

Low Blood Donation Practice of Health Sciences College Students in Northeast Ethiopia: A Cross-Sectional Study

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Mekedes Dejene¹

Azeb Tefera¹

Abebe Dires¹

Sisay Gedamu²

Yemiamrew Getachew³

Sewunet Ademe²

¹Emergency Department, Dessie Referral Hospital, Dessie, Ethiopia; ²Department of Nursing, School of Nursing and Midwifery, College of Medicine & Health Sciences, Wollo University, Dessie, Ethiopia; ³Department of Community and Mental Health, School of Nursing and Midwifery, College of Medicine & Health Sciences, Wollo University, Dessie, Ethiopia

Introduction: Blood transfusion is a basic and an emergency intervention in health care facilities which has a great role in reducing significant morbidity and mortality. However, there is a major shortage of blood and blood products in developing countries including Ethiopia. This study aimed to assess practice of blood donation and associated factors among health science college students in Dessie town, northeast Ethiopia.

Methods: An institution-based cross-sectional study was conducted among health science college students from May to June 2019. A pre-tested and self-administered structured questionnaire was used for data collection. Multivariable logistic regression analysis model was applied to identify independent predictors of blood donation practice at the level of significance below 0.05.

Results: Overall, 12.4% (95% CI: 9.5–15.5) of participants had been donated blood at least once in their lifetime. However, 59.2% of participants have willingness to donate blood in the future. In this study, older age (≥ 25 years) (AOR=2.30, 95% CI: 1.18–4.46), had family history of blood transfusion (AOR=3.55, 95% CI: 1.71–7.36), had knowledge (AOR=2.09, 95% CI: 1.04–4.17) and favorable attitude (AOR=2.41, 95% CI: 1.01–5.75) about blood donation were significantly associated with practice of donating blood.

Conclusion: In this study, blood donation practice of health sciences college students was found to be low. Age, family history of blood transfusion, knowledge and attitude towards blood donation were independent predictors of blood donation practice. Therefore, Red Cross societies, Dessie town health office, health science colleges and other stakeholders should enhance the awareness of college students regarding the importance of donating blood.

Keywords: blood donation, college students, northeast Ethiopia

Introduction

Blood transfusions help to save millions of lives every year and support complex medical and surgical procedures.¹ It is a basic and an emergency intervention in health care facilities which has a significant role in reducing morbidity and mortality. In addition, blood has an essential life-saving role in maternal and childcare interventions that could occur in human made and natural disasters. However, in many countries there is no adequate supply of blood available to fulfill the demand.²

There was a marked difference in the accessibility of blood between high and low income countries. The average annual collection of blood per blood center was

Correspondence: Abebe Dires
Email abede9907@gmail.com

30,000 units of blood in high-income countries as compared to 3,700 in low-income countries.³ In principle, there are three types of blood donors. These are; replacement, paid, and voluntary donors.⁴ The World Health Organization (WHO) is recommending all countries should obtain their blood supplies from voluntary donors by the year 2020. But the majority of blood donation practices are replacement type of donation.⁵

From the 92 million units of blood collected annually, almost half was collected in high-income countries.³ Similarly, more than 34 million peoples were donated blood from 189 national societies.⁶ Collected bloods could be discarded due to different reasons. The WHO's global database on blood safety indicated that, about 1.6 million units of collected blood was discarded annually due to the presence of infections like HIV, hepatitis virus and syphilis.⁷

In developing countries, the habit of blood donation was much lower than that of high income countries.⁶ In sub-Saharan Africa, blood helps to reduce morbidity and mortality of young children and pregnant women in particular. However, many deaths could be prevented if national blood services and hospitals have adequate supplies of blood.⁸ From 2011 to 2014, the overall blood collections were increased by 19% among 14 African countries, and in Ethiopia the services was increased by 73.8%.⁹ The Ethiopian Red Cross Society (ERCS) is the first organization in establishing blood bank service in the country. After the federal ministry of health has taken over the service from ERCS in 2012, the rate of national blood collection was increased from 40,000 units of blood in 2011 to 88,000 in 2014 and the involvement of voluntary blood donors had been increased from 10% in 2011 to 70% in 2014.¹⁰ According to WHO, countries' blood transfusion service was recommended to be based on voluntary blood donors by 2020.¹¹

The global burden of injuries and death from road traffic accidents was increased, particularly in Africa.¹² The majority of deaths after traumatic injuries is as a result of hemorrhage.² In addition, hemorrhage has been identified as the leading cause of maternal mortality worldwide and in Ethiopia.^{13–18} Generally, 50–80% of all blood transfusions were given to treat patients with severe anemia as a result of hemorrhage and trauma.¹⁹ Thus, timely access to blood transfusion has a great role to reduce significant morbidity and mortality in health care facilities. Although the global need of blood supply has been increased progressively, there is still evidence of a shortage of

blood and blood products in developing countries including Ethiopia. In low income countries, lack of knowledge and poor attitude about donating blood were the major factors affecting blood donation practice.²⁰ To what extent eligible segments of the population in Ethiopia have donated blood is vital to enhance community awareness interventions which are essential to meet the demand for blood. In Ethiopia, numerous studies have been conducted regarding blood donation at community level. However, there are few studies about the practice of blood donation among health science college students.

