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Original Research

Investigation of Knowledge, Attitude, Practice, and Its Associated Factors Regarding Blood Donation among Healthcare Workers in Private and Government Hospitals in Dire Dawa, Eastern Ethiopia

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Abstract

Background: Blood donation is a critical component of healthcare systems, yet knowledge, attitude, and practice (KAP) regarding blood donation among healthcare workers can vary significantly. This study investigates the KAP related to blood donation and associated sociodemographic factors among healthcare workers in private and government hospitals in Dire Dawa, Eastern Ethiopia.

Methods: The study used an institution-based cross-sectional design with stratified random sampling, allocating samples proportionally from each department. Data were collected via pre-tested self-administered questionnaires and analyzed using SPSS version 26 software.

Result: The findings revealed that the magnitude of knowledge, attitude, and practice regarding blood donation among participants was 78.0%, 79.2%, and 31.8%, respectively. Length of service as a healthcare worker (6-8 years) was significantly associated with increased knowledge (AOR=7.031; 95% CI=1.665-29.696) and a nine-fold increase in favorable attitudes towards blood donation (AOR=9.128; 95% CI=1.666-50.023). Additionally, motivation by others to donate blood was positively correlated with knowledge (AOR=2.443; 95% CI=1.166-5.119). Conversely, being male (AOR=2.153; 95% CI=1.127-4.111) and holding a Diploma qualification (AOR=0.173; 95% CI=0.097-0.311) were significantly associated with the practice of blood donation.

Conclusions: The study found that healthcare workers in Dire Dawa have good knowledge and positive attitudes towards blood donation, but their actual participation is low. To improve blood donation practices, targeted interventions should focus on practical engagement and addressing gender disparities. Further research is needed to identify additional barriers to blood donation among these workers.

Keywords: Knowledge, Attitude, Practice, Blood Donation, Health Workers, Dire Dawa

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1. Introduction

Blood is a vital bodily fluid that transports oxygen and nutrients to cells and removes metabolic waste products from them. The ABO blood group system, discovered by Dr. Karl Landsteiner in 1901, was a significant development in blood donation. Although stored blood was used during World War I, it was not until 1937 that the first large-scale blood bank was established in Chicago. By the end of the war, blood transfusion had become widely accepted as the preferred treatment for severe blood loss [1].

Safe blood transfusion is a crucial aspect of healthcare delivery that saves millions of lives every year. The demand for blood and blood products is increasing globally [2]. Generous blood donors play an essential role in modern healthcare by providing a life-saving resource. However, transfusion of infectious agents can pose potential risks to the recipient, necessitating particular attention. Therefore, it is essential to assess the knowledge, attitude, and practice among healthcare providers to identify gaps and implement appropriate strategies within the institution [1, 3].

In Sub-Saharan Africa, where the demand for blood is high, only 2 million units are donated each year out of the global total of over 80 million units. This creates a significant gap between blood requirements and supplies in many developing and transitional countries, with less than half of the needed blood being collected [4]. This is due to increasing demand for transfusions resulting from road traffic accidents, fighting accidents, pregnancy, and childbirth. Additionally, inadequate screening of donated blood, economic stress, delays in obtaining safe blood, and the risk of blood-borne infections further exacerbate the problem [4, 5]. Despite having a national blood transfusion service, Soroti Regional Referral Hospital in Uganda, which serves a population of approximately 2 million people in the northeastern region, has experienced a shortage of blood for patients. The hospital has 300 beds and is a teaching hospital [6].

In 1969, the Ethiopian Red Cross Society established the National Blood Transfusion Services (NBTS), which was later transferred to the Federal Ministry of Health. The NBTS is responsible for managing blood donors, collection, testing, and transfusion of blood and blood products in Ethiopia. Since 2004, funding from the United States President's Emergency Plan for AIDS Relief (PEPFAR) through the Centers for Disease Control (CDC) has supported these efforts [7]. The Ethiopian national blood bank manages the donation of blood on a voluntary

basis, as per the recommendation of the World Health Organization. Other types of blood donation approaches are banned in Ethiopia and are not used in clinical practice [8].

Blood is an indispensable component of human life and cannot be replaced by any other substance [6]. Donated blood can be a life-saving resource for individuals who have suffered from substantial blood loss due to severe accidents, obstetric and gynecological hemorrhages, surgeries, or stem cell transplants, as well as those with symptomatic anemia resulting from medical or hematological conditions or cancers [9]. Despite the critical need for blood, blood services worldwide are facing shortages [6].

The demand for blood is increasing at an alarming rate, and the current levels of blood donation are insufficient to meet this demand. Globally, approximately 107 million units of blood donations are collected each year, with nearly 50% of these donations coming from high-income countries that account for only 15% of the world's population [9]. About 10,000 blood centers across 168 countries report collecting a total of 83 million donations, with collection rates varying according to income group [10].

