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Research Article

The Practice of Blood Donation and Its Related Factors Among Medical Professionals Working in Public Hospitals in Hawassa City, Sidama, Ethiopia, in 2025

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Abstract

Blood is a crucial resource for modern healthcare, necessary for surgeries, trauma care, and treating various illnesses. However, many countries, particularly developing ones, face chronic blood shortages, which negatively affect patient care and outcomes. Health professionals, due to their medical expertise and influence, are a key potential source of blood donations. Understanding their donation practices, and associated factors is essential to develop targeted interventions to boost donation rates, ensure a stable blood supply, and improve overall healthcare delivery by creating a more reliable and safe blood supply. The aim of the study was to assess the blood donation practice and associated factors among health professionals in public hospitals in Hawassa city, 2025. An institutional-based cross-sectional study design was employed. A stratified random sampling technique was used, drawing from the payroll of health professionals from five governmental hospitals, with a total sample size of 372 participants were responded. Data was collected using structured questionnaires, entered and coded into kobo tool, then exported to SPSS version 20 for bivariate logistic regression analysis with a 95% confidence interval and a p-value < 0.05 for statistical significance. This study found that the practice of blood donation is low (28.4%,) at 95% CI (23.8, 32.9) meaning poor practice. Age, Sex, Marital status, educational status and attitudinal perception about blood donation were significantly associated with a blood donation practice at 5% level of significance. Respondents who were in age group of 20-28 years were 3.4 times (AOR=3.4, 95% CI: 1.6, 8). male was 1.7 times (AOR=1.7, 95% CI: 1, 3), Being in married was 2 times (AOR: 2, 95% CI (1, 4), Positive attitudinal & perception about blood donation were 6.8 times (AOR: 6.8, 95% CI: 3.5, 13) and Respondents who had MSC and above were 3.8 times (AOR: 6.8, 95% CI 1.3, 7.8) were significantly associated about good practice of blood donation. In this study the practice of blood donation is poor. Age, Sex, Marital status, educational status and attitudinal & perception about blood donation were significantly associated with blood donation practice.

Keywords

Blood, Blood Donation Practice, Health Professionals, Hawassa City

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1. Introduction

The World Health Organization (WHO) urged all countries to obtain their blood supplies from voluntary, non-remunerated donors by the year 2020 [1]. However, 40 countries in Africa have donation rates below the WHO threshold level of 1%, which is required to meet the most basic blood requirements. Many countries in Sub-Saharan Africa are still unable to meet the minimum need for blood transfusions from all sources combined [2]. The fact that there is no substitute for human blood makes blood donation crucial. To cope with the ever-growing demand, the Ethiopian National Blood Bank Service collects over 200,000 units of blood annually from non-remunerated donors. The demand, however, stands at 18,000 units of blood, yet the average daily amount collected is approximately 1,100 units (1,100 pints/517 liters), resulting in a shortfall of 16,900 pints/7,943 liters [3].

The Ethiopian Ministry of Health reported that in 2019/20, Ethiopia collected 223,000 units of blood, meeting only 22% of its need as per the WHO standard [4]. To ensure safe, adequate, and sustainable blood supplies nationwide, health workers play a significant role in various ways. Health professionals, desperate to save patients, give blood themselves, but it is just a drop in the ocean compared to the demand. Although health professionals have good knowledge about blood donation, their practice of donating and initiating the community to donate blood is minimal only about 36.7% have ever donated blood in their lifetime [5].

Health professionals are vital in mobilizing the community toward voluntary blood donation. Therefore, they need to be at the forefront of practicing and creating awareness and a favorable attitude about the importance of blood donation [6]. It should be understood that blood supplies are insufficient compared to the demand and need to be gathered from the voluntary population. Additionally, health workers are expected to practice blood donation to create a positive image for the public [7]. Blood services are facing a tremendous shortage of blood globally. The demand for blood is rising rapidly, and current blood donations are insufficient to meet this demand [8, 9]. The inaccessibility and scarcity of blood have led to deaths and many patients suffering from ill health. In many countries, family members are often forced to donate blood or find another donor in emergency situations. This causes emotional and financial stress and major delays in obtaining suitable blood, which puts patients at risk of blood-borne infections, as there is often no time or facilities to properly screen the donated blood [10].