This study aimed to assess blood donation practices of health science college students and any associated factors in Dessie town, northeast Ethiopia.

Methods and Materials

Study Design, Period and Setting

An institution-based cross-sectional study was conducted among health science college students in Dessie town, northeast Ethiopia from May to June 2019. Dessie town is located 523 kilometers (KM) far from Bahir Dar (Regional city of Amhara) and 401 KM northeast of Addis Ababa (the capital city of Ethiopia). The town has one public referral hospital and three private hospitals. The referral hospital is designed to serve up to 5,000,000 populations. There is one blood bank in the town that works in conjunction with the Red Cross society. There are four health science colleges in the town, with a total of 3,560 students. Nursing, midwifery, public health officers and medical laboratory were the main programs executed in those colleges.

Population

The source populations were all health science college students founded in Dessie town and the study populations were randomly selected health science college students during data collection period.

Sample Size

A single population proportion formula [$n = (Z a/2)^2 P(1-P)/d^2$] was used to estimate the sample size by considering the following assumptions: Proportion of 50%, 95% confidence level, 5% margin of error, and 10% non-response rate.²¹ Therefore, the final sample size was 423.

Sampling Technique and Procedure

From the four health science colleges found in Dessie town, the total number of students in each college was

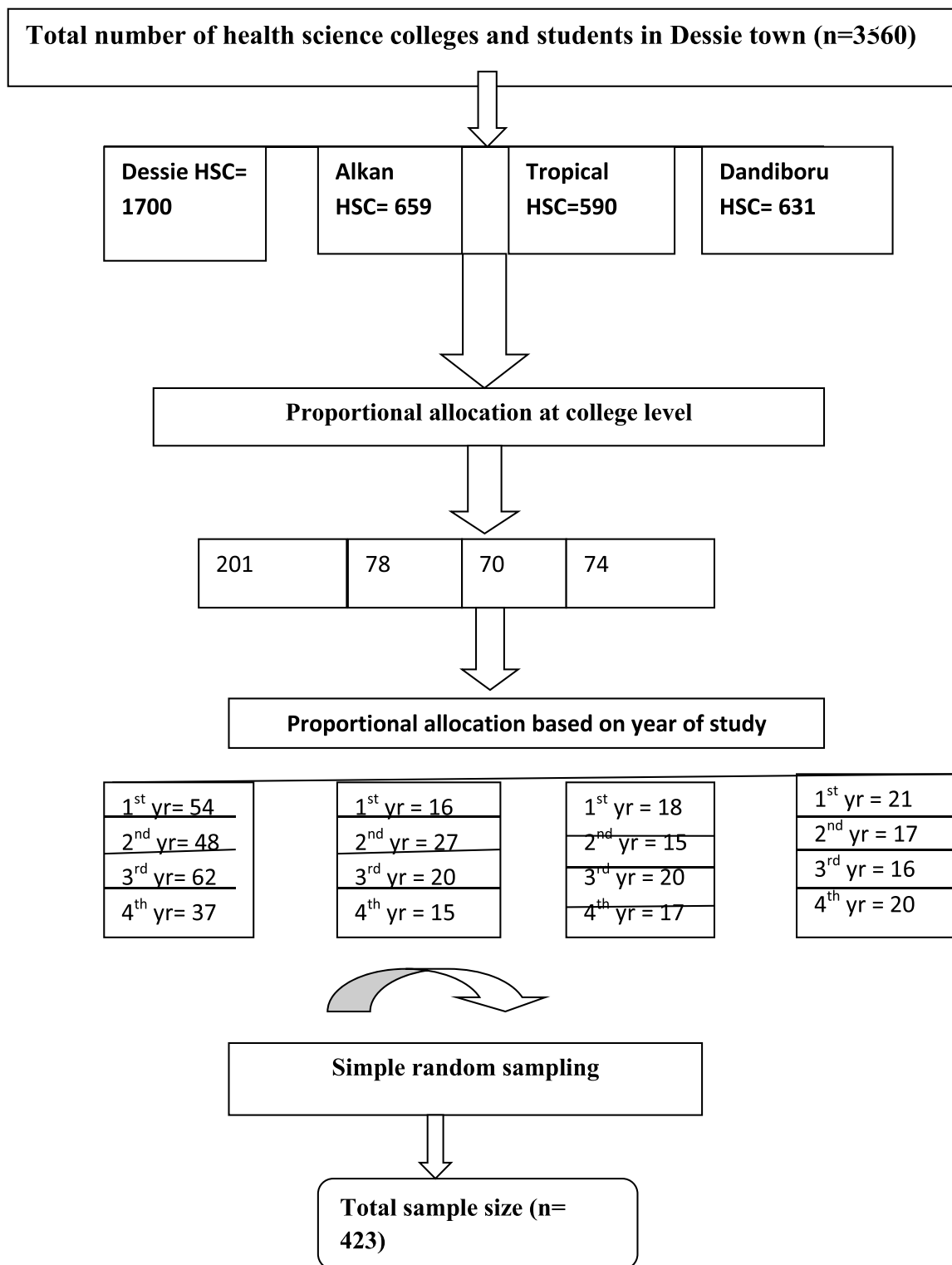


Figure 1 Sampling procedures on the practice of blood donation among health science college students of Dessie town, northeast Ethiopia, 2019. **Abbreviation:** HSC, health science college.

determined. Proportional allocation was made at the level of college and year of entry to select students. Finally, a simple random sampling technique was used to select study participants (Figure 1).

Data Collection Tool and Procedures

For data collection, self-administered structured questionnaire was used which was adopted from previous studies.^{21–24} Socio-demographic variables, questions assessing the knowledge, attitude and practice of students about blood donation were included in the questionnaire. In addition, participants' willingness to donate blood was also assessed ([Supplementary material](#)).

Data Quality Management