Although 80 million units of blood are donated annually worldwide, the need for safe blood is particularly high in Sub-Saharan Africa (SSA), where only two million units are donated. This means that only around 15% of the estimated need for 18 million units of safe blood per year is met [11]. In low- and middle-income countries, the median annual donation per blood center is 3,100, compared to 15,000 in high-income countries. High-income countries also have a higher median blood donation rate of 39.2 donations per 1000 population, compared to 12.6 in middle-income countries and 4.0 in low-income countries [10].

In Ethiopia, like many other developing countries, there is a significant shortage of safe blood supply. The national requirement for blood in Ethiopia ranges from 80,000 to 120,000 units per year, but only 43% is collected, indicating a gross inadequacy and inequity in the blood supply system [12]. Ethiopia faces high rates of maternal mortality (676/100,000) and motor accidents (ranking among the top ten countries in the world), as well as a large non-immune population for malaria. Despite these challenges, only 24,000 units of blood were collected in 2004, equivalent to just 0.3 units per 1000 people. Of these, 71% were collected from Addis Ababa, leaving a severe shortage of blood supplies for the vast majority of the population (around 96%) residing outside the capital [13].

Research has identified various reasons why people do not donate blood, including a lack of awareness, concerns about their own health status, not being approached to donate, financial constraints, and fear of needles or discovering their sero-status. While many studies have explored people's knowledge, attitudes, and practices related to blood donation, motivating individuals to donate remains a challenge [12]. To help address this issue, health workers are encouraged to lead by example and donate blood themselves, thereby setting a positive example for the public. With this in mind, a study was conducted to assess the knowledge, attitudes, and practices related to blood donation among health professionals in Dire Dawa city administration and identify factors that may influence their decision to donate.

2. Methods

2.1. Study design, setting and period

A cross-sectional study was conducted from September 1 to October 30, 2023, in Dire Dawa city administration, located in the eastern part of Ethiopia approximately 517 km from the capital Addis Ababa. According to the 2012 E.C figure from the Central Statistical Agency (CSA) of Ethiopia, the city administration has a total population of 506,639, consisting of 185,377 males and 184,264 females [14].

The study focused on healthcare workers in six hospitals (two governmental and four private) and was conducted in Dire Dawa Referral Hospital (DCRH) and Delt General Hospital (DGH). DCRH is a government hospital located in the northeast of Dire Dawa city and established in 1952 E.C. It has different departments and wards, including pharmacies, laboratories, medical and surgical wards, maternal child health, and TB clinic, with around 359 health professionals working in various departments such as physicians, nurses, ophthalmology, laboratory pharmacy, anesthesia, radiology, and physiotherapy. The hospital provides teaching and referral services and is open 24 hours for emergency services. DGH is one of the private hospitals in Sabian, Goro, with 131 healthcare workers working in different departments and is also open 24 hours for emergency services. In total, there are approximately 1163 healthcare workers working in private and government hospitals in Dire Dawa city administration, including those in the study hospitals. Data for this study were obtained from the Dire Dawa City Administration Health Bureau, DCRH Human Resource Management Office, and Medical Service Directorate of Delt General Hospital.

2.2. Study Participants

The source population for this study was all healthcare workers working in both public and private hospitals in Dire Dawa city administration, Eastern Ethiopia, while the study population consisted of the randomly selected healthcare professionals working in the selected hospitals during the data collection period.

2.3. Eligibility Criteria

This study included all healthcare workers with more than 6 months of work experience who were working in randomly selected hospitals in Dire Dawa city administration during the study period, except for those who were critically ill and unable to respond during data collection.

2.4. Sample Size Determination and Sampling Procedures

The sample size for this study was determined using the Single Population Proportion formula, which took into account several assumptions based on data obtained from previous studies. Specifically, the knowledge level of students at Addis Ababa University's College of Health Sciences and Medicine was found to be 83.7%, with a sample size of 210. The attitude level was 68%, with a sample size of 335, and the practice level was 23.4%, with a sample size of 276 [15]. Additionally, data from another study conducted among healthcare providers in Addis Ababa health facilities in Ethiopia was used to inform the sample size calculation. This study found knowledge levels of 72.7%, attitude levels of 81.7%, and practice levels of 32.6%, with corresponding sample sizes of 305, 230, and 337, respectively.

In order to enhance the study's statistical power, a maximum sample size of 335 was utilized, based on the prevalence rate of attitude (68%) obtained from a previous study conducted on health science students at Addis Ababa University [16]. A confidence interval of 95% (z=1.96) and a margin of error of 5% (d=0.05) were employed to calculate the minimum sample size using a single proportion estimate.

Where, n=minimum sample size required for the study, Z=standard normal distribution (Z=1.96) with confidence interval of 95% and α=0.05, P=prevalence/ population proportion (p=0.68), d= margin of error (d=0.05)

Therefore: - n=, n = 335; Since our source population is less than 10,000, we used the correction formula: Sample population (335 / (1+ 335/1163) = 259.5 ~ N= 260; after adding non-response rate of 10%, the final sample size =260 + 26, the final sample size was N_f = 286.