A reliable and adequate supply of safe blood can be ensured by a stable base of regular, voluntary, unpaid blood donors [11]. Regular, voluntary, unpaid blood donors are considered the safest group of donors. Access to a safe and sufficient blood supply could prevent up to 150,000 pregnancy-related deaths globally each year. However, in developing countries, there is a significant challenge in providing safe and adequate blood [12].

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Health professionals are vital in mobilizing the community toward voluntary blood donation. Therefore, they need to be at the forefront of practicing and creating awareness and a favorable attitude about the importance of blood donation [6]. It should be understood that blood supplies are insufficient compared to the demand and need to be gathered from the voluntary population. Additionally, health workers are expected to practice blood donation to create a positive image for the public [7]. Blood donation is a voluntary service aimed at helping others in their time of need. This activity is directed by health professionals, who are responsible for initiating and motivating the entire society in cooperation with other concerned bodies. They are also responsible for collecting the blood. In this context, they are the main advocates for this honorable service in saving lives. In Hawassa Town there are hospitals to provide curative health care were provided, where many cases from surrounding areas are referred, blood is vital for providing good service to patients. Major surgeries take place, emergencies are packed with patients needing blood, and maternal and child services require blood immediately. The health professionals working at each facility play a crucial role in the supply of blood, as they are expected to have knowledge about the benefits of donating blood and are presumed to have a favorable attitude towards it since it is part of their job.

Health professionals are important in the recruitment of blood donors, and having knowledge about blood donation, a positive attitude towards promoting voluntary blood donation, and higher donation rates are essential for effective recruitment. Identifying the possible factors affecting blood donation in the study area can help design evidence-based interventions and education for healthcare workers that can improve their knowledge, attitude, and practice, leading to increased voluntary donations and blood collections.

This study assessed the practice of blood donation and the factors related to or associated with the behavior of health professionals working at Hawassa town public Hospitals. The information gained from this study was revealed the current situation of health professionals regarding blood donation practice and the factors impacting them. The results will be provided valuable insights to develop strategies to address and solve the problem.

2. Objectives

2.1. General Objective

To assess the blood donation practice and associated factors among health professionals in public hospitals in Hawassa city, 2025.

2.2. Specific Objectives

To assess the blood donation practice among health professionals in public hospitals in Hawassa city.

To identify the factors that associated with blood donation practice in public hospitals in Hawassa city.

3. Methods and Materials

3.1. Study Area

The study was conducted in public hospitals in Hawassa City. Hawassa is one of the fastest growing cities in Ethiopia and hub of Sidama National Regional State. Hawassa city located 275 Km to south of Addis Ababa. Based on the information from Hawassa City Municipality the population projection of 2014/15 of the city has more than 500,000 populations. The city has a total area of 119,316 Square kilo meters. In city there are five public health hospitals (Hawassa university comprehensive specialized hospital, Adare general hospital, Tulla general hospital, Motite Fura primary hospital and Alamura primary hospital. Two thousand five hundred fifty professional health care providers are found in Hawassa public hospitals. Hawassa university comprehensive specialized hospital, Adare general hospital, Tulla general hospital, Motite Fura primary hospital and Alamura primary hospital have 717,448,328,316 and 239 health care providers respectively according to Hawassa city health department 2024 health management informatics systems.

3.2. Study Design and Period

Institutional based cross- sectional study design was conducted from March 20 to April 20, 2025.

3.3. Population

3.3.1. Source Population

All health professionals working in public hospitals in Hawassa city.

3.3.2. Study Population

Randomly selected health professionals working in public hospitals in Hawassa city during study period.

3.4. Inclusion & Exclusion Criteria

3.4.1. Inclusion Criteria

All health professionals, they are currently working in public hospitals and voluntary to participate in the study.