To maintain the quality of the data, four nurse data collectors and two public health officers as a supervisor were recruited and trained for two days regarding the objective of the study and other ethical issue. In addition, the data collection tool was pre-tested by assumption of 5% of the total sample size within one week prior to the actual data collection period in Wollo University health science students. Based on pre-test evaluation, the tool was modified and the necessary corrections were made. Finally, an organized and valuable tool was made ready and used for the actual data collection.

Operational Definitions

Practice of blood donation: Students who had donated blood at least once in his or her lifetime.

Knowledgeable about blood donation: Among knowledge assessing questions, students who score was greater than or equal to a mean value of 0.5 were considered knowledgeable. Whereas, those who scored less than the mean value 0.5 were not considered to be knowledgeable.

Favorable attitude towards blood donation: Those respondents who scored the mean value of 0.3 and above among attitude assessing questions.

Unfavorable attitude towards blood donation: Those respondents who had scored below the mean value of 0.3 answering attitude assessing questions.

Data Analysis

Data was entered using Epi-info version 7 and analyzed by SPSS (statistical package for social science) version 20. Data were reported using mean for continuous variables and proportions and tables were used to describe categorical variables. Bivariable and multivariable logistic analyses model were used with odds ratio and 95% confidence interval. In bivariable analysis, variables with p-value of 0.2 and below were entered into

multivariable analysis model. In multivariable analysis model, variables with p-value < 0.05 were considered statistically significant.

Results

Socio-Demographic Characteristics of Study Participants

In this study, 412 students were participated with response rate of 97.4%. The mean age of participant was 19.5 years and 62.6% were in the age group of 18–24 years. Overall, 55.6% of the participants were male, 64.8% were from an urban area, 36.9% were students of public health, and 28.9% were second year students ([Table 1](#)).

Table 1 Socio-Demographic Characteristics of Respondents for Practice of Blood Donation Among Health Science College Students in Dessie Town, 2019 (n = 412)

Variables	Frequency	Percent (%)
Age category in completed year		
18–24	258	62.6
≥25	154	37.4
Sex		
Male	229	55.6
Female	183	44.4
Religion		
Orthodox	186	45.2
Muslim	127	30.8
Protestant	99	24.0
Ethnicity		
Amhara	357	86.7
Oromo	28	6.8
Tigray	19	4.6
Others ^b	8	1.9
Original Residence		
Urban	267	64.8
Rural	145	35.2
Type of department		
Nursing	80	19.4
Public Health Officer	152	36.9
Medical Laboratory	101	24.5
Midwifery	79	19.2
Student's study Year		
First	107	26.0
Second	119	28.9
Third	96	23.3
Forth	90	21.8

Note: ^bAfar, Benishangul-Gumuz.