To ensure a representative sample, the study utilized a sampling procedure in Dire Dawa city Administration, which has a total of six hospitals (two government and four private). The author selected two hospitals, DCRH and DGH, using a lottery method (SRS) representing 30% of the total hospitals. The sample size of 286 was proportionally allocated to these two hospitals and study subjects were selected through stratified sampling based on their department, including Physicians, Nurses, Pharmacy, Laboratory, Anesthesia, Radiology, and Physiotherapy. Proportional allocation was used to select the sample from each department based on the number of professionals in each department. Participants were then chosen from each department using a lottery method (SRS), and the questionnaire was distributed until the calculated sample size was reached.

2.5. Study Variables

The outcome variable of the study is Knowledge, Attitude and Practice of healthcare workers towards blood donation and independent variables were Socio-demographic characteristics like: Age, Sex, Marital status, Religion, Level of Education; Profession; Department; Length of service as a health professional; Availability of blood donation service with in the facility; Motivation by previous volunteers / colleagues; Exposure to mass media about blood donation; History of previous HIV test.

2.6. Operational Definition

Healthcare Professional: a person who provides healthcare services, including preventive, curative, promotional, or rehabilitative care to individuals or communities [5].

Level of knowledge: refers to the extent of understanding that healthcare workers have about blood donation. The knowledge level was assessed using ten questions, and those who scored below the 50th percentile was categorized as having poor knowledge, while those who scored at or above the 50th percentile was categorized as having good knowledge [15].

Level of attitude: refers to the intention of respondents towards blood donation, and it was assessed using seven questions. Those who scored below the 50th percentile was categorized as having a poor attitude, while those who scored at or above the 50th percentile (score of 4 or more) was categorized as having a good attitude towards blood donation [15].

Practice of blood donation: Practice of blood donation refers to whether an individual has ever donated blood in their lifetime. Those who have donated blood at least once were categorized as having good practice, while those who have never donated blood were categorized as having poor practice towards blood donation [15].

Paid or remunerated donors: are individuals who give blood in exchange for money or other forms of payment [5].

2.7. Data Collection Tools and Procedures

Data were collected by self-administered questionnaire by using structured, pre-tested English version questionnaire. Close ended structured self-administered questionnaire was used and the questionnaires are prepared in English. The items are developed based on the findings of previous similar study [15]. Vagueness and logical flow of the questions was corrected. The data collector facilitated data collection.

2.8. Data Quality Control

Before actual data collection, the questionnaire was adapted and assessed for reliability. It was then translated into Amharic, one of the local official languages, by a language expert. The Amharic version was translated back into English by another language expert to ensure consistency. Data collectors received brief orientations on the assessment tools, and a pretest was conducted on 5% of the sample size in public hospitals not included in the study site. The pretest results were not included in the final analysis. Investigators provided supervision during data collection to ensure accuracy and clarity. Incomplete data was not entered into Epi Info version 7.0, and data clean-up and cross-checking were conducted before analysis.

2.9. Data Processing and Analysis

Data were coded, edited, and then entered and cleaned using Epi version 7 and exported to Statistical Package for Social Sciences (SPSS) software version 26. The association between independent factors and the outcome variable was determined by bivariable and multivariable logistic regression. Bivariate analysis was used to evaluate the association between the independent and the outcome variable. Variables with a p-value less than 0.25 in the bivariate logistic regression analysis were considered for multivariable analysis. After checking for multicollinearity, multivariable analyses were performed to adjust for confounders and to produce significant predictors. Odds ratios and their 95% Confidence Intervals were computed and Variables which had P value of < 0.05 with 95%CI were used to express the statistical significance of the variables.

3. Results

3.1. Baseline Socio Demographic Characteristics of Study Participants

The survey involved 286 healthcare workers, and all of their completed questionnaires were included in the analysis, resulting in a response rate of 100%. The age range of the participants was 21-47 years, with a mean age of 30.33 years and a standard deviation of 4.765 years. Of the total number of participants, 148 (51.7%) were female and 138 (48.3%) were male. The majority of respondents, 139 (48.6%), were single, and the largest professional group represented was nurses, with 208 (72.7%) respondents identifying as such (Table 1).

Table 1: Socio-demographic characteristics of healthcare workers in Dire Dawa City Administration, Eastern Ethiopia, 2023 (n=286).

Variables	Response Category	Frequency (%)
Age Groups	21-25	30(10.5)
	26-30	139(48.6)
	31-35	70(24.5)
	36-40	40(14.0)
	>40	7(2.4)
Sex	Male	138(48.3)
	Female	148(51.7)
Marital Status	Married	132(46.2)
	Single	139(48.6)
	Others (divorced & widowed/er)	15(5.2)
Qualification	Diploma	190(66.4)
	1st degree	76(26.6)
	2nd degree and above	20(7.0)
Religion	Orthodox	92(32.2)
	Muslim	140(49)
	Catholic	6(2.1)
	Protestant	47(16.4)
Work Experience (year)	0-2	38(13.3)
	2-4	64(22.4)
	4-6	65(22.7)
	6-8	38(13.3)
	>8	81(28.3)
Department	Physician	27(9.4)
	Nursing	20(72.7)
	Laboratory	19(6.6)
	Pharmacy	16(5.6)
	Anesthesia	8(2.8)
	Physiotherapy	8(2.8)
Monthly Income Groups (ETB)	4000-6000	127(44.4)
	6001-8000	74(25.9)
	80001-10000	76(26.6)
	>10000	9(3.1)