3.4.2. Exclusion Criteria

Individuals who were sick and absent during the data collection period.

Individuals with severe physical and mental illness.

Unwillingness to participate the study. Individuals' temporary employees.

3.5. Sampling Technique and Procedure

3.5.1. Sample Size Determination

The sample size was calculated using single population proportion formula by considering the following assumptions: p= (34.2%) Proportion taken study done from Addis Ababa [13].

d =Margin of error as 5%, CI =confidence level at 95%, Non-response rate of 10%

$$n=\frac{\left(\frac{Z\alpha}{2}\right)2*P*(1-P)}{d2}$$

$$n=\frac{1.96*1.96\ x\ 0.342\ x\ 0.658}{0.05\ x\ 0.05}$$

$$n = 345$$

10% non-respondent Total sample size was 380.

3.5.2. Sampling Procedure

A total of 380 health professionals were selected using a stratified random sampling method. The list of health professionals working in the five governmental public hospitals of

Hawassa city were obtained from the human resource departments of all hospitals. The professionals were divided into strata according to their professions. From each stratum, samples were selected using a simple random sampling method, ensuring proportional distribution to each facility's record as the sampling frame.

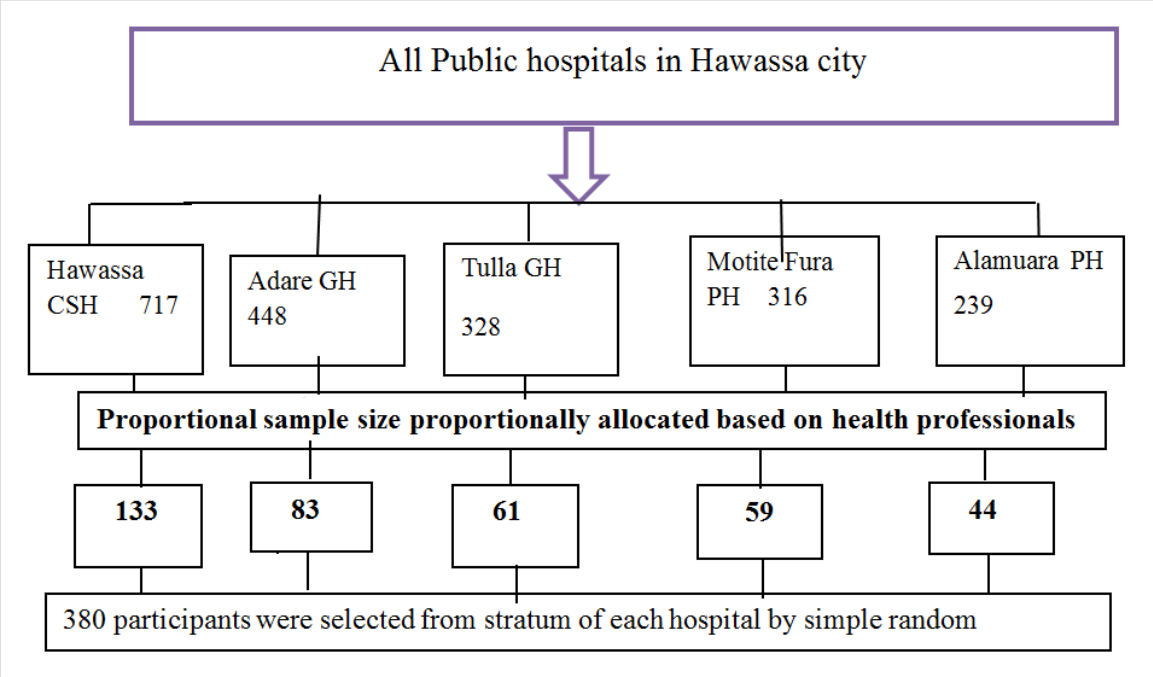

Figure 1. *Diagram representation of the sampling methods for blood donation practices and related variables among medical staff in Hawassa City's public hospitals in 2025.*

3.6. Study Variables

3.6.1. Dependent Variable

Blood donation practice.