Respondents' Practice of Blood Donation and Related Factors

Among all participants, 5.6% had been transfused with blood and 23% had family history of blood transfusion. Of all respondents, 40.5% and 67.2% had knowledge and favorable attitude about blood donation, respectively. Overall, 12.4% (95% CI: 9.5–15.5) of participants had donated blood at least once in their lifetime, of which, 62.7% were donated voluntarily. Fear of health

Table 2 Respondents' Practice of Blood Donation and Related Factors Among Health Science College Students in Dessie Town, 2019 (n = 412)

Variables	Frequency	Percent (%)
History of being transfused with blood		
Yes	23	5.6
No	389	94.4
History of blood transfusion in the family		
Yes	95	23.1
No	317	76.9
Attitude towards blood donation		
Favorable	277	67.2
Unfavorable	135	32.8
Knowledge about blood donation		
Yes	167	40.5
No	245	59.5
Had donated blood previously		
Yes	51	12.4
No	361	87.6
Type of blood donation(n=51)		
Voluntary	32	62.7
Replacement	19	37.3
Reasons for not donated blood (n=361)?		
Fear of health problem after screening	142	39.3
Lack of information	114	31.5
Fear of pain	56	15.5
Fear of weight loss	33	9.1
Others*	16	4.6
Willingness to donate blood voluntarily in the future		
Yes	244	59.2
No	168	40.8

Note: *Lack of time, non-remuneration, I do not think I am fit to donate.

problems after screening (39.3%) and lack of information (31.5%) were the main reasons identified by non-blood donors. In this study, 59.2% of students are willing to donate blood voluntarily in the future (Table 2).

Factors Associated with Practice of Blood Donation

A total of eleven independent variables were included in the bivariable logistic regression analysis. Those variables associated with the dependent variable at p-value of less than 0.2 were subjected into multivariable logistic analysis. Thus, after adjusted for confounding variables in multivariable analysis; older age (≥ 25 year) (AOR=2.30, 95% CI: 1.18–4.46), those who had a family history of blood transfusion (AOR=3.55, 95% CI: 1.71–7.36), knowledge (AOR=2.09, 95% CI: 1.04–4.17), and a favorable attitude (AOR=2.41, 95% CI: 1.01–5.75) about blood donation were significantly associated with the practice of donating blood (Table 3).

Discussion

Blood transfusion is a basic and vital tool in emergency lifesaving interventions. Globally, the need for blood and blood products has been increasing and evidence showed that the habit of donating blood in the population was not satisfactory. In our study, 12.4% of students had been donated blood at least once in their lifetime. This finding was comparable with a previously reported study done in Nigeria (15%).²⁵ However, it was higher compared to a study done in India (1.4%)²⁶ and it was lower compared to studies conducted in three settings of Ethiopia Ambo (23.6%),²⁷ Arsi (27.2%),²⁸ and Addis Ababa university students (24.3%).²⁹

It was also lower compared to studies done in Africa; Tanzania (30%),³⁰ Sudan (27%),³¹ Malaysia (29.7%),³² Nigeria (59.5%),³³ Nepal (28.5%)³⁴ as well as in three setting of India (38.4%),³⁵ (17.3%),³⁶ (23%),³⁷ and Saudi Arabia (19%).³⁸ This discrepancy could be due to difference in socio demography and economical characteristics of study participants and the study period.

WHO is recommending all countries should obtain their blood from voluntary blood donors.¹¹ In this study, of the total respondents who had been donated blood, about 62.7% were donated voluntarily. In Ethiopia, voluntary blood donation showed a significant increase in the past decade.¹⁰ Although the proportion of voluntary blood donors were moderate in the country, it is still not enough to meet the need required amount of blood so as to prevent the morbidity

Table 3 Bivariable and Multivariable Analysis for the Practice of Blood Donation Among Health Science College Students in Dessie Town, 2019 (n = 412)