3.2. Level of Knowledge on Blood Donation among Healthcare Workers

A series of questions were used to evaluate the knowledge level of the participants. Out of the 286 healthcare workers, 280 (97.9%) demonstrated good knowledge of the common blood group types, and 248 (86.7%) were aware of their own blood groups. The distribution of blood

groups among the respondents was as follows: A Rh positive (17.5%), A Rh negative (6.3%), B Rh positive (10.8%), B Rh negative (4.5%), AB Rh positive (4.2%), AB Rh negative (0.3%), O Rh positive (26.2%), and O Rh negative (16.8%). The majority of participants, 208 (72.7%), were aware of the risk of infection transmission through transfusion, including HIV (99.5%), HBV (91.8%), HCV (85.5%), Syphilis (65.4%), Malaria (73.1%), and CMV (64.9%).

When asked about the minimum blood donation frequency, 253 (88.5%) responded every three months, while only a small percentage reported monthly (1.7%), every six months (8.4%), annually (1.0%), or weekly (0.3%). Regarding the volume of blood collected in each process, 264 (92.3%) knew it to be <500 mL, while 14 (4.9%) believed it to be between 500-1000 mL, and 8 (2.8%) were unsure of the amount. In terms of eligibility criteria for blood donors, 216 (75.6%) knew that men aged 18-60 years and women aged 18-60 years were eligible, and 272 (95.0%) knew that the donor must be healthy. The overall level of knowledge was determined by adding up the correct answers for each participant, and it was found that 223 (78.0%) had good knowledge (scored above the 50th percentile of correct answers), while 63 (22.0%) had poor knowledge (did not achieve the 50th percentile of correct answers) (Table 2).

Table 2: Level of knowledge on blood donation among healthcare workers in Dire Dawa City Administration, Eastern Ethiopia, 2023 (n=286).

Knowledge Questions	Response Category	Frequency (%)
Knowledge of the common blood groups	Yes	280(97.9)
	No	6(2.1)
Knowledge of your blood group	Yes	248(86.7)
	No	38(13.3)
Blood transfusion can bring infection	Yes	208(72.7)
	No	78(27.3)
Diseases which are transmissible by blood Transfusion	HIV	207(72.4)
	HBV	191(66.8)
	HCV	182(63.6)
	Syphilis	136(47.6)
	Malaria	152(53.2)
	CMV	56(19.6)
How often an individual can donate blood	Weekly	1(0.3)
	Monthly	5(1.7)
	Every 3 Month	25(88.5)
	Every 6 Month	24(8.4)
	Annually	3(1.0)
Who should donate blood	Men 18-60 yrs.	267(93.3)
	Women 18-60 yrs.	269(94.1)
	Healthy	286(100)
Who should Not donate blood	Young <18 yrs.	262(91.6)
	Old >60 yrs.	269(94.1)
	Diseased	278(97.2)
	Vulnerable	213(74.5)
What volume of blood is collected during each donation	<500 mL	264(92.3)
	500-1000 mL	14(4.9)
	I don't know	8(2.8)

What is the duration of a donation process	<20 minute	209(73.1)
	20-60 minute	41(14.3)
	I don't know	36(12.6)

3.3. Blood Donation Knowledge Associated Factors among Healthcare Workers

Bivariable and multivariable analyses were conducted to identify factors associated with the healthcare providers' level of knowledge. Among the sociodemographic factors, only length of service as a healthcare provider and motivation by others to donate blood were found to be statistically significant predictors of knowledge of blood donation. Healthcare workers with 6-8 years of work experience as healthcare providers were seven times more knowledgeable than those with over 8 years of experience [AOR=7.031; 95% CI=1.665-29.696]. Additionally, healthcare workers who were motivated by others to donate blood were twice as knowledgeable as those who were not [AOR=2.443; 95% CI=1.166-5.119] (Table 3).

Table 3: Logistic Regression on knowledge level of healthcare workers towards blood donation in Dire Dawa City Administration, Eastern Ethiopia, 2023 (n=286).