3.6.2. Independent Variables

Socio-demographic factors:

Age, sex, marital status, educational level, Religion and place of residence.

History of blood donation:

Blood donation related questions:

Attitude and perception related questions about blood donation:

3.7. Data Collection Procedure and Quality Assurance

Data were collected by using structured self-administered questionnaires after using 5%pretested checklists prepared English version done before actual data collection. 4 BSC nurses for data collectors and supervisors were used.

A standardized English version questionnaire was adapted and translated in to Sidaamu to ensure consistencies. Data collectors and supervisors were orientated for 1 day on the kobo tool and process of data collection. After that, a pretest were conducted on 5% of the sample size to ensure the reliability of the tool, and then the correction was made before the actual data collection.

3.8. Operational Definitions

Blood donation practice: Practice about blood donation was categorized after asking four questions. Those respondents who scored greater than or equal to the mean for practice questions were considered as good practice, otherwise not [16].

Attitude about blood donation: was categorized after asking seven questions using a likert scale method and the mean scores were computed and dichotomized into favorable (positive attitude) (score ≥ mean value) or unfavorable (negative attitude) (<mean value) [16].

3.9. Data Management and Analysis

The data was entered and coded in to kobo tool on creating the questionnaire. The entered data were cleaned to ensure the validity of the data. Then, the analysis was done using SPSS version 26 after exporting the prepared data. Descriptive statistics and logistic regression were computed. All variables were used in the bivariate logistic regression analysis and a

variable with p-value ≤0.25 was candidate for multi-variable logistic regression analysis. And Hosmer and Lemeshow goodness of fitness test was done to control confounding variables. The adjusted odds ratio (AOR) and 95% CI was used to show the direction and strength of statistical association. A *p*-value <0.05 was used to measure statistical significance.

3.10. Ethical Considerations

Ethical clearance was obtained from Hawassa University College of Medicine and Health Science Institutional Review Board (IRB). Permission letters were obtained from Sidama Region public Health Institute, Hawassa city administration health department and medical directors of the hospitals. The study participant was informed oral consent was acquired from the study participants after explaining the purpose of the study. The confidentiality of the study participants were maintained throughout the study.

4. Results

4.1. Socio-demographic Characteristics of Respondents

Three hundred eighty respondents participated in the study giving a response rate of 97.8%. Among respondents 244(65.2%) were males and 167 (44.4%) fall under the age category of 20-28. The mean age of the participants was 31.86 + (standard deviation 4.783). The majority 273(73%) were married. Almost all 371 respondents were governmental employers. Regarding to educational status, the BSC was the majority which accounted 65%. And 365 (96.3%) of respondents were urban resident. The majority, one hundred ninety eight and one hundred four of respondents were Orthodox and Protestant religion respectively.

Table 1. *Socio-demographic characteristics of health professions in public hospital in Hawassa city, 2025.*

Variable	Response	Frequency	Percent
Age	20-28 years	159	44.4
	29-37 years	158	42.3
	>37 years	45	13.3
Sex	Male	244	65.2
	Female	128	34.8
Marital status	Single	88	24.2
	Married	273	72.9
	Divorced	9	2.9
Educational status	Bachelor Degree	243	64.5
	Master Degree	129	34.5
	Diploma	2	0.5
	PHD	2	0.5
Occupational status	House wife	1	0.2
	Government	371	99.8
Residence	Urban	365	98
	Rural	7	2
Religion	Orthodox	198	51.2
	Muslim	26	7.8
	Catholic	24	7.3
	Protestant	124	33.6

4.2. Blood Donation History

Table 2. *Blood donation history of study participants, health professionals in public hospital in Hawassa city, Sidama Ethiopia, 2025.*

Variable	Responses	Frequency	Percent
Have you ever donate blood?	yes	224	60
	no	148	40.0
How many times have you donated blood?	one time	0	0
	2-3 times	14	4.2
	4-5 times	72	19.5
	5-6 times	99	26.6
	More than 6 times	35	9.7
How did you find out about blood donation opportunities?	Social media	6	2.1
	Community events	26	7
	School / university	63	17
	Work place	125	33
	Health care facility	1	0.2