Variables	Practice of Blood Donation		COR (95% CI)	AOR (95% CI)
	No (%)	Yes (%)		
Age (year)				
18–24	234(90.7)	24(9.3)	1	1
≥25	127(82.5)	27(17.5)	2.07(1.15–3.74)*	2.30(1.18–4.46)*
Sex				
Male	192(83.8)	37(16.2)	2.32(1.21–4.45)*	1.36(0.67–2.79)
Female	169(92.3)	14(7.7)	1	1
Residence				
Rural	136(93.8)	9(6.2)	1.000	1
Urban	225(84.3)	42(15.7)	2.82(1.33–5.97)**	1.34(0.55–3.26)
Ethnicity				
Amhara	313(87.7)	44(12.3)	0.98(0.12–8.19)	
Oromo	26(92.9)	2(7.1)	1.86(0.17–19.9)	
Tigray	15(78.9)	4(21.1)	0.53(0.04–6.83)	
Others	7(87.5)	1(12.5)	1.000	–
Religion				
Orthodox	160(86.0)	26(14.0)	2.13(0.89–5.11)	
Muslim	109(85.8)	18(14.2)	2.17(0.86–5.42)	
Protestant	92(92.9)	7(7.1)	1.000	1
Type of department				
Nursing	70(87.5)	10(12.5)	1.000	1
Health Officer	126(82.9)	26(17.1)	1.44(0.65–3.16)	1.05(0.55–3.79)
Medical laboratory	92(91.1)	9(8.9)	0.68(0.26–1.77)	0.47(0.25–2.83)
Midwifery	73(92.4)	6(7.6)	0.57(0.19–1.66)	0.16(0.45–5.94)
Year of study				
First	97(90.7)	10(9.3)	1.000	1
Second	99(83.2)	20(16.8)	1.96(0.87–4.40)	
Third	84(87.5)	12(12.5)	1.38(0.57–3.37)	
Forth	81(90.0)	9(10.0)	1.07(0.41–2.78)	
History of being transfused with blood				
Yes	16(69.6)	7(30.4)	3.43(1.33–8.79)*	2.51(0.81–7.79)
No	345(88.7)	44(11.3)	1	1
Family history of blood transfusion in the family				
Yes	68(71.6)	27(28.4)	4.87(2.63–8.92)***	3.55(1.71–7.36)**
No	293(92.4)	24(7.6)	1	1
Attitude towards VBD				
Favorable	233(84.1)	44(15.9)	3.43(1.51–7.88)**	2.41(1.01–5.75)*
Unfavorable	128(94.8)	7(5.2)	1	1
Knowledge about blood donation				
Yes	133(79.6)	34(20.4)	3.42(1.84–6.37)***	2.09(1.04–4.17)*
No	228(93.1)	17(6.9)	1	1

Notes: Asterisk shows significant associations at different P-value: 0.05–0.01*, 0.01–0.001**and < 0.001***.

and mortality of children and women, in particular. The most significant increases in the percentage of voluntary blood donation were reported in India, Bulgaria, Afghanistan, Belarus, Algeria, and Costa Rica.³

In our study, participants aged ≥ 25 years were 2.3 times more likely donated blood as compared to those who were found between 18 and 24 years. It was in line with the study done in Addis Ababa, Ethiopia.²⁹ The odds of blood donation practice was higher in those students who had family history of blood transfusion compared to those who had not family history. This was in line with the study done in Ambo, Ethiopia.²⁷ This could be explained by people voluntarily donating blood after experiencing a family member's health problems which required a blood transfusion. Furthermore, students who had knowledge about blood donation were twice as likely to donate blood compared to those who had no knowledge, which was similar to the studies done in Ambo, Ethiopia²⁷ and Ghana.²⁰ Students who had favorable attitudes towards blood donation were 2.4 times more likely to donate blood compared to their counterparts. In this study, 87.6% of participants had never donated blood and fear of health problems after screening and lack of information were the main reasons identified for not donating. However, a significant proportion of students are willing to donate blood in the future, which is an opportunity to increase the number of blood donors in the country.

A strength of this study is that we have assessed blood donation practices of health science college students who would be involved in direct patient care. The possible limitations of this study could be related to the nature of the cross-sectional study design used and there could be social desirability and recall bias. Additionally, since this study was carried out on selected health science college students of Dessie town, our findings may not be generalized to the overall college students of the town.

Conclusion

In this study, blood donation practices of health science college students was found to be low. Age, family history of blood transfusion, knowledge, and attitude towards blood donation were independent predictors of blood donation practice. Therefore, Red Cross societies, Dessie town health office, health science colleges and other stakeholders should enhance the awareness of college students regarding the importance of donating blood. Furthermore, frequent promotional campaigns should be conducted by media and health care providers.

Data Sharing Statement

The used data set and analyzed during this study are available from the corresponding author on reasonable request.

Ethical Approval and Consent

Ethical approval was obtained from ethical review committee of Wollo University, school of nursing and midwifery, department of nursing. Study participants were informed that participation was on a voluntary basis and they can leave the study at any time if they are not comfortable about the questionnaire. Verbal informed consent taken from study participants was approved by the Ethical Review Committee of Wollo University and that this study was conducted in accordance with the Declaration of Helsinki. Confidentiality was preserved for all data collected.

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Author Contributions

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

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The authors report no conflicts of interest for this work.

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