Variables	**Response Category**	**Knowledge Level**		**95% CI**	
		Good	**Poor**	**COR**	**AOR**
Age	21-25	18	12	1	1
	26-30	105	34	4.000(0.426, 37.554)	1.289(0.355, 4.688)
	31-35	59	11	1.943(0.226, 16.713)	1.032(0.185, 5.746)
	36-40	35	5	1.119(0.122, 10.225)	0.678(0.447, 9.709)
	>40	6	1	0.857(0.085, 8.679)	0.545(0.010, 29.753)
Gender	Male	114	24	1.700(0.959, 3.012)	1.323(0.656, 2.668)
	Female	109	39	1	1
Marital Status	Married	114	18	2.297(1.232, 4.285)	0.813(0.331, 1.995)
	Single	102	37	5.278(1.458, 19.110)	5.321(0.820, 34.531)
	Others (divorced & widowed)	7	8	1	1
Qualification	Diploma	135	55	0.249(0.108, 0.576)	8.374(0.162, 2.143)
	1st degree	69	7	0.1649(0.021, 1.269)	2.801(3.008, 9.010)
	2nd degree & above	19	1	1	1
Length of service as a health worker (year)	05-1	23	15	5.951(2.239, 15.820)	3.040(0.398, 23.220)
	2-4	49	15	2.793(1.101, 7.089)	2.076(0.339, 12.719)
	4-6	52	13	2.281(0.882, 5.898)	2.016(0.415, 9.801)
	6-8	26	12	4.212(1.549, 11.452)	7.031(1.665, 29.696)
	>8	73	8	1	1
Monthly Income (ETB)	4000-6000	89	38	0.635(0.325, 1.242)	0.798(0.555, 1.343)
	6000-8000	59	16	0.315(0.142, 0.695)	0.876(0.421, 3.001)
	8000-10000	67	9	0.135(0.125, 3.242)	1.688(1.113, 6.092)
	>10000	8	0	1	1
Mass Media Exposure	Yes	209	55	2.171(0.867, 5.438)	1.994(0.625, 6.360)
	No	14	8	1	1
HIV test in the past	Yes	206	44	5.233(2.520, 10.867)	2.286(0.860, 6.076)
	No	17	19	1	1
Motivation by someone to donate blood	Yes	163	24	4.415(2.451, 7.951)	2.443(1.166, 5.119)
	No	60	39	1	1

3.4. Level of Attitude Towards Blood Donation Among Healthcare Workers

Of all the survey respondents, 96.9% (277 individuals) believed that blood donation is good, while only 0.3% (1 individual) believed it to be bad. Voluntary donation was considered the best source of donors by 84.3% (412 individuals), while replacement donors were preferred by 5.2% (15 individuals), and remunerated (paid) donors were preferred by only 1.7% (5 individuals). Self-donation was preferred by 4.5% (13 individuals), and 4.2% (12 individuals) had no knowledge of it. Of the respondents, 40.2% (115 individuals) believed that something could happen to a donor, while 15.8% (43 individuals) believed that the donor could contract an infection, 79.7% (228 individuals) believed that the donor could become temporarily weak, and 5.4% (15 individuals) believed that the donor could fall sick.

A total of 82.9% (237 individuals) of respondents believed that patient relatives should be asked to donate blood, while 91.6% (262 individuals) encouraged their families and relatives to donate, and 90.6% (259 individuals) were willing to be reminded or called upon to donate. The overall attitude towards voluntary blood donation was assessed by summing up the correct answers to individual questions, and it was found that 79.2% (227 individuals) had a positive attitude towards blood donation, while 20.7% (59 individuals) had an unfavorable attitude towards blood donation (Table 4).

Table 4: Attitude of health workers towards blood donation in Dire Dawa City Administration, Eastern Ethiopia, 2023 (n=286).

Attitude Questions	Response Category	Frequency (%)
What do you think about blood donation?	Good	277(96.9)
	Neutral	8(2.8)
	Bad	1(0.3)
What do you think is the best source of blood donation?	Voluntary	241(84.3)
	Replacement	15(5.2)
	Remunerated	5(1.7)
	Self-donor	13(4.5)
	I don't know	12(4.2)
Can something harmful happen to a blood donor during or after blood donation	Yes	115(40.2)
	No	125(43.7)
	I don't know	46(16.1)
What can happen to a blood donor during or after donation?	Contract infection	43(15.0)
	Temporary weakness	228(79.7)
	Fall sick	15(5.4)
Should patient relatives be asked to donate?	Yes	237(82.9)
	No	8(2.8)
	I don't know	41(14.3)
Do you encourage relatives to donate?	Yes	262(91.6)
	No	24(8.4)
Will you donate if called upon or reminded to do so?	Yes	259(90.6)
	No	27(9.4)

3.5. Blood Donation Attitude Associated Factors Among Healthcare Workers

The attitude of health workers towards blood donation was found to be significantly associated with several sociodemographic factors, including length of service as a health worker, exposure to mass media information about blood donation, motivation by others to donate, and past HIV testing. Health workers with 6-8 years of service were 9 times more likely to have a positive attitude towards blood donation compared to those with more than 8 years of service (AOR=9.128; 95%CI=1.666-5.023). Similarly, those with 6 months to 1 year of work experience were 1.8 times more likely to have a positive attitude than those with over 8 years of experience (AOR=1.844; 95%CI=0.179-19.047). Other significant factors included exposure to mass media information about blood donation, motivation by others to donate, and past HIV testing, which were associated with 3.7, 2.5-, and 4.9-times higher likelihood of having a positive attitude towards blood donation, respectively (Table 5).

Table 5: Logistic Regression on factors associated with attitude of healthcare workers towards blood donation in Dire Dawa City Administration, Eastern Ethiopia, 2023 (n=286).