4.3. Blood Group of the Study Participants

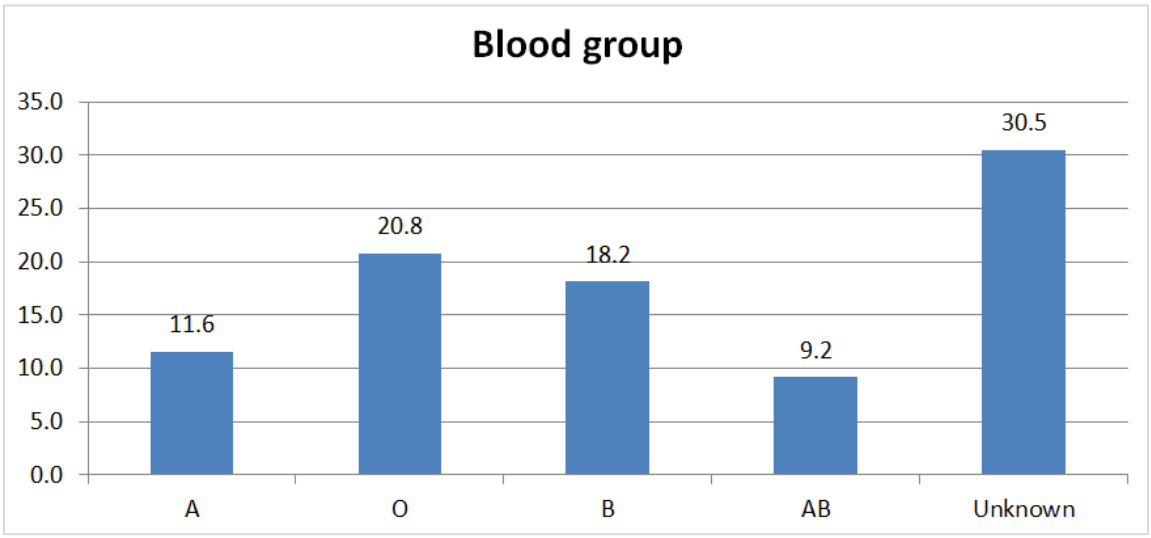

Figure 2. *Blood group of the study participants in Hawassa City's public hospitals in 2025.*

4.4. Practice of Blood Donation

Four questionnaires about blood donation practices and the study participants' answers are shown in the table below. The aggregate mean of the respondents' responses, as determined by the mean score calculation technique, was 2.0579. Individuals with scores equal to or higher than the overall mean were deemed to have good blood donation practices, whereas those with scores below the mean were deemed to have bad blood donation practices. Therefore, 108 (28%) of the 372 study participants had good blood donation practices, while 78% had poor practices.

Table 3. Practice of Blood Donation among health professionals in public hospital in Hawassa city, Sidama Ethiopia, 2025.

Variables	category	Frequency	Percent
1. How often do you donate blood?	Twice a year	90	24.7
	Every three month	130	34.7
	Total	220	59.5
	Missing (non-donors)	152	40.5
Total		372	100.0
2. What type of blood donation do you usually participate in?	Whole blood	221	59.5
	(non-donors)	151	40.5
Total		372	100.0
3. Have you ever experienced any adverse effects after donating blood?	Yes	36	10.5
	No	336	89.5
	Total	372	100.0
4. Do you feel adequately informed about the blood donation process?	No	224	60.5
	Yes	147	39.5
	Total	372	99.5

From the above table study participants had 104(28%) of good practice about blood donation at (95%CI23, 33).

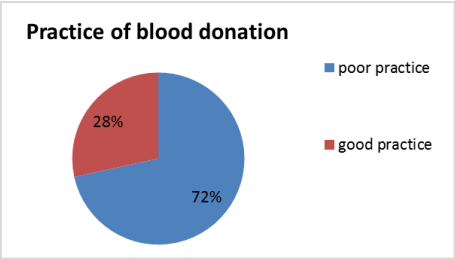

Figure 3. Blood donation practice of the study participants at Hawassa city public hospitals at 2025.

