, supervised data collection, analyzed and interpreted the data, report writing. AF supervised the idea and approved the proposal and took part in the follow up of principal investigator, oversaw data analysis and contributed throughout the

process of the write-ups. KZ Writing the manuscript. EA: Reviewed and edited the manuscript. NG Review and Editing, interpretation of data and approved the final manuscript. All authors have made substantial contributions to this manuscript.

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Availability of data and materials

The datasets produced and/or analyzed throughout the current study are available from the authors for reasonable request.

Ethics approval and consent to participate

Ethical clearance was obtained from the Institutional Research Ethics Review Committee (IRERC) of Pharma College, and permission was obtained from the administrators of the selected sub-cities and kebeles in Shashemene town. Confidentiality and privacy was maintained throughout the study. Written informed consent was obtained from each participant after explaining the purpose of the study, the confidentiality of the data, and the voluntary nature of participation. To ensure anonymity, data was anonymized using

unique codes instead of names, ID numbers, or phone numbers, and all information was kept confidential. Participants are also informed of their right to withdraw from the study at any time without any consequences.

Consent for publication

Not applicable.

Competing Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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