Characteristics	Response Category	Attitude Level		95% CI	
		Good	Poor	COR	AOR
Age	21-25	19	11	0.559(0.242, 1.292)	1.371(0.302, 6.223)
	26-30	105	34	4.000(0.426, 37.554)	0.549(0.079, 3.805)
	31-35	61	9	1.943(0.226, 16.713)	0.887(0.051, 15.280)
	36-40	35	5	1.119(0.122, 10.225)	0.716(0.107, 6.165)
	>40	7	0	1	1
Gender	Male	114	24	1	1
	Female	113	35	0.680(0.380, 1.215)	0.875(0.405, 1.889)
Marital Status	Married	114	18	1	1
	Single	104	35	0.158(0.021, 1.193)	0.079(0.003, 2.006)
	Others (divorced & widowed)	9	6	0.908(0.046, 5.775)	0.236(0.009, 7.236)
Qualification	Diploma	138	52	0.227(0.093, 0.555)	1.467(0.452, 2.013)
	1st degree	70	6	0.177(0.023, 1.373)	0.385(0.005, 0.119)
	2nd degree & above	19	1	1	1
Length of service as a health worker (year)	0.5-1	25	13	0.490(0.198, 1.212)	1.844(0.179, 19.047)
	2-4	51	13	0.577(0.238, 1.397)	1.497(0.192, 11.670)
	4-6	50	15	0.783(0.297, 2.067)	3.008(0.487, 18.564)
	6-8	27	11	0.182(0.065, 0.507)	9.128(1.666, 5.023)
	>8	74	7	1	1
Department	Physician	26	1	1	1
	Nursing	157	51	0.269(0.015, 4.867)	3.819(0.215, 6.778)
	Laboratory	18	1	2.274(0.273, 18.925)	0.478(0.012, 8.429)
	Pharmacy	13	3	0.389(0.021, 7.111)	1.081(0.042, 2.863)
	Physiotherapy	6	2	1.615(0.140,18.581)	4.129(1.387, 2.297)
	Anesthesia	7	1	2.333(0.167, 32.584)	2.011(0.064, 6.337)
Monthly Income (ETB)	4000-6000	91	36	0.685(0.349, 1.343)	5.046(0.043, 1.865)
	6000-8000	59	16	0.256(0.108, 0.611)	0.982(0.712, 9.041)
	8000-10000	69	7	0.116(0.684, 1.416)	0.774(0.332, 1.214)
	>10000	8	0	1	1

Mass Media Exposure	Yes	214	50	2.963(1.200, 7.317)	3.796(1.103, 10.968)
	No	13	9	1	1
HIV test in the past	Yes	212	38	7.811(3.700, 16.488)	4.927(1.700, 2.280)
	No	15	21	1	1
Motivation by someone to donate blood	Yes	164	23	4.075(2.240, 7.413)	2.535(1.120, 5.736)
	No	63	36	1	1

3.6. Level of Practice on Blood Donation among Healthcare Workers

Out of all the participants, 91 (31.8%) had donated blood before, with 31 (10.8%) donating once, 44 (15.4%) donating 2-3 times, and 16 (5.6%) donating more than three times. The majority of donors, 83 (29.0%), donated voluntarily, while 7 (2.4%) donated for a friend or relative, and 1 (0.3%) donated to know their screening status. On the other hand, 195 (68.2%) had never donated blood in their lifetime. The reasons for non-donation included 105 (36.7%) not being approached to donate, 24 (8.4%) needing to donate for relatives or friends in the future, 20 (7.0%) believing that donated blood may be sold, 15 (5.2%) having a fear of needles, 14 (4.9%) being unfit to donate, 12 (4.2%) having a fear of knowing their screening status, and 2 (0.7%) citing religious reasons against it (Table 6).

Table 6: Blood donation practice among healthcare workers in Dire Dawa City Administration, Eastern Ethiopia, 2023 (n=286).

Practice Questions	Response Category	Frequency (%)
Have you ever donated blood in your life	Yes	91(31.8)
	No	195(68.2)
If yes, how often do you donate	1 time	31(10.8)
	2-3 times	44(15.4)
	>3 times	16(5.6)
Reason for donation	Voluntarily	83(29.0)
	To Know Screening status	1(0.3)
	Friend/Relative needed blood	7(2.4)
Reason for non-donation by non-donors	Religion	2(0.7)
	Need to donate to friends / relatives in the feature	24(8.4)
	Fear of knowing my status	12(4.2)
	Unfit to donate	14(4.9)
	Not approached to donate	105(36.7)
	Fear of needles	15(5.2)
	Donated blood may be sold	20(7.0)
	No response	3(1.0)

3.7. Factors Associated with Practice of Blood Donation

Only two variables, gender and qualification, were found to have a statistically significant association with healthcare workers' practice of blood donation in the multivariate logistic regression analysis. Male respondents were 2.1 times more likely to practice blood donation than female respondents [adjusted odds ratio (AOR) = 2.153; 95% confidence interval (CI) = 1.127-4.111]. Additionally, healthcare workers with a second degree or higher qualification

were 82.7% more likely to have a practice of blood donation than those with a diploma [AOR = 0.173; 95% CI = 0.097-0.311] (Table 7).