4.5. Attitude and Perception about Blood Donation

Seven attitudes and perceptions questions about blood donation are included in the table below, along with the answers. Using the mean score calculation method, the respondents' overall mean response was 2.0867. Positive attitudes regarding blood donation were attributed to those who scored equal to or higher than the overall mean, whereas negative attitudes toward blood donation were attributed to those who scored lower than the mean. Therefore, out of the 372 study participants, 216 (58%) had a positive attitude toward blood donation, whereas 42% had a negative attitude (table 3).

Table 4. Attitude and perception about blood donation of the study participants.

Variable	Response	Frequency	percent
1. How important do you think blood donation is?	Not important [1]	22	6.3
	Neutral [2]	62	16.9
	Important [3]	97	26.2
	Very important [4]	171	50.5
	Total	372	100.0
2. Do you know who is eligible to donate blood?	No [1]	143	38.7
	Yes [2]	229	61.3

Variable	Response	Frequency	percent
	Total	372	100.0
	Negative [1]	3	1.1
	Neutral [2]	134	36.3
	Positive [3]	235	62.6
3. What do you think about the idea of donating blood?	Total	372	100.0
	No [1]	52	14.2
	I don't know [2]	93	25.3
	Yes [3]	226	60.5
	Total	372	100.0
5. Do you have any fears or worries about donating blood?	No [1]	35	10.3
	Yes [2]	337	89.7
	Total	372	100.0
6. Have you ever donated blood before?	No [1]	150	40.7
	Yes [2]	222	59.3
	Total	372	100.0
7. Do you think leaders influence whether or not people donate blood?	No [1]	156	42.1
	Yes [2]	216	57.9
	Total	372	100.0

From the above table study participants had 216(58%) of positive attitude and perception about blood donation at (95% CI 52.9, 62.9).

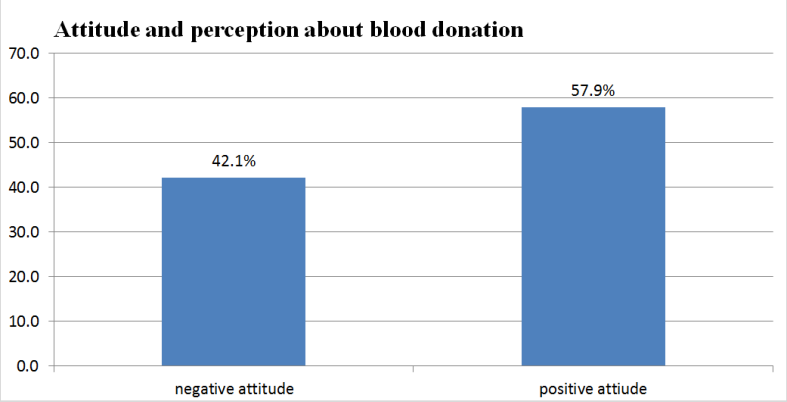

Figure 4. *Attitude and perception about blood donation of the study participants at Hawassa city public hospitals at 2025.*

4.6. Factors Associated with Blood Donation Practice

In bi-variable analysis: Age, Sex, Marital status, educational status and attitudinal&perception about blood donation were significantly associated with blood donation practice. Multivariate logistic regression analysis was used to control confounding variables and to identify independent predictors of blood donation health professionals in public hospital in Hawassa city. Age, Sex, Marital status, educational status and attitudinal perception about blood donation were significantly associated with a blood donation practice at 5% level of significance. Respondents who were in age group of 20-28 years

were 3.4 times (AOR=3.4, 95% CI: 1.6,8) more likely in donating blood than those above 37 years. Odds of blood donation practice was 1.7 times higher for male (AOR=1.7, 95% CI: 1, 3) when compared to female. Being in married (AOR: 2, 95% CI (1, 4) had higher the Odds of blood donation by 200% when compared to those who were single. Respondents who had good attitudinal & perception about blood donation were 6.8 times higher than their counterparts (AOR: 6.8, 95% CI: 3.5, 13). Respondents who had MSC and above were 3.8 times higher (AOR: 6.8, 95% CI 1.3, 7.8) than those having BSc and diploma certificate.

Table 5. *Bivariate and multivariate analysis for factors associated with blood donation practice among health professionals in public hospital in Hawassa city, Sidama Ethiopia, 2025.*

Variable	Response	Practice of blood donation		COR at 95% C. I	AOR at 95% C. I	P-value
		Good	Poor			
Age in years	20-28	59	108	4 [1.8, 12]	3.4 [1.6,8.3]	0.00
	29-37	40	118	2.8 [0.95, 2.4]	3 [0.97,7.6]	0.058
	>>37	5	43	1	1	
Sex	Male	82	158	3 [1.4, 4.4]	1.7 [1.05,3.21]	0.047
	Female	18	110	1		
Marital status	Married	89	183	2.5 [1.4, 4.5]]	2 [1.02,4.5]	0.033
	Single	15	85	1	1	
Educational level	MSc &above	45	84	1.67 [1, 2.6]	3.8 [1.8,7.8]	0.002
	Bsc&diploma	59	184	1	1	
Attitude&perception about blood donation	Positive	93	123	8.6 [4.6, 16]	6.8 [3.5, 13.2]	0.001
	Negative	11	145	1	1	

Keys: COR=crude odd ratio; AOR=Adjusted odd; CI =confidence interval, 1=reference group

5. Discussion

At 95% CI (23.8, 32.9), 28.4% of participants in this study good donation of blood. Blood donation practices were substantially associated with age, sex, marital status, educational status, and attitudes and perceptions toward blood donation. Even still, the study's findings of health professionals' blood donation practices were found to be low when compared to other studies carried out in developing nations and WHO recommendations, especially when it came to the level of frequent and voluntary blood donation. A research at Nnamdi Azikiwe University in Awka, Nigeria, revealed that 59.5 percent of the medical personnel donated blood [19] while another study in the Tigray region revealed that 47 percent of the medical staff at public hospitals did the same [20]. Blood banks and other social organizations that promote blood donation may be to blame for this discrepancy. however in this study it is relatively higher than similar studies conducted in other parts of the country like a comprehensive analysis conducted in Ethiopia revealed that the combined prevalence of blood donation was 25.82% [5], followed by Samara University (24.5%) [9], Madawalabu University (18.4%) [17], and other places such as South India (21.75%) [18]. This study was conducted recently, which could explain the higher practice. These days, blood donation is promoted by the Ministry of Health and the WHO.

People between the ages of 20 and 28 were 3.4 times (AOR=3.4, 95% CI: 1.6, 8) more likely to donate blood than people over the age of 37. According to a related study, respondents who were 18–20 years old and those who were 21–23 years old were six times more likely to donate blood than respondents who were 24 years of age or older [AOR 6.14 (1.82-20.69) and AOR 6.49 (2.04–20.64)], respectively [17]. But among students at Hargeisa University, older age groups are 1.28 times more likely to give than younger ones [21]. Blood donation among students at Addis Ababa Health Science College is associated with older age [AOR (95% CI) = 6.5 (1.6, 26.9) [22]. Additionally, another study by health professionals at the University of Gondar Northwest in Ethiopia found that participants over 25 were twice as likely to donate blood than those under 25 [15]. Differences in research period, methodology, and other demographic factors

could be the cause of this.

Males were 1.7 times more likely than females to practice blood donation (AOR=1.7, 95% CI: 1, 3). This research is comparable to a study In Nigeria, being male increases the odds of donation by 3.8 times (AOR=3.8; 95% CI: 1.7-8.2), according to a descriptive cross-sectional study design conducted among 300 students. Additionally, among Addis Ababa Health Science College students, being male [AOR (95% CI) =3.9 (1.4, 10.8)] was significantly associated with blood donation practice [22]. According to a different survey conducted among students at Hargeisa University, men are 7.5 times more likely than women to donate [21] which is higher. But in Kilimanjaro, Tanzania, men were 48% less likely than women to donate blood (AOR: 0.52 (0.03–0.92) [23].