Table 7: Logistic Regression on factors associated with practice of healthcare workers towards blood donation in Dire Dawa City Administration, Eastern Ethiopia, 2023 (n=286).

Variables	Response Category	Practice Level		95% CI	
		Yes	No	COR	AOR
Age	21-25	7	23	1	1
	26-30	35	104	2.2464(0.441,13.755)	0.286(0.020, 4.063)
	31-35	28	42	2.229(0.475, 10.499)	0.383(0.043, 3.428)
	>=36	21	26	2.042(0.181,5.415)	1.372(0.193, 9.643)
Gender	Male	55	83	2.062(1.242, 3.423)	2.153(1.127, 4.111)
	Female	36	112	1	1
Marital Status	Married	50	82	1.812(1.077, 3.047)	0.923(0.387, 2.200)
	Single	35	104	1.067(0.297, 3.830)	0.695(0.118, 4.078)
	Others*	6	9	1	1
Qualification	Diploma	35	155	0.173(0.097, 0.311)	0.173(0.097, 0.311)
	1st degree	43	33	0.176(0.061, 0.504)	0.176(0.061, 0.504)
	2nd degree and above	13	7	1	1
Length of service as a health worker (year)	0.5-1	10	28	1	1
	2-4	14	50	1.276(0.501, 3.246)	1.628(0.277, 9.576)
	4-6	16	49	1.094(0.437, 2.735)	4.492(1.020, 19.795)
	6-8	13	25	0.687(0.256, 1.839)	3.688(1.118, 12.168)
	>8	38	43	0.404(0.174, 0.940)	2.167(0.747, 6.288)
Monthly Income (ETB)	4000-6000	27	100	1	1
	6000-8000	22	53	6.173(1.387, 27.476)	0.974(0.105, 9.072)
	8000-10000	37	39	4.015(0.882, 18.271)	1.204(0.145, 10.013)
	>10000	5	3	1.757(0.392, 7.876)	1.042(0.143, 7.619)
Mass Media Exposure	Yes	88	176	3.167(0.913, 10.989)	3.532(0.868, 14.383)
	No	3	19	1	1
HIV test in the past	Yes	88	162	5.975(1.782, 20.039)	3.505(0.809, 15.189)
	No	3	33	1	1
Motivation by someone to donate blood	Yes	72	115	2.636(1.475, 4.711)	1.634(0.790, 3.378)
	No	19	80	1	1

*Widowed and divorced

4. Discussion

The study revealed that 78.0% of healthcare workers had good knowledge about blood donation, which is comparable to similar studies conducted among students of Addis Ababa University CMHS 83% [15] and healthcare providers in Addis Ababa health facilities 72.7% [15]. However, this percentage is lower than the finding of a study conducted among healthcare workers of Tikur Anbessa specialized hospital 97.6% [16], which could be attributed to the higher involvement of healthcare providers from Tikur Anbessa specialized hospital in blood donation clubs. On the other hand, the finding of this study is higher than a study conducted among health science students of South India 42.7% [17] and regular students of Ambo University 40.4% [5], which could be due to the fact that students have less exposure and knowledge about blood donation compared to healthcare workers.

According to the study, 79.2% of healthcare workers exhibited a positive attitude towards blood donation. This percentage is lower than the results of a similar study conducted among healthcare workers at Tikur Anbessa Specialized Hospital, which found a prevalence of 98.3% [18]. This difference may be attributed to the availability of blood donation services within the hospital. However, the prevalence of favorable attitudes in this study is higher than that found in studies conducted among health science students at Addis Ababa University 68% [16] and regular students at Ambo University 47.4% [5]. The discrepancy could be due to the fact that the participants in those studies were students.

In this study, only 31.8% of healthcare workers reported having donated blood, which is lower than the rates found in similar studies conducted among physicians at the University of Benin Teaching Hospital in Nigeria 41.4% [19] and health professionals in Tigray regional state public hospitals 47.8% [15]. The difference may be due to the fact that the Nigerian study only included physicians, while health professionals in Tigray are more involved in blood donation clubs. However, the rate of blood donation among healthcare workers in this study is higher than that found among regular students at Ambo University 23.6% [17] and health science students at Addis Ababa University 23.4% [16]. This discrepancy may be explained by the fact that students have less exposure to blood donation than healthcare workers.

In this study, the primary reason reported by those who had donated blood was voluntary donation, accounting for 83 (29.0%) of the participants. This rate is lower than that found in similar studies conducted among physicians at the University of Benin Teaching Hospital in Nigeria 53.4% [14] and health professionals in Tigray regional state public hospitals40.2% [15]. The difference may be attributed to the fact that physicians in Nigeria and health professionals in Tigray have greater exposure to mass media campaigns promoting voluntary blood donation.

The study also found that 195 (68.2%) of participants had never donated blood, with the most common reason given being that no one had approached them to donate (36.7% or 105 participants). Other reasons included the need to donate for relatives or friends in the future (8.4% or 24 participants), selling donated blood (7.0% or 20 participants), fear of needles (5.2% or 15 participants), being unfit to donate (4.9% or 14 participants), fear of knowing their screening status (4.2% or 12 participants), and religious prohibition (0.7% or 2 participants). Notably, the proportion of individuals who cited not being approached to donate was higher in this study (36.7%) than in a similar study conducted among healthcare providers in Addis

Ababa health facilities 31.6% [18]. This difference may be due to a lack of information provided during blood donation drives.

According to this study, there were significant associations between knowledge of blood donation and certain sociodemographic factors such as length of service as a healthcare provider and motivation by others to donate blood. Healthcare workers who were motivated by others to donate blood were found to be twice as knowledgeable as those who were not motivated [AOR=2.443; 95%CI=1.166-5.119]. Additionally, healthcare workers with 6-8 years of work experience were found to be seven times more knowledgeable than those with more than 8 years of experience [AOR=7.031; 95%CI=1.665-29.696]. This finding contradicts a study conducted among healthcare providers in Addis Ababa health facilities, which found that those with 13 years or more experience was likely to have 13.5 times more knowledge than those with 1-6 years of experience [16]. The difference may be explained by the availability of blood donation services within the facility in Addis Ababa health facilities, which could create greater awareness and a more favorable attitude towards blood donation.

In this research, only the length of service for healthcare workers was found to be significantly linked to their attitudes toward blood. Healthcare workers with 6-8 years of service were 9 times more likely to have a positive attitude towards blood donation compared to those with over 8 years of service [AOR=9.128; 95%CI=1.666-50.023]. This contrasted with a study at Tikur Anbessa hospital, where health workers with 1-2 years of experience were 4 times more likely to have a positive attitude than those with over 5 years of experience [18]. This difference may be attributed to the active involvement of more healthcare workers in blood donation campaigns and clubs.

In this research, the practice of blood donation among healthcare workers was found to be significantly associated with their sex and qualification. Males were 2.1 times more likely to practice blood donation compared to females [AOR=2.153; 95%CI=1.127-4.111], which is consistent with a study conducted among health science students in South India [5]. This may be attributed to the fact that males are the predominant donors of blood, as there are certain circumstances such as lactation and pregnancy that may make females ineligible to donate. Additionally, healthcare workers with a second degree or higher qualification were 82.7% more likely to practice blood donation than those with a diploma [AOR=0.173; 95%CI= 0.097-0.311]. This finding contrasts with a study conducted among health workers in the Tigray region, where professionals with a second degree or higher were 69% more likely to participate

in blood donation compared to those with a diploma [15]. The difference may be explained by the fact that as the education level of healthcare workers increases, so does their knowledge, making them more inclined to donate blood.

5. Conclusion

The level of knowledge of health workers on blood donation is relatively high (78.0%) and significant percent of health workers in this study have good attitude towards blood donation (79.2%). length of service as a healthcare provider and motivation by others to donate blood were associated with the level of knowledge. length of service as a health worker, mass media exposure about blood donation, motivation by others to donate blood and HIV test in the past were associated with the level of attitude. The major reasons to donate and not to donate were voluntarily and not approached to donate respectively. Hence, in order to achieve better results, it is important to raise blood donation awareness among newly employed healthcare professionals about the importance of blood donation. Furthermore, it is essential to provide education on blood donation through various media platforms, including easily accessible social media channels.

Abbreviations

AIDS: Acquired Immune Deficiency Syndrome, AOR: Adjusted Odds Ratio, BP: Blood Pressure, CDC: Centers for Disease Control, CHB: Chronic Hepatitis B virus, CI: Confidence Interval, COR: Crude Odds Ratio, DCRH: Dilchora Referral Hospital, DGH: Delt General Hospital, KAP: Knowledge Attitude and Practice, MOH: Ministry Of Health, NRCS: National Red Cross Society, NBTS: National Blood Transfusion Service, RTA: Road Traffic Accidents, SSA: Sub-Saharan Africa, SGH: Sabian General Hospital, WHO: World Health Organization, WSUTRH: Wolaita Sodo University Teaching and Referral Hospital

Authors' Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Competing interests

The authors state that they have no competing interests

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Ethical Approval and consent to participate

In order to conduct this research, the authors tried to address the Declaration of Helsinki Ethical principles for medical research. Ethical clearance was obtained from the institutional review board (IRB) of Dire Dawa University before the start of the study. An official support letter was written to the selected Hospitals and permission for data collection was sought from the responsible authorities. Informed voluntary written and signed consent was obtained from all study participants prior to start data collection. Finally, all collected information was coded and locked in an isolated room before entering the computer and locked by password after entering the computer. The confidentiality of the information was kept throughout the study process and the information was used only for the study purpose.

Consent for publication

Not Applicable.

Availability of data and materials

Data will be available upon request from the corresponding author.

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