Compared to respondents with a BSc and diploma, those with an MSC or higher showed a 3.8-fold higher AOR (6.1, 95% CI 1.3, and 7.8). According to this study, which is backed by a cross-sectional study conducted among students at Ambo University, students with literate parents were 2.46 times [AOR, 95% CI], 2.46 times [1.44-4.2)] more likely to voluntarily donate blood than students from illiterate families [24]. Even though these medical professionals are a significant and healthy source of blood, the current study's findings indicate that everyone needs to be educated and encouraged to donate blood.

Positive attitudes and perceptions toward blood donation were 6.8 times more prevalent among respondents than among those who did not (AOR: 6.8, 95% CI: 3.5, 13). According to a similar study conducted among medical professionals in Ethiopia's Tigray region, Samara university, those who had a good attitude toward blood donation were higher to give blood than those who had a negative attitude [14, 20]. Married people had a 200% higher chance of donating blood than single people (AOR: 2, 95% CI (1, 4). One study conducted in Addis Ababa, Ethiopia, and Nigeria supports it [13, 15].

Limitation and Strength of the Study

The response might have been liable to reporting bias since the result depends on only their response.

Lack of qualitative exploration of factors limits the in-depth understanding of factors

Cross-sectional nature of the study design cannot assess the cause and effect relationship.

It has to be noted that the finding of this study mainly reflects the situation at Hawassa city, public hospitals particularly for employed health professionals. Therefore, the findings should be interpreted with caution.

6. Conclusion and Recommendation

6.1. Conclusion

Blood donation practice of health professionals in this study was found to be low as compared to other studies conducted in developing countries. It is also lower compared to WHO recommendation; particularly the level of voluntary blood donation and regular donation is very low. Age, Sex, Marital status, educational status and attitudinal & perception about blood donation were significantly associated with blood donation practice are factors associated with blood donation practice of respondents. These factors should be considered during blood donation program development.

6.2. Recommendation

Following the findings of the study, the following recommendations were made;

Hawassa city hospitals

Re-strengthen blood donation clubs

Working with various agencies to remove the misconceptions which are attached to blood donation.

Blood Bank

Health professionals need to receive training on blood donation to create and increase awareness about blood donation.

Preparing regular blood donation campaigns to give near access for health professionals.

Encouraging, recruiting and motivating potential donors including newly enrolled Hospital health professional staff from all Hawassa city public hospitals and health centers in order to have a pool of eligible donors.

Researchers

More studies need to be conducted by using qualitative method to identify more factors.

Abbreviations

AOR	Adjusted Odds Ratio
CI	Confident Interval
COR	Crudes Odds Ratio
CBHI	Community Based Health Insurance
OPP	Out of Pocket Payment
SPSS	Statistical Package for Social Science
SHI	Social Health Insurance
WHO	-World Health Organization
VNBD	Voluntary non Remunerate Blood Donors
IRB	Institutional Review Board
EDHS	Ethiopia Demographic and Health Surveys
SSA	Sub- Saharan African
SNRS	Sidama National Regional State

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Author Contributions

Kassie Temesgen Kebede: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing

Teshale Abera: Formal Analysis, Investigation, Methodology, Software, Validation, Visualization**,** Writing – review & editing

Fekadu Atalel: Formal Analysis, Investigation, Methodology, Software, Validation, Visualization**,** Writing – review & editing

Mulugeta Edao Shate: Formal Analysis, Investigation, Methodology, Software, Visualization, Writing – review & editing

Robel Mesfine: Formal Analysis, Investigation, Methodology, Software, Visualization, Writing – review & editing

Data Availability Statement

We described all the relevant information in the manuscript, but the refined dataset can be obtained from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare no conflicts of interest.

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